International Conference on Raw Materials to Processed Foods

RFOODSP

11-13 April 2018
Antalya - TURKEY

International Conference on RAW MATERIALS TO PROCESSED FOODS

11-13 April 2018, Spice Hotel, Antalya - Turkey

Book of Abstracts








Invited Speakers

Fereidoon Shahidi
Memorial University of Newfoundland

Apostolos Kiritsakis
Technological Educational Institution of Thessaloniki

Mohamed Bouaziz
University of Sfax

Adamo D. Rombolà
University of Bologna

Brijesh K. Tiwari
Agriculture and Food Development Authority in Ireland

Mohammed Farid
University of Auckland

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Welcome

Dear Colleagues and Friends,

It is a great privilege for us to invite you to the International Conference on Raw Materials to Processed Foods which will be held on 11-13 April 2018 in Antalya, Turkey. One of the aims of this multi-track event is to bring together leading academic scientists, researchers and scholars to present and discuss the most recent innovations and trends as well as to exchange and share their experiences and research results on all aspects of Food Science, Processing and Technology.

The Food and Agriculture industries effectuate the largest vital and economic sectors in the world. Therefore, the titles of Food Science, Processing and Technology continue to evolve by gaining importance daily as within these food processing is already a crucial field since the ancient times paving the way for humankind to lead a sedentary life and is also essential for supporting the civilization. Creating novel technologies and innovations in food science requires comprehensive knowledge about majors like biology, chemistry, physics and engineering sciences forming a multidisciplinary field. Thus the International Conference on Raw Materials to Processed Foods welcomes your ideas and researches of all related disciplines including Food Science and Technology, Fisheries Science, Nutrition Science, Animal Science, Veterinary Science, Horticulture, Agricultural and Food Biotechnology.

Your valuable scientific contributions are welcomed as oral or poster presentations on the following main themes:

- Health-relevant raw and processed food products
- Quality and safety of raw and processed foods
- Trends in new food product and technology development
- Food chemistry, hygiene and quality assessment of raw and processed foods
- Nutrients and nutritional assessment of raw and processed foods
- Instrumental and sensory analysis strategies in raw and processed foods
- Process design and practices applied from raw material to processed foods
- Medicinal and aromatic plants: raw material to essential oils
- Meat and seafood processing technology, quality and safety
- Physicochemical, microbiological and sensory properties of raw and processed meat, poultry, fish and other sea products
- Postharvest applications and technologies for raw materials

This unique event will be an academically valuable conference, with a scientific committee comprised of researchers from different universities and institutions of all over the world serving an opportunity to promote about international novel researches. Furthermore, participants will have the chance to meet relevant researchers and even to make new collaborations for future studies.

We would also like to invite you to experience the city of Antalya, one of the most attractive towns of Turkey with peerless Turkish hospitality on top of its historical richness and national beauties. Antalya being one of the fastest-growing cities, it offers you excitement and contrast as history and modernity. In addition, there will be no difficulty in accommodation and transportation as you can experience the excellent services of hundreds of five-star hotels and resorts and the city has an international airport with direct links to the major towns abroad.

You are cordially invited to submit an abstract to the "International Conference on Raw Materials to Processed Foods". The event will be hosted by Cukurova University and Adana Science and Technology University jointly. We look forward to meeting you for the conference in Antalya, a lovely town in the south of Turkey.

Kind regards,

Prof. Dr. Serkan SELLİ
Chair
Cukurova University

Prof. Dr. Haşim Kelebek
Co-Chair
Adana Science and Technology University

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Conference Programme

1st DAY – 11 April 2018 (WEDNESDAY)			
Hours	**Events / Venues**		
09.00-10.30	Registration / Lobby Hall		
10.30-10.45	Opening Ceremony - Dr. Serkan SELLİ - Dr. Haşim KELEBEK		
10.45-11.30	Plenary Session / Hall A **Dr. Mohammed FARID** *Innovations in the Thermal / Non-Thermal Processing of Food*		
12.30-13.30	Lunch		
13.30-14.00	Plenary Session / Hall A **Dr. Apostolos KIRITSAKIS** *Olive Oil as a Functional Food and the Effect of Processing Techniques on Quality*		
Concurrent session I (14.15-15.45)			
Room	Hall A	Hall B	Hall C
Chair	M. Farid	Dr. Z. Ayhan	Dr. B. K. Tiwari
14.15-14.30	*Detecting Adulteration of Extra Virgin Olive Oil by Chemometric Methods* **T. KECELI MUTLU**, A.S. COLAKOGLU	*Isolation and characterization of lactic bacteria from curdled milk having antimycotoxinogene activity* **M. KARA ALI**, A. AIT KAKI, S. BENHASSINE, F. BAHRI, N. KACEM CHAOUCHE	*Probiotic Set Yogurts Fortified with Fiber-Rich Persimmon and Apple Powders at Different Fat Ratios* O. B. KARACA, **I. B. SAYDAM,** M. GUVEN
14.30-14.45	*Determination of sterol composition of olive oil obtained from cv. Nizip Yaglik* **S. KESEN**	*Determination of The Bacterial Diversity of Fermented Foods By High-Throughput Sequencing of 16S Amplicons* **B. METIN**	*Enzyme-modified cheese technology and the production steps of enzyme-modified cheese with ripened white cheese flavor* **P. SALUM**, P. KENDIRCI, D. BAS, G. GOVCE, M. CAM, H. KELEBEK, Z. ERBAY
14.45-15.00	*Determination of Aroma Compounds using purge and trap extraction technique in Albanian cvs. Kalinjoti and Bardhi Tirana Olive Oils* **D. TOPI**, A. AMANPOUR, H. KELEBEK, S. SELLI	*Thermal inactivation of some pathogenic bacteria in broth and manti* **S. UZUNLU,** I. VAR	*Effect of inulin on physical properties of dried and reconstituted yoghurt* M. DEMIRAL, Z. GULSUNOGLU, **E. KOCER,** M. KILIC AKYILMAZ

Conference Programme

1st DAY – 11 April 2018 (WEDNESDAY)			
15.00-15.15	*Chemometric Analysis of Chemo-Optical Data for the Assessment of Olive Oil Blended with Hazelnut Oil* **P. KADIRO**GLU, F. KOREL, M. PAR*DO*	*Biocontrol of Postharvest Fungal Diseases of Fruit and Vegetables by Antagonistic Yeasts* **B. AGIR**MAN, E. CARSANBA, A. BEN GHORBAL, H. ERT*EN*	*Production of Yogurt by Adding the Maca (Lepidium meyenii) Powder and Propolis Extract* **B. I. OMUR**TAG, C. BILICI, S. KORKMAZ
15.15-15.30	*The Influence of Ozone Treatment on the Some Structural and Chemical Properties of Hazelnut Oil* **H. UZUN KARKA**, E. IBANOGLU	*Investigation of Some Microbiological Properties of Roasted Peanuts Purchased from Adana Province* **O. UCKUN**, I. VAR	*Comparison of The Residual Coagulant Activity in Different Blends of Calf Rennet and Camel Chymosin of White-Brined Cheese* **P. GUMUS**, A.A. HAYALOGLU
15.30-15.45	*Stabilization of emulsion of olive oil-in-water by ultrasound treatment* **U. B. YAVUZ**, M. KILIC AKYILMAZ	*Antioxidant and Antipyretic activity of methanolic extract of Marrubium vulgare located un Khenchela area from Algeria* **W. KARAALI**, S. IHOUAL, H. AGABA, M. BAHRI, N. ABIDLI	*GC-Olfactometric characterization of the potent aroma-active components in traditional Moroccan fermented milk: Lben* **S. TSOULI SARHIR**, A. AMANPOUR, S. SELLI, A. BOUSETA
15.45-16.00	Coffee Break		
16.00-16.30	Plenary Session / Hall A **Dr. Brijesh TIWARI** *Emerging Technologies for Sustainable Food Processing*		
Concurrent session II (16.45-18.00)			
Room	Hall A	Hall B	Hall C
Chair	Dr. G. Sumnu	Dr. G. Evrendilek	Dr. Z. Erginkaya
16.45-17.00	*Bio-Fungicidal Activity against Some Plant Pathogens of Endemic Pyrus serikensis Güner & Duman Leaf and Fruit Extract* **A. YAVUZ**, *A. ONARAN, Y. YANAR, H. GÜLER*	*Volatile and non-volatile components of Aesculus hippocastanum L. blossoms from Lithuania* **J. BUDIENE**, A. LINGYTE, A. JUDZENTIENE, A. LINKEVICIUTE, R. GARJONYTE	*Characterization of Bioactive Compounds and Antioxidant Potential of Fermented Beverage: Shalgam* H. KELEBEK, P. KADIROGLU, A. S. SONMEZDAG, **G. GUCLU**, O. KOLA, S. SELLI

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1st DAY – 11 April 2018 (WEDNESDAY)			
Concurrent session II (16.45-18.00)			
Room	Hall A	Hall B	Hall C
Chair	Dr. G. Sumnu	Dr. G. Evrendilek	Dr. Z. Erginkaya
17.00-17.15	*Comparison of Volatile Compounds of Lemon Balm (Melissa officinalis L.) with Two Different Extraction Methods* G. GUCLU, A. AMANPOUR, **T. OZKARA,** H. KELEBEK, O. ZANNOU, S. SELLI	*Changes in the in-mouth release of typical wine aroma compounds produced by oenological polyphenolic extracts during wine intake and their relationship with wine aroma perception* **M. ANGELES POZO BAYON**, M. PEREZ-JIMENEZ, C. CHAYA	*Changes in Total Anthocyanin Content, Degradation Index and Antioxidant Capacity at Grape Juice Concentrate Processing Steps* **I. T. OZEN**
17.15-17.30	*The Effects of Tuber Root of Maca (Lepidium Meyenii Walp.) Plant on Egg Production And Antioxidant Status of Hens* **S. KORKMAZ,** I. OMURTAG KORKMAZ, H. ESECELI, T. BILAL	*Effects of Pure and Mixed Autochthonous Torulaspora delbrueckii and Saccharomyces cerevisiae on Fermentation and Volatile Compounds of Narince Wines* E. ASLAN, **Z. D. ÇELIK**, T. CABAROĞLU	*Biotechnological production of fermented feed enriched with polyunsaturated fatty acids and beta-carotene for broiler chicken* **O. SLANY**, T. KLEMPOVÁ, T. SAHULČÍK, O. E. RENÉ, M. TARANDA, J. GARČÁROV, S. MARCINČÁK, M. ČERTÍK
17.30-17.45	*Determination of Behaviors of The Hydrophilic and Lipophilic Antibacterial Drugs in Skim Milk and Cream* **Z. OZDEMIR**, B. TRAS	*Effect of Triple Pot Still Distillation on the Volatile Compositions During the Raki Production* **M. DARICI**, D. BERGAMA, T. CABAROGLU	*Determination Anthocyanidin Profile and Antioxidant Capacity of Black Myrtle (Myrtus communis L.)* **S. AKSAY**, F. CINAR, R. ARSLAN, H. TOKBAS
17.45-18.00	*Optimization of the Parameters of Microwave (MAE) and Ultrasound Assisted (UAE) Extraction of Purple Basil Leaf Phenolics* **B. E. KOCAMAZ OZCAN**, O. SAGDIC, S. KARASU	*Effect of CMC and guar gum on oil absorption and acceptability of banana (Musa acuminate) fritters during repeated frying* **N. ABD RASHID**	*Textural Quality of Gluten-Free Breads formulated with Some Pseudo-Cereals* **B. UÇAR,** A. ALSAIQALI, G. Nil YAZICI, M. S. ÖZER
18.00-19.00	Opening Cocktail		

Conference Programme

2nd DAY – 12 April 2018 (THURSDAY)				
08.00-9.30	Breakfast & Registration			
09.30-10.00	Plenary Session / Hall A **Dr. Adamo Domenico ROMBOLA** *Management Strategies in AgroEcological Viticulture*			
Concurrent session III (10.15-11.30)				
Room	Hall A	Hall B	Hall C	Hall D
Chair	Dr. S. Sahin	Dr. T. Keceli Mutlu	Dr. A. A. Hayaloglu	Dr. M. Angeles
10.15.10-30	*Influence of microwave and microwave-convective drying on the drying kinetics and quality parameters of pomelo* **G. YILDIZ**, G. IZLI	*Effects of Ultrasonication Time on Pigment Extraction from Spirulina platensis Before Solvent Extraction* **S. AKSAY**, R. ARSLAN	*Characterization of Hot Air Dried Pomegranate Arils* **O. SUFER**, T. K. PALAZOGLU	*Determination of vitamin A (Retinol palmitate & all-trans retinal) losses in seabream (Sparus aurata) meat cooked by different cooking methods* **P. YERLIKAYA**, O. K.TOPUZ, H. A. YATMAZ, A. KAYA, ALI C. ALP
10.30-10.45	*Processed Food Products of Taro (Colocasia esculanta)* **M. ESER ONER**	*Comparison of two different methods for the identification of Salmonella spp. from poultry samples* **B. HESHMATI**, N. DIKBAS, I. VAR,	*Gluten Free Noodle Enriched with Chickpea and Quinoa: Cooking Property, Colour and Sensory Properties* E. A. OZER, **B. OZPALAS**, S. B. DOLGUN, I. KARAASLAN	*Partial Replacement of Sugar with Rebaudioside A in Blackberry Jam Production using Response Surface Methodology* **D. BENZER GUREL**, *S. DURAKLI VELIOGLU*
10.45-11.00	*Drying of Orange (Citrus sinensis) Slices Using Vacuum Infrared: Effects on drying kinetics and quality attributes* H. BOZKIR, **Y. TEKGÜL**, T. BAYSAL	*Bioanalysis System for the Determination of Antimicrobial in Foods* **N. N. YAZGAN KARACAGLAR**, F. C. DUDAK SEKER, I. H. BOYACI, A. TOPCU	*Fungal solid-state fermented cereals as nutritional supplement for bakery products* **T. KLEMPOVÁ**, J. GARČÁROVÁ, M. JAŠUREK, S. GAVURNÍKOVÁ, M. HAVRLETNOVA, M. ČERTÍK	*Processing of Hardaliye Drink by Ultrasonication: Changes on Quality Parameters and Microbial Inactivation* **G. AKDEMIR EVRENDILEK**, M. DEMIRAY, S. UZUNER

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2nd DAY – 12 April 2018 (THURSDAY)				
Concurrent session III (10.15-11.30)				
Room	Hall A	Hall B	Hall C	Hall D
Chair	Dr. S. Sahin	Dr. T. Keceli Mutlu	Dr. A. A. Hayaloglu	Dr. M. Angeles
11.00-11.15	*Determination of some pomological and physicochemical properties of deer apple fruits (Malus Trilobata v eriolobus trilobatus) grown in mediterranean region* **H. DEMIRCAN**, O. SAGDIC, A. A. US, R. A. ORAL, K. SARIOGLU	*Effect of Active Packaging (Oxygen Scavengers) and MAP on the Physicochemical and Microbial Quality of Sliced Bread* E. POSTOĞLU, E. SEZER, **Z. AYHAN**	*Effect of Addition of Beta-glucan on Physical Properties of Breakfast Cereals* A. CALISKAN, **S. YAGCI**, I. HASBAY	*Effects of the combined use of different commercial proteolytic enzymes in the production of enzyme-modified cheese with ripened white cheese flavor* **Z. ERBAY**, P. SALUM, G. GOVCE, D. BAS, P. KENDIRCI, H. KELEBEK, M. CAM,
11.15-11.30	*Use of High Pressure Processing for Brewing Cold White Tea and Its Effects on Health-Related Properties of Cold White Tea* **S. UZUNER**, G. AKDEMIR EVRENDILEK	*Using Chickpea-Quinoa Flour and Ground Dry Mulberry into Gluten-Free Biscuits: Nutritional, Antioxidant and Quality Characteristics* **E. A. OZER**, A. KURT	*Effects of Pomegranate Peel Supplementation on Chemical, Physical and Nutritional Properties of Muffin Cakes* C. TOPKAYA, **F. ISIK**	*Skin ripening cheese: Turkish Tulum Cheese* **C. A. OLUK**, M. GUVEN, A. A. HAYALOGLU, O. B. KARACA
11.30-12.30	Coffee Break & Poster Sessions			
12.30-13.30	Lunch			
13.30-14.00	Plenary Session / Hall A **Dr. Fereidoon SHAHIDI** *Functional Food Ingredients for Health Promotion*			

Conference Programme

2nd DAY – 12 April 2018 (THURSDAY)				
Concurrent session IV (14.00-15.15)				
Room	Hall A	Hall B	Hall C	Hall D
Chair	Dr. P.Yerlikaya	Dr. S. Marcincak	Dr. I. Var	Dr. G. Gunes
14.00-14.15	*Biotechnological evaluation of raw cereal materials into functional cereal-derived bioproducts enriched with lipophilic bioactive compounds* **M. ČERTÍK**, T. KLEMPOVÁ, O. SLANÝ, M. JANÁK	*Cardioprotective effect of Olea europaea aqueous leaf extract against hyper homocysteinemia associated oxidative stress in rat heart* **F. DEROUICHE**	*Effects of Ultrasonication on Quality Parameters of Licorice Drink* S. BAKAY, S. UZUNER, **G. AKDEMIR EVRENDILEK**	*The Mould and Aflatoxin Contamination of Trout Feeds Used in Trout Farms of Adana (Turkey)* **O. GOLGE**, A. AKTURE, R. AYDIN
14.15-14.30	*Functional properties of dried coriander leaves as affected by method of drying* **B. KOC**	*Effects of Differerent Formulation in Zerde Production* N. YILDIRIM, **S. ARSLAN**	*Determination of The Best Antioxidant and Techno-Functional Chickpea Cultivars by Technique for Order Preference by Similarity to Ideal Solution (Topsis) Analysis* **L. Y. AYDEMIR**, S. AYDEMIR, F. G. AKCAKAYA	*Quality changes in coated shrimp with powdered herbal extracts* **N. GOKOGLU**, P. YERLIKAYA, O. K. TOPUZ
14.30-14.45	*Effect of citric acid and lactic acid modifications on functional properties of corn and sorghum starch* **T. M. ALI**	*Application of Thermal Analysis in Fats and Oils* **A. S. COLAKOGLU**, T. KECELI MUTLU	*Ultrasound technology to overcome the low solubility problem of plant proteins at pH values around isoelectric point* **G. YILDIZ**, H. FENG	*Glucomannan compositions of salep powder for the determination of salep and its adulteration* **M. F. CENGIZ**, A. K. BILGIN, O. BASANÇELEBI, C. GUMUS, B. KARAKAS

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2nd DAY – 12 April 2018 (THURSDAY)				
Concurrent session IV (14.00-15.15)				
Room	Hall A	Hall B	Hall C	Hall D
Chair	Dr. P.Yerlikaya	Dr. S. Marcincak	Dr. I. Var	Dr. G. Gunes
14.45-15.00	*Multivariate Statistical Prediction of Health Related Properties of Chickpea Cultivars with FT-IR Spectroscopy* **P. KADIROGLU**, L. Y. AYDEMIR, F. G. AKCAKAYA	*Comparition of Chemical Composition of Pomegranate (Punica granatum L.) and Grape (Vitis vinifera L.) Seed Oils Obtained by Extraction* **H. DEMIR**	*Environmental Monitoring Program Application in Frozen Food Industry* E. ONBASI, **A. CINAR**	*Glass Transition Temperature of Goose Meat. A DSC Study* **A. AKKOSE**
15.00-15.15	*Application of Processing Technologies on Avocado* **M. ESER ONER**	*Application of Inula viscosa L. extracts on Bread and Antifungal Activitiy* A. CINAR, **A. N. DUNDAR**	*Research of the Processes Drying Food Herbs Motor (Allium Motor)* **J. SAFAROV**, S. SULTANOVA, G. DADAEV	*Development of Gluten-Free Cracker Snacks Using Chicpea, Quinoa Flours* E. A. OZER, **S. B. DOLGUN**, B. OZPALAS, I. KARAASLAN
15.15-15.45	Coffee Break			
15.45-16.15	Plenary Session / Hall A **Dr. Mohamed BOUAZIZ** *Olive By-Products: Valuable Nutrients, Drugs and Functional Bioactive Compounds*			
Concurrent session V (16.30-17.45)				
Room	Hall A	Hall B	Hall C	Hall D
Chair	A. Kiritsakis	A. D. Rombola	Dr. F. Shahidi	Dr. N. Gokoglu
16.30-16.45	*Certain Characteristics of Oleogels Prepared with Olive Oil and Olive Wax* H. ERINC, **A. S. COLAKOGLU**	*Color, Phenolic Content and Antioxidant Activity of Tarhana Containing Mushroom Powder* F. BOZOK, **O. SUFER**	*The Microbiological Quality of Edible Nuts* I. VAR, **S. SAGLAM**, O. UCKUN , B. HESHMATI	*Quality Properties of Cheeses Dried at Different Temperatures* **S. ARSLAN,** G. ERGENE
16.45-17.00	*Effect of Varieties, Processing Systems and Regions on the Quality Parameters, Sensory Characteristics and Fatty Acid Ethyl Esters (FAEE) of Turkish Virgin Olive Oils* **O. KOSEOGLU,** D. SEVIM, S. KANTARCI SAVAS, E. B. BUYUKGOK, M. ULAS, E. NASIBOV	*Investigation of Antioxidant Activity of Two Tagetes Species with Potential Use as Food Additives* **Y. OZKAN,** M. OZGUR, A. AKPINAR-BAYIZIT, T. OZCAN, L. YILMAZ-ERSAN	*Ultraviolet C (UVC) Radiation as a Practical Alternative to Decontaminate Thyme (Thymus Vulgaris L.)* **G. GUNES,** E. DOGU BAYKUT	*Determination of bioactivities of kefir by in vitro gastrointestinal simulation* **O. USTUN AYTEKIN**

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2nd DAY – 12 April 2018 (THURSDAY)				
Concurrent session V (16.30-17.45)				
Room	Hall A	Hall B	Hall C	Hall D
Chair	A. Kiritsakis	A. D. Rombola	Dr. F. Shahidi	Dr. N. Gokoglu
17.00-17.15	*GC-MS-Olfactometric Characterization of the Key Aroma Compounds of Olive Oils Obtained from Different Regions and Varieties of Turkey* **D. SEVIM,** O. KOSEOGLU, M. ULAS, A. AMANPOUR, S. SELLI	*Surfactant assisted aqueous extraction of carotenoids from food materials* **G. DURMAZ**	*Processing of Turnip Juice by High Hydrostatic Pressure with Respect to Quality Parameters and Microbial Inactivation* C. ATES, **S. UZUNER**, G. AKDEMIR EVRENDILEK	*ComDim for multi-block data analysis of Cantal-type cheeses: effects of salts, gentle heating and ripening* M. LOUDIYI, D. N. RUTLEDGE, **A. AIT KADDOUR**
17.15-17.30	*The study of elimination potential of sulfur blanket (Na2S2O4) and recovery of sugar juice specification in sugar factories using membranous Nano-filtration method* M. SABET TEYMOURI, **M. SABET TEIMOURI**	*Effects of Fruit and Vegetable Processing on Antioxidants and Their Bioavailability* **G. TOYDEMIR SEN**, E. CAPANOGLU	*Development Functional Gluten Free Biscuits from Buckwheat, Amaranth and Quinoa Flour* **B. OZPALAS**, E. A. OZER	*Determination of Catechol in Water Extract of Tea using CPE Modified with Banana tissue* M.VASJARI, **N. BROLI**
17.30-17.45	*Characterization of antioxidant potential of lentil protein fractions obtained by DEAE-cellulose cation exchange chromatography, isoelectric precipitation and ultrafiltration* **L. Y. AYDEMIR,** A. YEMENICIOGLU	*Component composition and biological activity of essential oils and plant extracts from Cousinia alata Schrenk and Achillea salicifolia Besser* **Y.M. SULEIMEN**, Z.B. ISKAKOVA, A.S. ZHANZHAKSINA, G.G. SISSENGALIYEVA	*Permeability of multilayer polymer active packaging films incorporated potassium sorbate* **S. DIBLAN**, B. GOKKAYA ERDEM, S. KAYA	*Identification of volatiles compounds of Nigella sativa L. extract using purge and trap extraction system* **S. KESEN**, A. AMANPOUR, S. TSOULI SAHRIR, O. SEVINDIK, H. KELEBEK, S. SELLI
19.00-22.00	Gala Dinner			

Conference Programme

3rd DAY – 13 April 2018 (FRIDAY)			
08.00-09.30	Breakfast & Registration		
Concurrent session VI (10.00-11.30)			
Room	Hall A	Hall B	Hall C
Chair	Dr. N. Sari	Dr. M. S. Ozer	Dr. M. Kara Ali
10.00-10.15	*The effect of ecotourism development on endemic herbs conservation on harvest of pastured from natural area, Golmakan region, Iran* **M. SABET TEIMOURI**, G. SABET TEYMOURI	*The effects of hydrocolloids on the physical properties of sponge cakes* **N. AHMAD**, N. HASANAH, H. ANIDA	*Biodegradable Plastics from Palm Tree Wastes* D. SUTAY KOCABAS, **E. YURTDAS**
10.15-10.30	*Antifungal Activity of Leaf and Fruit Extracts obtained from Melia azedarach L.* **A. YAVUZ**, A. ONARAN, Y. YANAR	*The Comparative Effect of Hydro Alcoholic and Hydro Distillation Extracts of Melissa Officinalis on Acne* ***G. SABET TEYMOURI***, *M. SABET TEIMOURI*	*Quality of fresh blackberry (Rubus fruticosus L.) fruit as affected by Ultraviyolet-C treatment* **G. CELIK**, G. GUNES
10.30-10.45	*Effect of photoselective nets on harvest and postharvest apple fruit cv. "Fuji"* N. DOLEK, O. DUNDAR, H. DEMIRCIOGLU, A. KUDEN, B. IMRAK, **O. OZKAYA**	*GC-MS-Olfactometric characterization of key odorants in Moroccan Argan oil* **O. SEVINDIK**, A. AMANPOUR,S. TSOULI SAHRIR, S. KESEN, G. GUCLU, K. T. OZKARA, H. KELEBEK, S. SELLI	*Drying Kinetics of Coriander Leaf in a Microwave Dryer* **B. KOC**
10.45-11.00	*Effects of Different Liquid Fertilizer Applications On Bread Wheat Quality* **T. AKAR**, E. CAKIL, M. TEKIN	*Comparison of essential and non-essential amino acid variations in Einkorn and Emmer wheat cultivated in Turkey* **M. F. CENGIZ**, M. TEKIN, T. AKAR	*Could Avocado be the New Alternative for Healthy Unsaturated Oil Source?* E. ADAL, **T. AKTAR**
11.00-11.15	*Investigation of The Bio-Dynamic Commands Use Effect on Mucilage Content and Germination Behavior in 3 Ecotype Of Basil (Ocimum Sp.)* **M. SABET TEIMOURI**	*Effect of Chickpea Type on Physical, Chemical and Sensory Properties and Aroma Profile of Simit Bread* **N.SAVLAK**, S. KASIM, E. KÖSE	*Kinetic Modelling of Drying and Osmotic Dehydration of Asparagus officinalis in Microwave* C. BALTACIOGLU, **I. OKUR**
11.15-11.30	*Molecular Assessment of Tetraploid Wheat Genotypes With Low Cadmium Accumulation* **T. AKAR**, M. TEKIN, A. CAT, S. SONMEZ	*Determination of chemical properties of home-made fruit juices during storage* O. CAGINDI, **D. BENZER GUREL**, T. AYDIN, A. KEMAH	*Effect of three different infusions in aroma compounds of endemic Iranian plant tea obtained from dried violet–blue petals of Borage (Echium amoenum)* **A. AMANPOUR,** O. ZANNOU, H. KELEBEK, S. SELLI
13.00	Group Event (City & Boat Tours)		

ORAL PRESENTATIONS

Theme: Agriculture

Management Strategies in AgroEcological Viticulture

Adamo Domenico Rombolà

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Agroecological systems provide tangible benefits on environment, soil fertility, biodiversity, resilience, productivity, incomes and capability to meet the needs of future generations and an efficient use of natural resources. Our Research Group has been conducting studies in Agroecology with emphasis on grapevine. In organic and biodynamic viticulture, all field strategies, including canopy and soil management practices, were addressed to preserve and enhance plant health and resilience capability, producing healthy grapes. Different soil (e.g. intercropping) and canopy managements (e.g. post-veraison trimming and defoliation) strategies have been evaluated. Neither fertilizers nor irrigation water were used. The vines displayed an appropriate vegetative-productive balance, as proved by the satisfactory yield, optimal nutritional status, high quality of grapes and wines. The use of biodynamic preparations induced changes in physiological parameters typically correlated with plant biotic and abiotic stresses and associated with induced plant resistance. Agroecological soil management strategies included the "stripped" biodiverse grassing, consisting in the cultivation, along the row, of self-reseeding legumes and grasses with low water requirements. Canopy management strategies play a relevant role in our agroecological viticultural systems. Late (post-veraison) trimming increased berry skin anthocyanin and phenolic concentration without modifying berry soluble solids, pH and titratable acidity, reduced malic acid levels at harvest, contained plant productivity, loosened clusters and limited the severity of Botrytis cluster rot. Late (post-veraison and pre-harvest) defoliations enhanced berry skin flavonols concentration and limited the severity of Botrytis cluster rot without modifying anthocyanins levels, berry soluble solids, pH and titratable acidity. Increasing flavonols through agronomic approaches plays a relevant role in the co-pigmentation of young red wine, stabilizing anthocyanin and creating stable association to form polymeric pigments, important for the color of older red wines. The agroecological management promote the valorization of additional products in vineyards, such us grape seed oil.

Keywords: Agroecology, grapevine, intercropping, soil and canopy management, vineyard

Theme: Food Science and Technology

Olive oil as a functional food and the effect of processing techniques on its quality

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Abstract

Olive oil, a natural juice obtained from the fruit of the tree Olea europaea, is not only a food with excellent organoleptic characteristics, but also a product with a unique composition, playing an important functional role in our life. It is a naturally monounsaturated oil containing flavones and other polyphenols with strong antioxidant properties, protecting our body from oxidative stress. The latter, which causes several diseases (e.g neurodegenerative and cardiovascular diseases and cancer), is the result of the unbalance between free radicals formed in our body and the presence of antioxidants. Olive oil also contains other micro-components, such as aroma and taste compounds and pigments (chlorophyll, pheophytin), which contribute to the good aroma and taste of the oil and facilitate the absorption of all the useful components (e.g antioxidants) existing in the food. These important compounds are present only in good quality olive oils.

The quality of olive oil is affected by several factors, such as cultivar, fruit maturity, micro-environment and processing technology of olive fruit (crushing of olive fruit, mixing of olive paste, using of enzymes, separation of olive oil by two or three-phase decanter, reuse of waste water etc). Phenol and other functional constituents of olive oil are seriously affected by the processing techniques and the conditions applied. Research has shown that replacing fresh water with olive mill waste water (OMWW) in the three phase decanter system, the olive oil obtained had higher total phenolic content and higher antioxidant activity (based on DPPH test). Phenolic profile of treated olive oils with OMWW analyzed by quantitative 1H NMR revealed more than two fold oleocanthal and oleacein, as well as oleuropein and ligstroside aglycone contents than the control. Sensory evaluation of treated oils also showed an enhancement of fruity, bitter and pungent attributes. This treatment resulted in improving olive oil quality and increasing its functional properties.

The purpose of this presentation is to provide an overview of evidence that olive oil is an important original functional lipid food, and to discuss mainly how processing techniques may increase the content of functional compounds in the oil improving its final quality and protecting the environment at the same time.

Keywords: Olive oil, functional compounds, processing technologies

Theme: Food Science and Technology

Lemon Grass (*Cymbopogon citratus*) essential oil as a Potent Anti-Inflammatory and Wound-Healing Drug

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Abstract

The objective of this study was to evaluate the antimicrobial, anti-inflammatory and wound-healing properties of an Algerian medicinal plant, Cymbopogon citratus, for a future use as bioactive component in aromatherapy and/or as a nutraceutical ingredient.

The chromatographic profile of the C. citratus essential oil (CCEO) is characterized by the presence of 13 constituents. Geranial is the major compound with a rate of 28.9%, followed by neral (24.3%) and myrcene (23.9%).

The antimicrobial activity of CCEO has been evaluated by several methods. In the liquid phase, CCEO exhibited a promising inhibitory activity against the growth of all bacterial strains with diameters of the zones of inhibition zone (DIZ) varying from 45 to 85 mm for Acinetobacter baumannii. Further, pathogenic staphylococci strains have been completely inhibited. The CCEO possess a huge antifungal action at a high dose because all fungal strains have been inhibited. In the vapor phase, Escherichia coli, Staphylococcus aureus and all fungal species where inhibited totally at high concentration. In addition, this inhibitory action is "dose-dependent". The determination of minimum inhibitory concentrations (MIC) confirmed the sensitivity of yeast species to CCEO with the lowest MIC values (between 0.625% and 0.007%). Else, the potential use of CCEO as a natural food preservative in a real food system (Orangina juice) has been confirmed, alone or in combination with thermal treatment.

Topical administration of the CCEO (82 mg/kg) reduced the ear inflammatory edema induced by xylen with a rate of 54%. This activity was also confirmed by histopathology analysis. CCEO has been incorporated into a dermal cream to assess its wound-healing effect in vivo. The results proved the ability of CCEO in the reduction of circular wound healing area (at D-14) with a retraction rate of 92.2%, which has been found higher than Madecassol® (89.2%) and negative control (71.4%).

Finally, our findings suggest the effectiveness use of CCEO in the treatment-management of inflammation, human infection and to control food-spoilage micro-organisms. Further studies will be needed to assess the cytotoxicity of this oil in the future.

Keywords: Cymbopogon citraus; Essential oil; Fungicidal effect; Citral; Anti-inflammatory; Wound-healing cream.

Theme: Food Science and Technology

Isolation and characterization of lactic bacteria from curdled milk having antimycotoxinogene activity

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Abstract

Lactic bacteria are used in fermentation and food bio-preservation through their production of organic acids and other antimicrobial substances like the bacteriocins which restrain certain fungal strains. This category of bacteria can be isolated from range of food such as fermented milk, yogurt and cheese.

Food contamination by mold mycotoxinogènes is a chief problem for consumers. In order to fight against the later, several approaches are discussed mainly the biological resistance.

Six bacterial isolates were isolated from sour-milk which was derived from cows in the region of Constantine.

The selection test of the bacterial isolates to antifungal effect was designed for selecting a particular B6 isolate, which has a significant inhibitory effect vis-à-vis the Aspergillus flavus. Based on a study of a macroscopic, microscopic and so biochemical tests, the preliminary identification of the bacterial isolate B6 revealed that the strain belonging to the genus Lactobacillus. In fact, the B6 strain considerably slows the growth of mold (diameter of colony not exceeding 1.5 cm after 72 h of incubation at 28°C). The inhibition of fungal growth was due to the secretion of bacteria antifungal molecules, but not to the acidification of the biological environment since the Aspergillus flavus is a acidotolérante strain.

The results obtained after testing the antifungal activity against E. coli bacteria, Staphylococcus aureus, Klebsiella sp., Pseudomenas syringae were negative, attesting that the mold is not of antibacterial substances secreted which suggests that Lactobacillus product antimycotoxicogene effect of metabolites.

Keywords: Lactic bacteria, antifungal, antimycotoxinogene, Lactobacillus, Aspergillus.

Theme: Food Science and Technology

Characterization of cyclic lipopeptides produced by *Bacillus amyloliquefaciens* Rh2-F (KC341737/ KC-204921) strain isolated from salt lake's soil sample (Eastern Algeria)

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Abstract

Increasing demands of the consumers for lowering the addition of artificial chemicals i.e. additives and ingredients, bio-surfactants; including cyclic lipopeptides from *Bacillus genus* bacteria, have been used as alternative natural additives, due to their different beneficial properties, bio-surfactant; emulsifier, antioxidant; antiviral and antimicrobial. The objective of the present work is the characterization of the cyclic lipopeptides (C-LPs) families of Iturin, surfactin, and fengycin produced by a *Bacillus amyloliquefaciens* Rh2-F (KC341737/ KC-204921) strain isolated from salt lake's soil sample (Eastern Algeria). Diverse homologues of the three C-LPs families were detected by liquid chromatography–electrospray ionization–mass spectrometry analysis. Iturin molecules (MNa+=1065.6, 1079.6 and 1093.6) appeared at 4min, 5min, and 7min; fengycin molecules (MH+= 1463.9, 1477.9, 1448.9, 1491.9), between 8min and 13min); and finally, surfactin molecules (1461.9, 1030.7, 1044.7, 1058.7, 1072.8), between 23min and 26 min, retention times. Interestingly, some additional peaks with new masses MH+ (1450.90, 1461.9, 1506.9, 1492.9, and 1519.9) were observed in the fengycin fraction, which may correspond to new fengycin classes. To conclude, *Bacillus amyloliquefaciens* Rh2-F displays interesting performance in producing a large variety of C-LPs, in flasks culture conditions; however, it is important to do further research on large scale basis to evaluate its C-LPs production capacity, in order to study the possible formulations for their ideal application.

Keywords: *Bacillus amyloliquefaciens*, cyclic lipopeptides, LC-MS

Theme: Agriculture

Antioxidant and Antipyretic activity of methanolic extract of *Marrubium vulgare* located in Khenchela area from Algeria

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Abstract

The aim of this work is to determine the antioxidant and antipyretic activity of methanolic extract of *Marrubium vulgare* (MEMV), a medicinal plant cultivated worldwide as a source for food flavoring and to cure a variety of diseases. The preliminary phytochemical screening of the extract revealed the presence of flavonoids, tannins, saponins, coumarins, reducing compounds, phenolic compounds, terpenoids, quinons and alkaloids. A quantitative study of total flavonoids by spectrophotometric method revealed that the extract contain 08,56 ± 0,22 mg of quercetin equivalent per gram of extract. A qualitative analysis of flavonoids in the MEMV via thin layer chromatography showed the presence of flavonons, anthocyanidin 3-glycosids, flavonols, chalcons and phenolic acids.

The antioxidant activity was evaluated in vitro with the use of free radical scavenging activity method by DPPH assay, the result expressed in terms of IC50 was found to be 0,015 ±0,003 mg/ml. On the other hand, the result of antipyretic activity in wistar rats by Brewer's yeast method showed that *Marrubium vulgare* is capable of reinforce the organism against a hyperpyrexia.

Keywords : Antioxidant, antipyretic, *Marrubium vulgare*, Lamiaceae

Theme: Aquaculture

The Mould and Aflatoxin Contamination of Trout Feeds Used in Trout Farms of Adana (Turkey)

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Abstract

The present study was planned with the aim of detecting molding and aflatoxin levels of trout feeds in various types and sizes in trout businesses in province of Adana and its towns. A total of 33 trout feed samples collected from fifteen trout farms in Adana (Turkey) were analysed for moulds and aflatoxins (AFB_1, AFB_2, AFG_1 and AFG_2) from July 2010 to December 2010. To determine mould counts; feed samples were incubated in the aerobic atmosphere at 25 ± 1 °C for 5 days by using Dichloran Rose Bengal Chloramphenicol Agar (DRBC). Aflatoxins were determined by using liquid-solid extraction. Recoveries for aflatoxins were found between 70.00 and 112.20%. Precision of mould and aflatoxins method was obtained from intra-day repeatability and inter-day reproducibility. Accuracy of the aflatoxins method obtained from bias ranged from 4.312 to 12.909. While moulds were found in 12 of 33 analysed samples (36.30%): aflatoxins were found 8 of 33 analysed samples (24.25%). The ranges for positive samples were 3.08-4.86 $\log_{10}$ kob/g moulds and 0.21–0.90 µg AFB_1 kg^{-1} of trout feeds. To conclude the present study showed that none of trout feeds used in Adana has aflatoxin over the Turkey limit.

Keywords: Aflatoxins, feeds, moulds, trout fish

Theme: Food Science and Technology

Probiotic Set Yogurts Fortified with Fiber-Rich Persimmon and Apple Powders at Different Fat Ratios

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Abstract

In this study, persimmon and apple fibers were obtained through freeze-drying method and probiotic yogurts with different fat ratios were produced by 1% fruit fiber supplementation. Yogurts were then stored at +4°C for 14 days. The chemical composition and mineral profile of the yogurts were determined at the first day of storage. Also, gel firmness, whey separation, water holding capacity, viscosity, acetaldehyde, volatile fatty acids, color parameters, textural and sensory attributes and viable L. acidophilus count were determined throughout the storage period. Fat ratios had significant effects on gel firmness, viscosity, whey separation, water holding capacity, viscosity index, appearance scores and color parameters (L*, a* and b* values) of the yogurts. Ca, K, Na, Fe and Zn contents increased with increasing fat ratios. Gel firmness, viscosity and water holding capacity also increased, but whey separation values decreased with increasing fat ratios. Fruit fiber supplementations had significant effects on acidity, viscosity, water holding capacity, some textural properties (firmness, consistency, cohesiveness), flavor, taste, total sensory scores and color parameters (L*, a* and b* values) of the yogurts. Fiber supplements especially promoted the growth of probiotic bacteria on 7th and 14th days of storage. With regard to sensory attributes, control yogurts were liked the most. The yogurts produced with the addition of persimmon and apple had 20 and higher sensory scores out of 25 points, in other words, they had acceptable total scores.

Keywords: Persimmon, apple, probiotic, yogurt, texture, mineral.

This study was supported by Turkish Scientific and Technological Research Council (TUBITAK) with the project number of 112O053 and carried out at Food Engineering Department of Çukurova University Agricultural Faculty.

Theme: Food Science and Technology

Biotechnological evaluation of raw cereal materials into functional cereal-derived bioproducts enriched with lipophilic bioactive compounds

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Abstract

Increasing commercial demand for natural evaluation and conversion of raw materials into food/feed with improved functionalities has led for the search of economically convenient and industrially accessible methods. Attention has been focused on development of solid state fermentation (SSF) processes where appropriate microorganisms effectively utilize and enrich raw agroindustrial materials with biologically active compounds. Interest is targeted on Zygomycetous fungi (e.g. Thamnidium sp., Cunninghamella sp., Mucor sp., Umbelopsis sp., Mortierella sp.) that are considered as promising microorganisms synthesizing lipophilic bioactive substances, such as polyunsaturated fatty acids, carotenoids, coenzyme Q10, etc. Numbers of low-cost agricultural byproduct (brans, husks, pulps, cereal and legume wastes) have been screened and cultivation conditions have been optimized to reach a maximum yield of bioactive compounds in fermented bioproduct. In addition, laboratory experiments were scaled-up in fermentation tanks. A range of cereal-based bioproducts enriched with PUFAs (up to 2.4% gamma-linolenic acid, 4.2% arachidonic acid, 2.1% dihomo-gamma linolenic acid, 2.3% eicosapentaenoic acid) and pigments (0.26% beta-carotene) have been prepared and successfully employed for making cereal goods (e.g. rolls, bread and pasta) and tested as a feed additive for animal diet (artificial rumen, calves, chicken). Fungi also enhanced content of dry matter, proteins, dietary fibres and various enzymes in fermented bioproducts. These microbial-derived bioproducts with improved nutritional and functional properties may open novel prospects for evaluation of agroindustrial raw materials and finally for the market of functional microbial-based food and feed supplements.

Keywords: solid state fermentation; functional fermented cereals; polyunsaturated fatty acids and carotenoids

Supporting Agencies: The work was supported by grants VEGA 1/0574/15 (Slovak Ministry of Education, Science, Research and Sport) and APVV-14-0397 (Slovak Research and Development Agency).

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Theme: Food Science and Technology

Biotechnological production of fermented feed enriched with polyunsaturated fatty acid and beta-carotene for broiler chicken

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Abstract

Polyunsaturated fatty acids and carotenoid pigments are group of significant fungal metabolites whose increasing production using fermentation processes is widely used in diverse types of industry. Nowadays, the interest is targeted on the production of healthy bioproducts with optimal nutrient profile, which is especially attractive in feed and food industry. Therefore, the study is focused on employing the fungal solid-state fermentation (SSF) in production of fermented cereal-based bioproducts enriched with biologically active lipophilic compounds and for their applications as additives to broiler chicken feed. Various Zygomycetes strains (Umbelopsis isabellina, Thamnidium elegans, Cunningamella echinulata) effectively utilized cereal substrates during SSF process and fermented bioproduct containing gamma-linolenic acid (GLA) and beta-carotene was acquired. Feeding broiler chickens with fermented substrate led to change fatty acid profile in their meat, especially growth in GLA content was recorded. The effect of fermented feed on chicken performance and nutrient digestibility was observed as well. The results indicate that solid-state fermentation of different agro-industrial cereal waste may lead to production of feed for broilers which provides enhanced nutrient digestibility and improves its performance. Moreover, feeding a diet containing solid-state fermented bioproducts, which is enriched with essential polyunsaturated fatty acids, may open novel prospects for the market of functional cereal food.

Keywords: gamma-linolenic acid; beta-carotene; broiler chicken; solid state fermentation

Supporting Agencies: The work was supported by grants VEGA 1/0574/15 (Slovak Ministry of Education, Science, Research and Sport) and APVV-14-0397 (Slovak Research and Development Agency).

Theme: Nutrition

Volatile and non-volatile components of *Aesculus hippocastanum* L. blossoms from Lithuania

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Abstract

Aesculus hippocastanum L. is commonly known as a "horse chestnut" and is an important element of urban and rural landscapes. In addition, it's bark, flower and especially seed extracts have been used traditionally for the treatment of chronic venous insufficiency, to reduce its associated symptoms: leg swelling and heaviness as well as vascular problems. There is a plenty of data concerning chestnut seed extract composition but only few about the volatile compounds of flowers.

Inflorescences of *Aesculus hippocastanum* L. were collected at full blooming stage in eight locations in Lithuania. Volatiles were obtained by hydro-distillation method (2h). GC-MS analyses were performed on a chromatograph Shimadzu GC-2010 PLUS interfaced to Shimadzu GC-MS-QP2010 ULTRA mass spectrometer and fitted with a Rxi–5MS capillary column. Two types of chestnut flower extracts were prepared: H_2O : MeOH (1:1) and 2% HCl in MeOH and analyses were performed on HPLC system (Agilent Technologies 1260 Infinity).

Results of gas chromatography revealed that the main volatile constituents of chestnut flowers were heneicosane (19.26 – 41.72%), nonanal (2.33 - 30.81%), pentacosane (4.46 – 20.38%) and 6, 10, 14- trimethyl 2-pentadecanone (8.30 – 15.10%). Nonanal, in a composition with several other compounds, according to G. Buchbauer , is responsible for the "flowery" note of essential oil of chestnut blossoms. Typical components of essential oil such as limonene, linalool, benzaldehyde, borneol, caryophyllene, α-terpineol exceeded only up 1% of the oils. Rutin is one of the phenolic compounds found in the plants and contributes to the antibacterial properties of it. This valuable compound was found in our analysed extracts in such amounts: 8.27–11.90 mg/g (MeOH : H_2O) and 5.30–7.04 mg/g (2% HCl in MeOH).

Keywords: *Aesculus hippocastanum* L., volatiles, GC-MS, HPLC, rutin.

Theme: Food Science and Technology

Fungal solid-state fermented cereals as nutritional supplement for bakery products

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Abstract

Cereals serve as major food supply with world production of over 2.6 billion metric tons (FAO, 2016). Cereals are rich source of carbohydrates and some proteins, but they are limited in various biologically active compounds such as polyunsaturated fatty acids (PUFA), carotenoid pigments, coenzyme Q10, etc. If cereals are considered for preparation of functional bakery products, their nutritional properties should be naturally modified with the aim to enrich them with these compounds. Zygomycetous fungi are known as excellent producers of lipophilic bio-active compounds especially PUFAs, carotenoids, coenzyme Q10, etc. These fungi during solid state fermentations are able to utilize cereals and convert them to new value-added cereal-derived bio-products that could be used in food/feed industry. Moreover, fungi are able to produce the various types of hydrolytic enzymes that has wide use also in bakery industry. The work is focused on characterization of flours and breads prepared with addition of different types of fermented cereals (wheat, oat, buckwheat, amaranth). Application of bio-products does not only enrich the final products with new compounds, but very significantly change the nutritional and functional properties of cereals such as content of starch, glucans, dietary fiber, due to production of hydrolytic enzymes. Supplemented fermented cereals also change rheological properties of the dough (increased water absorption, reduction of dough-rise, prolonged dough development time, higher softening degree of dough) and sensorial properties of the final cereal goods (brownish color, crackness, accepted fungal flavor). Thus, biotechnologically prepared PUFA-enriched cereals may open novel prospects for the market of functional cereal food.

Keywords: Solid-state fermentations; functional food; bakery goods

Supporting Agencies: The work was supported by grants VEGA 1/0574/15 (Slovak Ministry of Education, Science, Research and Sport) and by grant DOMAPLUS from Ministry of Agriculture, Slovak Republic.

Theme: Food Science and Technology

Biodegradable plastics from palm tree wastes

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Abstract

To reduce the environmental impact of plastic waste, biodegradable polymers have been widely studied as eco-friendly alternatives of conventional plastics [1]. Lignocellulosic biomass is one of the major renewable source for biopolymers as it is made up of cellulose, hemicellulose and lignin. Xylans are the most abundant hemicelluloses found in the cell walls of land plants. They can be benefited due to their nutritional/technological functions and film forming properties [2]. The aim of this study was to investigate palm tree wastes for their hemicellulose-based biodegradable plastic production potentials and characterize biofilms in compare to corn cob hemicellulose-based biofilms, as a benchmark.

The palm tree wastes have been collected in İzmir (Turkey), corn cobs were obtained from Karaman (Turkey). Biomass is dried and milled to 2 mm particle size. First, biomass were analyzed in terms of moisture, ash, fat, raw cellulose and protein content. Hemicellulose fractions were extracted by alkali extraction procedure [3]. H_2O_2 at a concentration of 2% (v/v) was used during extraction. Hemicellulose yields and insoluble hemicellulose fractions were determined. Hemicellulose-based biofilms were produced by solvent casting technique at 23ºC and 50% humidity condition. Biofilms were characterized in terms of thickness, moisture, color, solubility in water and water vapor permeability. Structural differences were observed by FTIR.

Addition of H_2O_2 has enhanced hemicellulose extraction yields for every biomass type. Observed yield increase rates were in the range of 10-28% (w/w). Biofilms made of hemicelluloses, which were extracted with H_2O_2, were lighter in color. H_2O_2 treatment also affected water vapor permeability; it decreased the permeability of corn cob hemicellulose biofilms but increased permeability of palm tree hemicellulose biofilms. A similar controversy result was observed for water solubility. H_2O_2 treatment increased the water solubility of corn cob biofilms, however, a decrease was observed in water solubility values of palm tree hemicellulose biofilms.

Keywords: Palm tree, hemicellulose, bioplastic, characterization

Theme: Food Science and Technology

Changes in Total Anthocyanin Content, Degradation Index and Antioxidant Capacity at Grape Juice Concentrate Processing Steps

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Abstract

Papazkarası, Öküzgözü and Köhnü grape varieties have been selected, in order to determine changes in total monomeric anthocyanin, antioxidant capacity and degradation index during the processing of the grape juice concentrate. Therefore, the processes applied on mash, respectively in conformity with the industrial process flow, are mash enzymation, pressing, clarification, filtration, detartarization and evaporation.

Monomeric anthocyanin and antioxidant activity decrease during processing into concentrate, whereas degradation index increases and those changes are found statistically significant ($p < 0.01$). The most critical process steps in terms of anthocyanin loss are determined as enzymation and clarification. Degradation index increase is repeated mostly at pressing process for all the grape varieties, statistically significant ($p < 0.01$). Statistically significant antioxidant capacity losses are determined, similar to monomeric anthocyanin decrease, to occur mostly at enzymation and clarification processes.

Findings of this research are important in consideration of improved process conditions and quality in grape juice and concentrate production.

Keywords: Grape juice concantrate, processing, anthocyanin, degradation, antioxidant

Theme: Food Science and Technology

Determination of Aroma Compounds using purge and trap extraction technique in Albanian cvs. Kalinjoti and Bardhi Tirana Olive Oils

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Abstract

Even though, nowadays olive tree is cultivated in many regions of the world; it is a precondition that this regions must have climatic characteristics similar to Mediterranean Sea region. Albania situated in the Southwestern Balkan with more than 38889 ha area and 99075 tons of olive fruit production, is ranked 17th in world according to FAO statistics for 2016. In this study, the aroma compounds of olive oils obtained from cultivars, Kalinjoti and Bardhi Tirana were investigated for the first time, with cv. Kalinjoti olive oils obtained from two different regions, Vlora and Himara, while Bardhi Tirana olive oil cv. was obtained from Tirana region in the year 2017.

A total of 24 aroma compounds comprising: aldehydes (6), alcohols (8), ketones (1), esters (2), terpenes (3), phenols (4) and alkene (1) to the Kalinjoti cv. Comparison of samples for Kalinjoti cv. from two different regions revealed that the styrene was present only to the sample from Himara region. Meanwhile investigation of the Bardhi Tirana cv. resulted in 17 aroma compounds: aldehydes (6), alcohols (6), esters (2), and phenols (4). The total amount of aroma compounds for Kalinjoti cv. resulted 40411 (mg kg^{-1}) for the sample from Himara region, and 36700 (mg kg^{-1}) from Vlora region, while for Bardhi Tirana cv. the total amount was 27542.7 (mg kg^{-1}).

Keywords: Bardhi Tirana, GC-MS, Kalinjoti, Olive Oil

Theme: Food Science and Technology

Determination of chemical properties of home-made fruit juices during storage

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Abstract

Various fruit juices are consumed in our country and in the world due to their nutritional and beneficial potential. In this study; orange, mandarin, cherry, plum and peach harvested, squash and acquired juices for fifteen days storage at +4 ± 2 °C in the refrigerator. Analysis of pH, water-soluble dry matter, titratable acidity, ascorbic acid, antioxidant activity and total phenolic were carried out in fruit juices. According to the results, the amount of ascorbic acid was found 16,54-27,31 Vit C mg/100mL in juice of mandarin, 7,95-10,95 Vit C mg/100mL in juices of orange, 5,02-54,15 Vit C mg/100mL in juices of cherry, 5,10-8,10 Vit C mg/100 mL in juices of plum and 6,56-8,10 Vit C mg/100 mL in juices of peach. As % inhibition of antioxidant activity values was ranged between 77,76-86,92 in mandarin juices, 89,29-90,52 in orange juices, 73,00-85,62 in cherry juices, 62,64-71,09 in plum juices and 44,02-57,50 in peach juices. Total amount of phenolic content were found among 0.57-0.83 in mandarin juice, 0.67-0.90 in orange juice, 0.86-0.92 in cherry juice, 0.24-0.29 in plum juice and 0.06-0.12 mg gallic acid / mL in peach juice.Freshly squeezed fruit juices were stored for 15 days and analyzed on storage days 1, 3, 6, 8, 10 and 15. The results are showed that, the fruit juices' C vitamins, antioxidant activity and phenolic content decreased as the storage period increased.

Keywords: orange juice, mandarin juice, cherry juice, plum juice, peach juice, chemical property

Theme: Food Science and Technology

Effects of Fruit and Vegetable Processing on Antioxidants and Their Bioavailability

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Abstract

Fruits and vegetables are rich in antioxidants including carotenoids, polyphenolic compounds, vitamins, etc. which are known to have positive effects on health. Dietary consumption of antioxidants from different plant sources has recently been associated with protection against a broad range of human diseases including certain cancers, cardiovascular diseases, obesity, and diabetes.

Fruits and vegetables are commonly consumed as fresh produce but they are also processed into a variety of food products including juices, pastes, canned foods, etc. which can also be valuable sources of antioxidants. However, various processing methods can have marked effects on fruit and vegetable antioxidants and hence, may influence their health-promoting properties.

Although the effect of processing on the fate of antioxidants has previously been reviewed, the extent of the losses or even gains, as well as the changes in their bioavailability have been reported to differ considerably according to the exact nature and conditions of the processes applied, the variety/origin of the food material used, and the biochemical properties of the antioxidant itself. Therefore, it is essential to gain a deep understanding of the consequences of processing on food bioactives in order to be able to design optimized strategies for the preservation and/or improvement of the antioxidant activity and bioavailability of these functional components in key foodstuffs in our daily diet. This presentation covers an overview of what is currently known about the effect of food processing treatments on fruit and vegetable antioxidants and their bioavailability.

Keywords: Food antioxidants; food processing; phenolic compounds; antioxidant capacity; bioavailability.

Theme: Food Science and Technology

Changes in the in-mouth release of typical wine aroma compounds produced by oenological polyphenolic extracts during wine intake and their relationship with wine aroma perception

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Abstract

During wine intake, odorants can be adsorbed into the oral and pharyngeal mucosa and further released to the exhalation breath that carries them to the olfactory receptors. The kinetics of adsorption/desorption from oral mucosa can be affected by the physiocochemical properties of aroma compounds, the wine matrix composition and physiological factors (e.g. saliva composition) (1,2).

The objective of this work was to determine the effect of different types of oenological polyphenolic extracts usually employed during winemaking, on the intraoral aroma release (immediate and prolonged) and on the aroma perception of specific wine descriptors.

To do so, a rosé wine was supplemented with three different types of phenolic extracts to obtain three wines: M and O, rich in procyanidin monomers and oligomers respectively, and (P) supplemented with a rich anthocyanin polyphenol extract. A control wine (C) without added extracts was also included. All the wines were flavored with a blend of six chemically different flavor compounds. Volunteers (n=6) rinsed their mouths with the wines. Intraoral release was monitored using intra-oral HS-SPME (1) at two different times after spitting-off the wine (just immediately and four minutes later). Ten assessors, including the six from the first study, were selected and trained for the sensory evaluation. They compared the aroma intensity of specific descriptors associated to the added flavoring substances in the control and polyphenol supplemented wines.

Results showed very high inter-individual differences in the first (t=0) and second (t=4) aroma monitoring. Polyphenols affected the intraoral release of 4 from the 6 target aromas. Control wine exhibited the highest aroma release, while procyanidins (M,O wines) significantly lowered it. This effect was also noticed four minutes after rinsing. These results agreed with a significant difference on the aroma intensity reported for some descriptors between the control and procyanidin supplemented wines.

Keywords: Wine, aroma release, polyphenols, aroma persistence, aroma perception

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Theme: Food Science and Technology

Thermal inactivation of some pathogenic bacteria in broth and mantı

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Abstract

Current study aimed at determining thermal death responses of some pathogenic bacteria to find out if there is a similarity between the broth and a model food (mantı).

Thermal inactivation of *Staphylococcus aureus, Escherichia coli* and *Bacillus cereus* were evaluated in both broth (tryptic soy broth) and mantı (dough stuffed with beef mince) at 55°C to 75°C for 4 mins. High hydrostatic pressure was also applied for inactivation of indigenous microbial flora of mantı, whether at 400 and 600 MPa.

E.coli was more resistant than *S.aureus* at thermal death respond findings, both in broth and mantı. Rapid death was observed for *B.cereus* at 55°C for 4 mins in broth. While, minimum 70°C for 4 mins heat treatment was required for *B.cereus* inactivation in mantı. Lag phase duration was useful to observe the thermal tolerance differences of studied bacteria.

Rapid inactivation time of studied bacteria in broth is not a useful finding for industry. It has to be fitted with real food systems. Finally, we would say that a 4 minute heat treatment at 75°C along with high hydrostatic pressure should be planned for safe mantı production.

Keywords: Thermal inactivation; survival; mantı

Theme: Food Science and Technology

Characterization of antioxidant potential of lentil protein fractions obtained by DEAE-cellulose cation exchange chromatography, isoelecxtric precipitation and ultrafiltration

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Abstract

Lentil albumin globulin extract (LAGE) of cultivar (red) was purified to determine the antioxidant potential of protein fractions obtained by isoelectric precipitation (IEP), ion exchange chromatography (IEC), and ultrafiltration (UF). IEP and IEC purified important part of soluble proteins and among obtained fractions lentil albumin extract (LAE) consisted of proteins with TEAC and ORAC with 3.0 and 7.0-fold purity, respectively. Although UF caused some protein loss during process, the protein fraction between 10 and 30 kDa (LAGE-R2) had highly remarkable ICC purification fold at 32. When the fractions were lyophilized, antioxidant activities were effected negatively except for ICC property. While TEAC and ORAC purification folds of lyophilized antioxidant fractions were similar to those of their non-lyophilized forms, purification fold of ICC was increased from 1.6 to 2.4, 1.8 to 3.0, and 0.4 to 2.7 for LAGE-C1 (basic and neutral proteins), LAGE-C2 (acidic proteins), and LAE fractions, respectively. The strong correlations were observed between the protein solubility and TEAC, ORAC or ICC ($p<0.05$). IEP and UF were more effective to obtain the antioxidant fractions with TEAC and ORAC while IEC purified the antioxidant proteins showing the highest ICC.

Keywords: lentil; protein fraction; antioxidant; ion-exchange chromatography; ultrafiltration; isoelectric precipitation

Theme: Food Science and Technology

Chemometric Analysis of Chemo-Optical Data for the Assessment of Olive Oil Blended with Hazelnut Oil

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Abstract

The authentication of virgin olive oil and adulteration is a significant issue for the oil industry. Economic losses, health and safety problems arise from frauds with cheaper vegetable oils or low quality olive oils. The main objective of this study was to differentiate hazelnut oil level in extra virgin olive oil (EVOO) of different geographical regions in Turkey with the aim of a SAW (surface acoustic wave) sensor based electronic nose (e-nose) and a color vision system (CVS). Classification and characterization of oils were performed by supervised chemometric methods such as partial least squares discriminant analysis (PLS-DA), and random forests (RF). The combination of e-nose and CVS demonstrated significantly successful results for detection of adulteration and geographical discrimination. RF analysis also produces feature ranking, permitting to shed light on what oils' characteristics influence the learning result. It was found that EVOO geographical provenance discrimination is mainly due to yellowness and guaiacol content, while (E)-2-hexenal chiefly determines the prediction of the hazelnut level.

Keywords: Colour vision system, extra virgin olive oil, electronic nose, random forests

Theme: Food Science and Technology

Multivariate Statistical Prediction of Health Related Properties of Chickpea Cultivars with FT-IR Spectroscopy

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Abstract

Chickpea is an ancient crop that was first domesticated in southeastern Turkey (dating back 8000 B.C.) and is currently cultivated in tropical, subtropical, and temperate regions of about 45 countries. Chickpea proteins and polysaccharides have many bioactive and functional properties that are important for health-related products and other processed products. Fourier transform infrared spectroscopy (FT-IR) technique is an attractive analytical method based on the vibration of functional groups found in the sample by infrared radiation exposure. It is simple, rapid, non-destructive, time and cost saving so that many researchers attempted to use this technique with combination of chemometric techniques. In this study, the predictive ability of FT-IR spectroscopy as a rapid and a reliable method to determine the health related properties such as total phenolic content, iron chelating activity, free radical scavenging activity were examined by using water soluble extracts of twelve registered chickpea cultivars which were grown in different harvest regions and harvest year. According to the results, the spectra of all samples gave similar trend for different harvest years and harvest regions only slight differences were observed between the spectra of the cultivars. PLS regression analysis was conducted as a multivariate statistical tool to predict the functional parameters of chickpea samples using unmodified FT-IR spectral data (4000 cm-1 to 450 cm-1). Regression coefficients of calibration and cross validation models were found as higher than 0.95. This study showed that FT-IR spectroscopy could be used as a rapid and reliable method for prediction of total phenolic content, iron chelating activity, free radical scavenging activity of chickpea cultivars.

Keywords: Infrared spectroscopy;chickpea;health;PLS regression analysis

Acknowledgement: This study was supported by Adana Science and Technology University Scientific Research Coordination Unit. Project Number MÜHDBF.GIDA.2015-14.

Theme: Food Science and Technology

Effect of adding muskmelon (*Cucumis melo* L.) fruit on physico-chemical properties and sensory attributes of yoghurt

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Abstract

Muskmelon (*Cucumis melo* L.) or cantaloupes is a rich source of vitamins, carbohydrates, sugars and protein, it was used as dessert and also eaten alone. This study is done with the objective of evaluating the effect of adding muskmelon either before or after processing of the yoghurt. It was also meant to assess some of the chemical constituents (total solids, fat, protein and ash contents), acidity and sensory attributes (flavor, color, texture, taste and overall acceptability) of muskmelon yoghurt. Fresh raw whole cow milk (6 liters) was obtained from Khartoum University farm. The cow's milk was first examined for chemical composition before the processing. Then the milk was heated at 95for 1 minute and cooled to 45. The milk was divided into 3 portions; in the first the slices of muskmelon (3%) were added before the incubation (45) of yoghurt and in the second the slices of muskmelon were added after the incubation, while the third portion was kept as a control (plain yoghurt). The starter culture was added at a rate of 3% and mixed well with the milk and other ingredients and then the different yoghurt samples were prepared and distributed into plastic bags (150 ml). The yoghurt samples were stored in a refrigerator (5-8 for 10 days) and the physico-chemical analysis and sensory evaluations were carried out on day 2, 5 and 10. The data showed non-significant ($P>0.05$) variations in the physico-chemical content of plain (control) yoghurt and those to which the muskmelon was added before or after incubation. Also the result indicated non-significant variations for total solids, fat and ash content during the storage period of yoghurt, while significantly ($P\leq0.01$) higher values were found for protein (2.86%) and acidity (0.72%) at day 2 of storage period. Similarly significant differences were found for flavor and texture ($P\leq0.05$) and taste and overall acceptability ($P\leq0.01$) of yoghurt. This study concluded that when adding slices of muskmelon to yoghurt, it is recommended to be done before incubation in order to give better flavor and overall acceptability and to avoid the high level of acid taste.

Keywords: Muskmelon slices, fruit yoghurt, incubation, chemical content, sensory properties, storage

Theme: Food Science and Technology

Influence of microwave and microwave-convective drying on the drying kinetics and quality parameters of pomelo

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Abstarct

This study investigates the effects of microwave (90 and 160 W) and combined microwave convective (90W-55°C, 90W-65°C, 90W-75°C, 160W-55°C, 160W-65°C and 160W-75°C) drying techniques on the drying kinetics, colour parameters (L*, a*, b*, C, α and ΔE) , total phenolic content and antioxidant capacity of pomelo samples. The drying data were fitted to nine typically used thin-layer drying models to select a suitable model for drying of pomelo. Comparing the statistical parameters of applied models, the Diffusion Aproach, Midilli et al. and Page models were found to be the best-fitting models in describing drying kinetics of the pomelo samples. It was observed that the drying temperature and/or microwave power changed significantly the all colour parameters, total phenolic content and antioxidant capacity. The combined microwave convective drying resulted in shorter drying times and high quality dried pomelo samples.

Keywords: pomelo, drying kinetics, colour, total phenolic content, antioxidant capacity

Theme: Food Science and Technology

Ultrasound technology to overcome the low solubility problem of plant proteins at pH values around isoelectric point

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Abstract

In recent years, a growing interest in protein-based acidic products, such as beverages has stimulated research and development activities exploring the interactions of proteins with a colloidal system at low pH levels. The use of plant proteins as ingredients in product formulations is notably attractive due to their functionality, eco-friendliness, nutritional value, and sustainability. However, plant proteins generally have low solubility under acidic conditions.

The objective of this study is to develop a plant-protein and polysaccharide-complex system to address the low solubility of the protein near the pI

A new polysaccharide-complex system was developed using the soluble plant protein nano-aggregates obtained by the mono-thermo-sonication (MTS) + pH shifting method. In particular, the effects of adding modified starch (MS) to soy-protein isolate (SPI) to form protein and polysaccharide complexes at pH 4.0 was evaluated by examining the functional properties of the complexes. The soluble protein content was determined by the Bradford method using BSA as the standard. The turbidity of the samples was measured using a spectrophotometer (Lambda 1050 UV/VIS/NIR Spectrometer, PerkinElmer, Waltham, MA, USA). The volume-weighted mean diameters ($D_{4,3}$) of the soluble proteins were determined by dynamic light scattering (DLS).

The protein and polysaccharides complexes exhibited a relatively high solubility around isoelectric point than that with protein alone. While the soy protein isolates treated with MTS and pH shifting combined method showed 10% solubility near the isoelectric pH (4-5), SPI-MS complexes showed around 40% solubility. The ultrasound treatment significantly decreased the particle sizes of the SPI-modified starch nanocomplexes around 300 nm.

The new protein-polysaccharide complex system may provide a good delivery system for the protection and delivery of hydrophobic bioactive compounds for the production of liquid food products, including acidic products, with enhanced nutritional values.

Keywords: Ultrasound; mono-thermo-sonication; protein-polysaccharide complexes; soy protein isolate; modified starch.

Theme: Food Science and Technology

Quality of fresh blackberry (*Rubus fruticosus* L.) fruit as affected by Ultraviyolet-C treatment.

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Abstract

Ultraviolet-C (UV-C) light treatment is a nonthermal process that can be used to inactivate microorganisms on the surface of fresh fruits and vegetables after harvest. Fresh blackberries (*Rubus fruticosus* L.) are highly perishable fruit, but have excellent nutritional and health benefits for consumers. The effects of UV-C treatment on firmness, pH, color (L, a, b value) and total bacterial count, total yeast/mold count of fresh blackberries was studied. UV-C light treatment was applied to the fruits at different doses of 50, 100 and 150 kJ/m^2 each delivered at two different dose rates (low and high). The quality parameters were evaluated immediately after the UV-C treatment and also after 7 days of refrigerated storage. The treatments did not have a significant effects on the firmness of blackberries. UV-C treatment at 150 kJ/kg resulted in higher pH of the berries. While the treatment did not affect the a values of the blackberries, the UV-C treatment at the high dose rate and highest dose caused significantly higher Chroma values in the samples. The samples had very low initial microbial load and thus the effect of the UV-C treatment on bacteria and yeast/mold counts were not detected. In conclusion, UV-C treatments up to 150 kJ/m^2 dose did not cause undesirable effects on quality attributes of the blackberries. Further studies on microbial inactivation on inoculated blackberries by the UV-C treatments are being made in our laboratory.

Keywords: ultraviolet light, blackberry, quality

Supporting Agencies: İTÜ-BAP

Theme: Food Science and Technology

Drying of Orange (*Citrus sinensis*) Slices Using Vacuum Infrared: Effects on drying kinetics and quality attributes

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Abstract

Drying is one of the oldest thermal processing technique which was aimed at reducing water activity, inactivate enzymes and limit deteriorative microbial growth. Conventional drying techniques give an adverse effect on quality and organoleptic properties of foods because of physicochemical changes occurring in the tissue during drying period. Vacuum infrared drying is a novel method that appropriates especially for thin layer and slices for achieving high-quality products. The main aims of this study were to determine the effect of drying temperature on orange slices in vacuum infrared dryer and to evaluate drying kinetics. The drying kinetics of orange slices were investigated in a vacuum infrared dryer at constant power (500 W), different drying temperatures (50, 60, and 70°C) and vacuum levels (877, 800, and 690 mbar). The effective moisture diffusivity values for vacuum infrared drying were calculated. The quality characteristics such as color values, bulk density, pH, acidity, water activity, total phenolic and ascorbic acid content of the dried products were also evaluated. Effective moisture diffusivity was increased with increase of drying temperature. Total color differences of orange slices were decreased with decrease of drying temperature. Total phenolic content values increased and ascorbic acid content values decreased when the temperature of vacuum infrared drying increased.

Keywords: vacuum infrared, orange, quality, drying kinetic.

Theme: Food Science and Technology

Effect of Addition of Beta-glucan on Physical Properties of Breakfast Cereals

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Abstract

Recently usage of dietary fibers especially beta-glucan naturally found in oats, barley and cell walls of fungi has been upsurging as its benefits to human-health have been comprehended properly. Beta-glucans as a source of water-soluble dietary fiber comprise a group of β-D-glucose polysaccharides. Beta-glucans have several health benefits as decreasing cholesterol level, balancing blood sugar level, and suppressing obesity which lead to usage of widespread beta-glucan for producing functional foods (Daou and Zhang, 2012). Apart from health benefits, beta-glucans improve the foods by texturizing, gelatinizing and stabilizing. Therefore, beta-glucan has been using as an ingredient to increase the fiber content of various food products including extruded foods for enhancing aforementioned health problems. Extrusion is mainly a thermo-mechanical processing operation that includes several unit operations, including mixing, kneading, shearing, heating and forming depending on the raw material and equipment used. The most preferred raw materials in the extrusion process are starch- and protein-based materials, which form the final structure and texture of the product.

In this study, beta-glucan which is extracted from barley (having 40% purity) was added to blends of corn and wheat semolina to produce beta-glucan enriched breakfast cereals. Beta-glucan percentages are 8.4, 15 and 25% on a dry basis. The extrudates were produced using a twin screw extruder at moisture content of 17%, screw speed of 500 rpm and die temperature of 130°C. 4 mm cylindrical die was used to form final shape of extrudates. Effects of beta-glucan addition on physical properties of extrudates such as expansion ratio, bulk density, textural properties, water solubility and absorption indices were determined.

Cheickna Daou and Hui Zhang (2012). Oat Beta-Glucan: Its Role in Health Promotion and Prevention of Diseases. ComprehensiveReviews inFoodScienceandFoodSafety. Vol.11,355-365.

Keywords: extrusion, beta-glucan, breakfast cereals

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Theme: Food Science and Technology

Chemical, rheological and yufka making characteristics of Aegean coast side region wheat

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Abstract

Yufka is flat bread which is a traditional food of Turkey. Aim of this study is to determine wheat genotypes suitable for yufka production. In this study, 17 genotypes which are originated from breeding programs of research institute, university. These materials selected in two years are analyzed for some chemical tests total gluten content, wet gluten , dry gluten gluten index, Zeleny sedimentation, modified Zeleny sedimentation, sds sedimentation, damaged starch, falling number and for some rheological tests extensograph, alveoConsistograph and farinograph. Penetration of dough, resistance to break and distance to break of yufka are studied by TA-XT texture analyzer. We determined the correlations between chemical, rheological properties and texture analyzer results. Modified Zeleny sedimentation, 45' extensogramme, alveoConsistograph W and alveoConsistographe Ie analysis have correlations between dough penetration and resistance to break and break distance of yufka.

Keywords: Yufka, wheat, dough

Theme: Food Science and Technology

Bioanalysis System for the Determination of Antimicrobial in Foods

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Abstract

Simple, fast and sensitive detection of antimicrobials in foods is highly important because of the prevention of health risks for consumers, and to prevent problems at the fermented food processing. It is important to perform these analyses before processing of raw material such as milk, at the farm or at the plant. Antimicrobial detection methods that are often used in foods such as immunoassays, high performance liquid chromatography (HPLC) and liquid chromatography/mass spectrometry (LC/MS) are very sensitive as well as they are over costing and specialization-required equipments.

In the scope of this study, development of a simple, fast, cost-efficient and sensitive whole cell based bioanalysis system is aimed. In accordance with this purpose firstly, transformation of Escherichia coli is done by the plasmid that contains green fluorescence protein (GFP) gene region. After transformation of E. coli, GFP expression was improved by the optimization studies (pH, NaCl level, washing procedure, shaking effect, O_2 effect, culture concentration and medium content) in the developed bioanalysis system. The effect of the culture pH and O_2 level on the analysis system was found so significant. It is obtained that when the pH increases emission peak shifts to left (decreases) and also the intensity of the peak increases. O_2 level was effected the bioanalysis system as increasing the cell count per unit time and also increasing the GFP expression yield per unit cell. After optimization of the bioanalysis system, antibiotic detection was carried out by pursuing the inhibition of viable bacteria cells at the presence of antibiotic. Changes in fluorescent intensity were pursued in the analysis system.

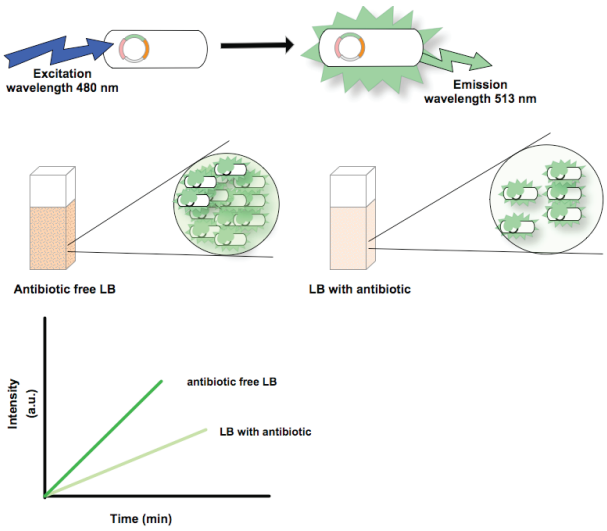

Fig. Schematic illustration of bioanalysis system

Keywords: Green Fluorescent Protein (GFP); Determination of Antimicrobial; Bioanalysis System

Theme: Veterinary Science

Determination of Behaviors of the Hydrophilic and Lipohilic Antibacterial Drugs in Skim Milk and Cream

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Abstract

The physicochemical properties of drugs influence the behavior of drugs in the body and biological fluids such as the milk. Lipophilic drugs tend to concentrate in cream of the milk while hydrophilic drugs tend to concentrate in skimmed milk. It is predicted that depending on the physicochemical properties of the drugs used accumulate at different concentration in separate parts of the milk. Thus, we aimed to show whether the withdrawal time of total milk differ from cream and skimmed milk. The study was also conducted in vitro to establish the relationship between in vivo and in vitro studies. It is aimed that the data obtained from this study is a guide for future studies. This study also may contribute to the development of a new method that will improve the using of the milk of drug administered animals.

In this study, amoxicillin and tylosin were selected as prototype of hydrophilic and lipophilic drugs, respectively. The study was conducted in two steps as in vitro and in vivo. In vivo study was performed in crossover design. In the study, healthy six Holstein breed cows supplied from private management which make intensive breeding were used as animal material. Firstly amoxicillin (IM, single dose, 14 mg/kg) was administered to cows. Milk samples were collected on day 0 (control) before drug administration and at 1, 3, 6, 9, 12, 24, 48, 72, 96, 120 and 144 hours after drug administration. Following washout period tylosin (IM, single dose, 15 mg/kg) was administered to each cow. Milk samples were collected on day 0 (control) before drug administration and at 24, 48, 72, 96, 120 and 144 hours after drug administration. Concentrations of amoxicillin and tylosin in whole milk, skimmed milk and cream were measured by HPLC-UV. The in vitro stage of the study, 0.004, 4 and 400 µg/mL concentration of amoxicillin and 0.05, 0.5 and 5 µg/mL concentration of tylosin were added to the drug free milk and drug concentrations in the whole milk, skim milk and cream were measured after incubation at 37 °C for 30 min.

It was determined that amoxicillin is more accumulated in the skimmed milk than the cream in both in vitro and in vivo stages of the study. Tylosin concentrations in whole milk and skimmed milk were similar the in vitro studies while the results of the in vivo studies showed that tylosin more accumulated in the cream more than the skimmed milk. But the rate of transition of tylosin to cream was less than expected.

As a result, it can be stated that amoxicillin with the hydrophilic accumulate less in the cream and therefore the legal washout period of amoxicillin in the cream may be shorter than the whole milk. But, there is needed for additional work with more sensitive analysis methods to verify this prediction. The concentration of tylosin in the cream was less than predicted. This may be due to the zwitterion property besides the lipophilicity of the tylosin.

Keywords: Amoxicillin, cream, distribution, hydrophilic, lipophilic, milk, skimmed milk, tylosin

Acknowledgement: This abstract was summarized from the PhD thesis of the first named author. This study is supported by SUPABK (17202008).

Theme: Food Science and Technology

The Influence of Ozone Treatment on the Some Structural and Chemical Properties of Hazelnut Oil

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Abstract

Ozone is a triatomic oxygen molecule and powerful oxidizing agent. Application of ozone as disinfecting agent in food industry has been gained an importance since it had been accepted as GRAS (generally recognized as safe) status by FDA in 1997. Suggested uses of ozone in food industry include disinfection of food surface, sanitation of food plant equipment, reduction of microbial load in the food storage atmosphere, reutilization of waste water, i.e. In the present work, the influence of ozone treatment on the some structural and chemical properties of hazelnut oil (HO) were investigated. The HO treated with ozone gas for 1, 5, 15, 30, 60, 180 and 360 min. The ozone reactivity with HO during ozone treatment were analysed by Gas Chromatography. HO contains a high proportion of unsaturated fatty acids (77.23 % of oleic acid, 11.39% of linoleic acid) and small proportion of saturated ones (5.61% of palmitic acid and 3.44 % of stearic acid). As ozone treatment proceeded, the proportion of unsaturated fatty acids especially oleic acid in the oil was observed to decrease. The percentage of oleic acid in the HO decreased by 86.34%, when linolenic acid and linoleic acid were destroyed completely after 360 min ozone treatment. An increase in the relative percentages of the saturated fatty acids with 360 min ozone treatment reached to the highest value. Thereafter, new peaks were observed in the chromatograms of ozone treated samples. Further, Iodine value (IV), viscosity of the untreated and ozone treated oil were measured. IV indicates the number of double bonds in the oil. The IV of HO reduced dramatically as ozone treatment time extended. The viscosity increased, whereas iodine value decreased with extended ozone treatment time. It was determined that the viscosity of HO increased 5.7 times after 360 min ozone treatment.

Keywords: Ozone, iodine value, viscosity, gas chromatography.

Theme: Food Science and Technology

Determination of the Bacterial Diversity of Fermented Foods by High-Throughput Sequencing of 16S Amplicons

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Abstract

Culture-independent microbial profiling techniques, which involves extraction and analysis of DNA directly from samples allow analyzing large numbers of microorganisms without the need for isolating and culturing them. Initially used to profile the microbial communities of deep oceans or soils, and then in human microbiome research, these techniques have recently attracted a great deal of attention in food microbiology. Among the culture-independent techniques, high-throughput sequencing (HTS) steps forward due to its sensitivity in identification and quantitation of microbial communities. In HTS, although sequencing of whole genomes is possible, generally, amplicon-based "targeted" approaches, which involves sequencing of only an informative region of the genome, are used as an easier and cheaper alternative. For identification of bacteria, the most widely used taxonomically informative region is the 16S rRNA gene. To perform a 16S-targeted amplicon based HTS analysis, the first step is DNA extraction directly from the food sample, which is a critical step since inefficient separation of impurities in the complex food matrix might inhibit the proceeding steps. Next, polymerase chain reaction (PCR) is performed using universal bacterial primers to amplify the 16S rRNA region. High-throughput sequencing and subsequent bioinformatics analysis gives information both on the identity and the relative abundance of the bacteria present in the sample. In food microbiology, especially fermented foods often consisting of a diverse group of microorganisms are perfect systems to be analyzed by HTS. Using HTS, we performed bacterial diversity analysis during the fermentation periods of hardaliye, which is a fermented grape beverage, and Thracian tarhana produced using sourdough obtained from koruk. While hardaliye fermentation has been found to be dominated by an acetic acid bacterium Gluconobacter frateurii, the most abundant bacterial species throughout the tarhana fermentation was found to be Lactobacillus brevis originated from the sourdough. HTS is a valuable technique that can be used for in-depth examination of the fermentation process. Understanding the complex microbial interactions taking place during the fermentation period would allow production of better quality fermented foods.

Keywords: High-throughput sequencing (HTS), 16S amplicon sequencing, bacterial diversity, fermented foods.

Agencies: İstanbul Sabahattin Zaim University BAP project BAP-1000-02

Theme: Food Science and Technology

Effects of Temperature and Storage Conditions on the Total Phenolic Content and Antioxidant Activity of Microcapsules including Strawberry Phenolics

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Abstract

Strawberries (Fragaria x ananassa) are widely used in food industry for production of juices. This causes production of high amounts of strawberry pomace, the residue obtained after juice production. It would be beneficial to develop a novel approach in the utilization of these waste materials. Strawberries are a rich source of phenolic compounds and antioxidants, which decrease the proclivity to several chronic diseases. Phenolic powder was obtained from strawberry pomace by maceration. Phenolics are easily degradable because of their sensitivity to light, oxygen and heat. Therefore, storage conditions of phenolic compounds are important for their shelf life. Microencapsulation is one of the techniques that are used for increasing the stability of phenolic compounds. In this study, the extracted phenolic powder was carefully encapsulated with 10% (w/w) maltodextrin solution by using high speed homogenizer. The objective of this research was to study the effects of storage conditions on the total phenolic content (TPC) and total antioxidant activity (TAA) of strawberry pomace and to find the retention of microcapsules at higher temperatures and their stability during storage. TPC was investigated by means of Folin-Ciocalteu method and TAA was measured by DPPH (1,1-diphenyl-2-picrylhydrazyl) method. TPC and TAA analyses were applied to strawberry pomace, freeze-dried strawberry pomace, maceration fluid and phenolic powder. The pomace was kept in three different mediums; namely, fridge (+4 °C), freezer (-18 °C) and deep freezer (-82 °C). The best storage condition is found as deep freezer in order to prevent phenolic loss. TAA results of strawberry pomace, freeze-dried strawberry pomace, maceration fluid and phenolic powder were found and to calculate the degradation of phenolic compounds, maceration fluid was kept at 60 °C, 40 °C and 25 °C during 180 min. The highest phenolic loss (35%) was found at 60°C. To understand the effect of microencapsulation, the encapsules of phenolic powder were also kept at 60 °C, 40 °C and 25 °C during 15 days. It was found that encapsulation protects phenolic compounds from degradation and increases the stability. For further studies, these microcapsules could be incorporated into foods and their bioaccessibility could be measured.

Keywords: Phenolic content, antioxidant activity, storage condition, strawberry pomace, extraction temperature

Agencies: Middle East Technical University

Theme: Food Science and Technology

Quality changes in coated shrimp with powdered herbal extracts

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Abstract

The aim of this study was to investigate quality changes in shrimp coated with powdered garlic, tomato, grape seed extracts. Commercial powdered extract was added into powdered mixture consisted of wheat flour, salt, Na_2CO_3 for coating. Five trial groups were formed in the study. (G; garlic, T; tomato, G; grape seed, M; mix of three extract, C; control). All groups were frozen and stored at -20ºC and investigated quality changes during the storage. Weight gain of shrimps with garlic, tomato, grape seed and mix of coating were 2.40, 1.64, 1.80 and 1.50%, respectively. The pH values of the shrimps treated with plant extracts were higher than the control group. All shrimp samples were in the edible form after storage period regarding TVB-N and TMA-N results. The highest TVB-N and TMA-N values were found in the control group compared to the groups treated with extracts. Antioxidant activity of grape seed extract suppressed the lipid oxidation process in shrimp samples. The lowest TBARS results were found in mixture and grape seed extract treatments at the end of the storage. Other extracts were not effective in inhibition of lipid oxidation and had higher TBARS scores than control samples. All extracts, especially mixtures and garlic extracts, have played a role in reducing microbial load. The highest total number of psychrophilic bacteria was determined on control samples every month during frozen storage. Sensory scores significantly decreased during the storage. The highest odor, taste and appearance scores were observed in the shrimp treated with garlic extract. The lowest scores were found in the control group at the end of storage. It was concluded that use of plant extracts in coating affected the quality of shrimp during frozen storage and the most protective effect was observed in the garlic extract. Extract mixture also showed a synergistic effect.

Keywords: Shrimp, coating, plant extracts, grape seed, garlic, tomato

Agencies: Akdeniz University

Theme: Food Science and Technology

Determination of Catechol in Water Extract of Tea using CPE Modified with Banana tissue

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Abstract

Tea, one of the most popular consumed worldwide beverages, is known to be rich in polyphenols, more particularly in catechin and catechol. Carbon paste electrode modified with banana crude tissue for determination of catechol in green tea was developed. Polyphenol oxidase enzyme that is present in banana fruit tissue was immobilized into carbon paste electrode CPE-B and the analytical performance of the biocomposit is investigated. The electrochemical properties were assessed by using square wave voltammetry in phosphate buffer 0.1 M, pH 7 using standard solutions of catechol. This biosensor exhibits a high sensitivity 2.32 µA/mg and a low detection limit 0.1 mg/L. The linear zone between peak high and catechol concentration was found from 1.4 to 15.7 mg/L with correlation coefficient 0.9990. Reproducibility of the signal obtained in 1.4 mg/L catechol resulted with relative standard deviation 3.6 % (n=4). The storage stability was also studied; the biosensor retained successively 85% and 75% of its initial response after 24 and 40 days. The biosensor was applied for the determination of catechol in green tea samples using two extraction methods (by water solution (141 ± 8.3 mg/L) and phosphate buffer solution (478.5±6.8 mg/L). The calculated recovery was between 89% and 92%, proving that the proposed CPE-B biosensor can be an alternative analytical tool for determination of catechol in tea.

Keywords: Green tea, carbon paste biosensor, crude tissue, PPO enzyme, catechol, square wave voltammetry.

Theme: Food Science and Technology

Investigation of Some Microbiological Properties of Roasted Peanuts Purchased from Adana Province

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Abstract

In this study it was aimed to determine the microbiological quality of roasted peanuts purchased from Adana province. For this purpose the microbiological quality of the roasted peanuts purchased from Adana province has been determined in terms of pathogens such as Salmonella, Listeria, coliform, E.coli as well as yeast and mold, total aerobic mesophilic bacteria. 27 of the 32 peanut samples which purchased from the snack shops, the total aerobic mesophilic bacteria were found to be between 2.0±0.2 - 5.0±0.1 log CFU / g. While in 2 samples coliform group bacteria were found to be 3 EMS / g - 23 EMS / g, and were not found E.coli. In 19 samples, yeast were found to be between 2.7±0.1 - 4.9±0.2 log CFU / g and mold were found to be between 1.6±0.2 - 3.3±0.1 log CFU / g in 5 samples. A total of 32 samples purchased from snack shops were found to be clean in terms of Salmonella, E-coli and Listeria.

Keywords: Peanut (Arachis hypogaea L.), food safety, microbiology, pathogens

Theme: Food Science and Technology

The Microbiological Quality of Edible Nuts

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Abstract

Nuts (including hazelnuts, peanuts, pistachios, walnuts, almonds, cashews, etc.) constitute an important part of our daily diet. They are a particularly important nutrient group because they contain protein, dietary fiber, vitamins, minerals, and especially unsaturated fatty acids. These products which were once thought to be microbiologically safe, have, in recent years, been shown to be contaminated with foodborne pathogens, leading to numerous food product recalls and foodborne illness outbreaks. The objective of this study was to determine the microbiological quality of nuts purchased randomly from different supermarkets and small shops in Adana, Turkey.

A total of 50 nut samples including walnut kernel, peanut, hazelnut, almond, and shelled pistachios were analysed. Microbial quality of the nut samples were evaluated with regard to the following groups of microorganisms; total aerobic colony count, yeast and mold, coliform bacteria, Escherichia coli, Salmonella spp., Staphylococcus aureus and Listeria monocytogenes, by standard procedures.

Of the 50 samples, 40 were found to be contaminated with the microorganisms investigated except Salmonella spp. and yeast. Both coliform bacteria and E.coli were found at the range of 3,6 to 1100 MPN/g. Staphylococcus aureus was found as $5x10^1$-$2x10^2$ CFU/g. Molds and total aerobic bacterial count were at the range of $5x10^1$-$1x10^2$ CFU/g and $5x10^1$-$36x10^2$ CFU/g, respectively. The presence of suspicious Listeria colonies were seen in 3 of the samples including walnut kernels and peanuts.

These results demonstrate that nuts are a potential source of microbial contamination in Turkey.

Keywords: nuts, pathogens, microbiological quality

Theme: Food Science and Technology

Comparison of two different methods for the identification of Salmonella spp from poultry samples

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Abstract

This study was conducted to comparise two identification method for Salmonella spp which includes biochemical test and Microbial Identification System (MIS) methods A total of 120 pieces of chicken samples examined in this study was provided from the markets in Erzurum city. The samples includes 40 pieces of chicken wings, chicken legs and chicken breasts. All the samples were analyzed for Salmonella spp using the classical culture technique (ISO 6579).

The results of this study showed that 40, 34 and 26% of wings, legs and breasts samples were contaminated with Salmonella spp.,respectively. It was found 35 out of 120 samples (29%) were positive for Salmonella. Of the 35 isolates, 16 isolate were identified as the predominant serovars, Salmonella Typhimurium, in both of two methods. Furthermore, it was found that the predominance of other Salmonella spp in the samples was mostly Salmonella enterica (15 isolates) followed by Salmonella Choleraesuis (4 isolates).

As a result, there could not found any differency when the results of both methods were evaluated. Biochemical tests are found to be appropriate for the identification of Salmonella spp. However, when we try to isolate isolated Salmonella species on serovar and serotype basis, the fatty acid methyl esters (FAME) (MIS) method is considered to be suitable method for clearer identification.

Keywords: Salmonella spp., chicken, ISO 6579, Microbial Identification System.

Theme: Food Science and Technology

Effects of Pomegranate Peel Supplementation on Chemical, Physical and Nutritional Properties of Muffin Cakes

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Abstract

Pomegranate peel is one of the by-products of food industry which remain as a by-product after pomegranate juice production, and it constitutes 26-40% of the whole fruit [1]. Guo et al. [2] were found in their study that pomegranate peel had the highest antioxidant activity (82.11 mmol/100g wet weight) among the peel, pulp and seed fractions of 28 kinds of fruits commonly consumed in China.

Bakery products are consumed all over the world and cake is one of the most consumed bakery products. Wheat flour, eggs, sugar, fat/oil, baking powder are the main ingredients in cake formulations [3] and in this study, it was thought that muffin cakes could be an alternative food for the consumption of pomegranate peels.

In this research, during the production of cakes, wheat flour was partially (5, 10 and 15%) substituted with pomegranate peel meal and some chemical, physical and nutritional properties of cakes were determined. Pomegranate peel addition caused a significant ($p<0.05$) increase in insoluble and total dietary fibers, Mg, Ca, K contents, total phenolic contents and total antioxidant activity values. In color analyses, it was found that crumb and crust Hunter L and b values and crust Hunter a value decreased ($p<0.05$) by increasing the amount of pomegranate peel meal in the formulation. Specific volume, symmetry index and uniformity index values of all cakes were similar ($p>0.05$). The addition of pomegranate peel significantly ($p<0.05$) increased hardness and decreased springiness values in texture analyses. Control cakes and cakes having 5% and 10% pomegranate peel in the formulation received similar ($p>0.05$) scores in smell and flavor. Although the control samples received the highest scores for all sensory characteristics, pomegranate peel-added cakes also received scores above the average appreciation score.

Keywords: Pomegranate peel; antioxidant activity; phenolic; dietary fiber; physical; sensory

Agencies: This work was funded by Pamukkale University, Unit of Scientific Research Projects, Turkey (Project No: 2015FBE033).

Theme: Agriculture

Investigation of the Bio-Dynamic Commands Use Effect on Mucilage Content and Germination Behavior in 3 Ecotype of Basil (*Ocimum* Sp.)

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Abstract

One of the most popular and useable of Aromatic plants are kinds of Basilica (*Ocimum* sp., Lamiaceae). This genius has different characteristics in behavior germination. Biodynamic agriculture is a new science in the research and especially, the position of stars and planet relative to each other, position of moon around the earth and seasonal change and Solar and lunar eclipses (Steiner, 1924). We must to demonstrative of this theory. In this experiment, we want to record the effect of based on tow calendars (biodynamic and Astronomic) on 3 ecotype of Basilica seed germination. The based on this experiment randomized block design with 3 replications. We use 50 seeds in Falcon tube (value=15ml) and record the weight and value of seed in tube. Then added 5ml of water in tube and shacked after moisturized and control and record of Mucilage value and another behavior of seed germination in lab condition. Results showed that different position of some planets such as moon and Mars and Jupiter had the highest effect, positive and significant effect on mucilage percent (p>95%), germination speed and length of root. Therefore, we could be express the lunar position had the highest effect on root length of local type and the lowest effect on purple basil. Mucilage percentage of seed coat in green basil had the highest content relative to another ecotype and this content was significant (p>95%). Then, the best suggest for produce of mucilage from the basil seeds, the best time is the first quadrature of moon.

Keywords: Basil; Bio-dynamic; Germination; Mucilage; ecotype

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Agencies: ACECR

Theme: Nutrition

Color, Phenolic Content and Antioxidant Activity of Tarhana Containing Mushroom Powder

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Abstract

Pleurotus ostreatus is one of the most known edible mushrooms and often consumed by local people in Turkey. It is also very rich in protein, various minerals and vitamins containing low fat and calorie. Tarhana is known as classic soup of Turks and it is a type of both dried and fermented product. In this study, P. ostreatus was produced in Mushroom House of Osmaniye Korkut Ata University. Harvested mushrooms were dried during 1 day at 60°C and then powdered by blender. Tarhana samples were manufactured by adding P. ostreatus powder (in the rates of 20, 40, 80 and 100%) into formulation (including wheat flour, yoghurt, onion, tomato and pepper paste, yeast and salt) which were substituted for wheat flour. The color values, antioxidant capacities (by DPPH and FRAP methods), phenolic and flavonoid contents of tarhanas were investigated. When powder concentration was increased, L* (brightness) and chroma values decreased from 79.60 to 39.61 and from 38.58 to 24.32 respectively, however ΔE (total color change) enhanced (between 12.95 and 42.89). The antioxidant capacities of tarhanas with mushroom were evaluated in the range of 0.31 and 0.50 mM trolox equivalent by DPPH method and in the range of 0.88 and 3.61 mM trolox equivalent by FRAP method on dry basis. Both the phenolic (32265. 31 ppm gallic acid equivalent/kg dry matter) and flavonoid (724.14 ppm catechin equivalent/kg dry matter) contents were the highest at 100% powder rate.

Keywords: Pleurotus ostreatus, mushroom, tarhana, fermented product, antioxidant activity.

Theme: Food Science and Technology

Drying Kinetics of Coriander Leaf in a Microwave Dryer

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Abstract

Coriander (*Coriandrum sativum* L.) is widely distributed and mainly cultivated for the seeds. The seeds contain an essential oil (up to 1%) and the monoterpenoid, linalool, is the main component. Coriander seed is a popular spice and finely ground seed is a major ingredient of curry powder Drying is one of the post-harvest processes of wet agriculture products and is applied in very different ways. The choice of the appropriate drying method for medicinal and aromatic plants is the most important step for successful drying. In this study, microwave drying of the coriander was carried out as an alternative way to conventional drying methods and drying kinetics at different microwave powers were determined. Drying experiments were carried out using a household microwave oven and three different microwave powers (125, 375 and 625 W) were used. The initial weight and the weight of the samples during drying were recorded to calculate dimensionless moisture ratio. The experimental drying data of coriander were used to fit Page, Logarithmic, Approximation of diffusion and Two-term models, and drying rate constants and coefficients of models tested were determined by non-linear regression analysis. The model having higher coefficient of determination (R^2), lower root mean square error (RMSE) values were selected as the best fitting model. According to the results, the drying times decreased when the power increased. The mathematical model defined by Page was the best fitted model at all conditions. The highest rehydration capacity was recorded for the samples dried at 125 W and lowest at 625 W.

Keywords: Coriander, drying kinetic, mathematical modelling, microwave drying

Theme: Food Science and Technology

Functional properties of dried coriander leaves as affected by method of drying

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Abstract

Herbs and spices are used to season foods throughout the world. These are the aromatic substances that enhance savoury character as flavouring agents and as appetite stimulants. Coriander (Corianderum sativum L.) has a pleasant aromatic odour. The fresh plant (stem and leaves) is used as an herb for culinary purposes, while the dried fruit is used as a spice. It is one of the most consumed culinary herbs. Coriander leaves possess antioxidants and exhibit stronger antioxidant activity than the seeds. Drying is one of the oldest and most traditional method to preserve biomaterials. Coriander was dehydrated in two different drying equipment (infrared and microwave dryers) in order to compare the drying and final product properties (moisture content, water activity, colour change and physical properties). Three different output power levels of 125, 250 and 500 W were used for microwave drying, whereas the infrared drying treatment involved three drying temperature levels that were 60, 70 and 80°C. A comparison of the drying kinetics, data revealed that microwave drying was more effective in shortening drying time when compared with infrared drying. The entire drying process took place in the falling rate period for both microwave and infrared dried samples. The results show that infrared dried coriander samples exhibited a significantly greater colour change than microwave dried coriander samples. This study has demonstrated that microwave drying treated samples better rehydration potential.

Keywords: Coriander, functional properties, infrared drying, microwave drying

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Theme: Food Science and Technology

The Study of Elimination Potential of Sulfur Blankit ($Na_2S_2O_4$) and Recovery of Sugar Juice Specification in Sugar Factories Using Membranous Nano-filtration Method

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Abstract

In the sugar industry using membrane filtration process designed to remove Blankit chemical substances, impurities and non-sugar compounds, keeps the nutritional value of sugar, reduces energy consumption and increases crystallization efficiency (Lancrenon and Kientz, 1993; Mohammad et al., 2007). Since most Nano-filtration membranes have superficial load, in Nano-filtration membrane processes, in addition to the mechanism of action (depending on the size of the molecules of the soluble components and the size of the membrane pores), the phenomenon of (electrostatic) caused by the surface charge of the membrane, in isolation and the percentage of excretion Organic compounds are effective (Darwish et al, 2007). In this study, in order to remove the Blankit sulfur substances (Na2S2O4)- because of its Irrecoverable effects on people's health -and improve the properties of the waste water (color, ash, turbidity, non- sucrose rejection percentage, sucrose remove percentage, purity rate) – considering the effect of parameters of pressure difference at three levels (5, 10, 15) times, the temperature at three levels (20, 40, 60) degrees Celsius and time in three levels (20, 55, 90) minutes on Nano-filtration process efficiency, statistical pattern of response level to the mentioned traits was used (Schneider,1978). Results showed that at the high levels of pressure and temperature, the removal percentage of Blankit, color, ash, turbidity and non- sucrose rejection percentage reduced. But as more time passes due to the compactness polarization layer growth, removal rate (Blankit, color, turbidity, ash and non- sucrose substances) was increasing. The rejection percentage of sucrose in high-pressure surfaces reduced. The maximum percentage was in 20 degrees Celsius and 5bar pressure and the minimum percentage was in 60 degrees of Celsius and 15bar pressure. The higher purity was the result of applying lower pressure and lower temperature in longer times. Results showed that the quantity of Blankit, color, turbidity and ash in syrup obtained from the use of Nano-filtration membrane process compared with the traditional method significantly (98%) decreased. With increasing pressure from 5 to 15 bar the amount of Blankit, color, turbidity and ash in syrup obtained from Nano-filtration membrane respectively (48.86%, 57.54%, 78.72%, 66.67%) and traditional methods (44.28%, 36.67%, 75.29%, 50%) was reduced. The results reflect the positive impact of treatments on the syrup produced by the membrane Nano-filtration process.

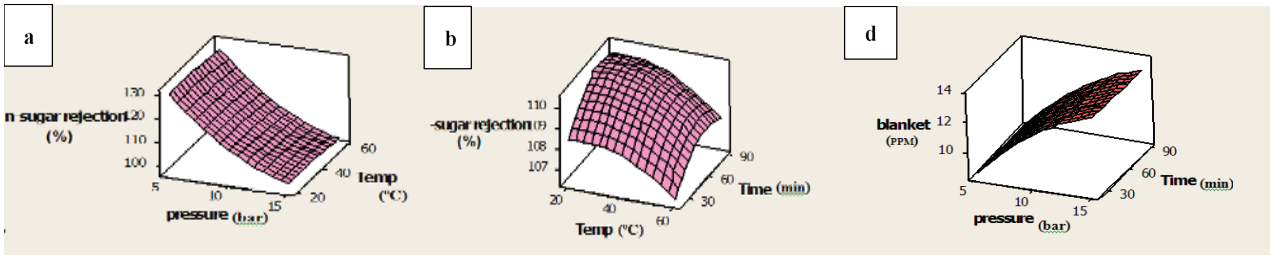

Figure1. Interaction effect of Temperature and pressure on non-sugar rejection (%); b. Interaction effect of Temperature and time on non-sugar rejection (%); d. Interaction effect of pressure and time on Blankit (ppm)

Keywords: Blankit; purity; non-sucrose material rejection; Nano-filtration
Agencies: Tebyan toos Institute

Theme: Nutrition

Effects of Different Formulation in Zerde Production*

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Abstract

This study investigated that the effect of the utilization of different formulation on zerde production. Saffron, safflower, turmeric, saffron-turmeric combination, safflower-turmeric combination were assessed as different materials in zerde production. Zerde is a sort of sweet pudding from rice. It is colored yellow with saffron. The changes of phenolic content, antioxidant activity and sensory properties of zerde samples were examined at during storage period. Zerde samples containing turmeric were determined to have higher general appreciation scores compared to the other samples during storage period (except 1. day). Zerde containing saffron was lower taste scores than that of another samples the end of storage. It was determined that samples containing safflower and turmeric showed the highest antioxidant activity.

Keywords: zerde, saffron, safflower, turmeric

* This research was funded by the Research Unit of Pamukkale University (2016FEBE010)

Theme: Nutrition

The effect of ecotourism development on endemic herbs conservation on harvest of pastured from natural area, Golmakan region, Iran

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Abstract

Natural tourism or travel to the natural environment is the new most attractions for some peoples in this century, but the eco-tourism is responsible travel to natural areas that conserves the environment and improves the well-being of local people. Herbal plants are an important part of natural environments. Golmakan is the beautiful region in Khorasan Razavi province of Iran. In this study we research the impact of ecotourism on medicinal plant biodiversity and vegetation communities in there. The results showed positive significant effect on herbs and increasing visitation of medicinal plants in this area between 4 years of ecotourism activity in there. Because some direct effect of tourism entrance to natural environments such as clearing of vegetation for infrastructure or damage from trampling, horse riding, mountain biking and off road vehicles has been decreased and environmental behavior has decreased and protected area after educated of ecotourism groups, learn local people about the best time and methods of harvesting, conservation method and training local tour guide skills them to conserved and developed herbal plants there. We could be recorded increasing trend of herbal population of lamiaceae family. The results indicate that the richness and individual indices show significant effects of ecotourism on biodiversity indices. This includes self-propagating impacts associated with the spread of some weeds from trails and roads. Golmakan has the rich population and genera of medicinal and aromatic plants. as well as, result showed that positive effec of revitalization of range on quality Production of milk and livestock. These products are purchased by regional ecotourists.

Keywords: Medicinal plants, Eco-Tour Guide, lamiaceae, Binaloud mountain

Theme: Agriculture

Quality Properties of Cheeses Dried at Different Temperatures*

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Abstract

Drying is one of the oldest known food preservation methods . It has been widely used for centuries. Cheese was enriched by adding dill and blackcumin to the çökelek cheese. Then

samples were dried in in a tray dryer at three different drying air temperatures (40, 50 and 60 °C). This study investigated the effect of different treatment and drying temperature on the chemical, and sensory properties, phenolic content and antioxidant activity of cheese . Cheese produced by using black cumin had higher the phenolic content and antioxidant activity than those of dill added cheese. Sensory attributes influence consumer choice. In the study, the odor scores of cheese produced by adding black cumin were lower than the other samples. The cheeses added to black cumin were less preferred by the panelists. Cheeses dried at 50 °C were found to have higher scores in general general appreciation scores.

Keywords: Drying, black cumin, dill, çökelek, dried cheese

*This research was funded by the Research Unit of Pamukkale University (2012FBE019 and 2018KRM002-463)
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Theme: Nutrition

The Comparative Effect of Hydro Alcoholic and Hydro Distillation Extracts of *Melissa Officinalis* on Acne and Pimple

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Abstract

One of the famous plants in family Lamiaceae is *Melissa officinalis* which is one of the important herbs for health and Medicine. Melisa contains rosmarinic acid, flavonoids and fenolics. These components have thightening and rejuvenation effect on skin. Also, it has monoterpenes and diterpens which are antibacterial. Essential oil of Melisa forms a good complex with sebum, so it can decrease inflammation and acne pain

30 gr of dry leaves and stems of melisa in 500 ml of distilled water were used for hydrodistillation. For hydro alcoholic extract, we used 150 gr of dry matter (leaves and stems) in 500 ml of ethyl alcohol at 25° C for 10 days. Then, the alcoholic extract was diluted 5 times with water 20 persons were under experiment for 3 month. Extracts were sprayed on skin 3-5 times a day.

The results showed that all the people treated got the best result of this treatment. After the application of the water extract of melisa, we observed 75% of clients improved the skin pore, 65% of clients improved neurological problems and Acne infections and 92% recovery of hyper secretion of Sebaceous glands. We observed the same results with Hydro Alcoholic extracts. 75% recovery of clients with improved skin pore, 95% of clients with improved neurological problems and Acne infections and 90% recovery of hyper secretion of Sebaceous glands. The results showed that Melisa extract has value of applying on some skin problems.

Keywords: Acne; hydro alcoholıc extracts; hydro dıstıllatıon extracts; melissa; pımple

Theme: Food Science and Technology

Effect of citric acid and lactic acid modifications on functional properties of corn and sorghum starch

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Abstract

The present study isolated starch from corn and sorghum grains through wet milling procedure. Sorghum starch is considered an alternative to corn starch in future, due to similar functional properties. However, agronomically sorghum is a cheap input cost crop compared to sorghum and can grow in drought hit areas where it is difficult to cultivate corn. Lactic acid and citric acid modifications with and without heat treatment were performed on both sorghum and corn grains followed by their comparison in terms of functional, textural, thermal, pasting and digestibility characteristics. For both sorghum and corn starches, slowly digestible starch increased after chemical modifications. Peak visocsity reduced after chemical modifications as observed through microviscoamylograph. Chewiness significantly reduced after lactic acid and citric acid with and without heat treatments. For sorghum starch, significant decline in percent retrogradation was observed after acid treatments. The crystallinity to amorphous ratio reduced after all chemical treatments. Paste clarity was further reduced after heat treatments, however the effect for corn was more pronounced. Citric acid and lactic acid are safe methods of chemical modifications and reduce the digestible content of starch and thus could be used in production of low-calorie foods.

Keywords: Starch; chemical modifications; sorghum, corn.

Agencies: Higher Education Commission

Theme: Food Science and Technology

Effects of the combined use of different commercial proteolytic enzymes in the production of enzyme-modified cheese with ripened white cheese flavor

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Abstract

Enzyme-modified cheese (EMC) is a natural flavor enhancer produced from fresh cheese curd to obtain an intensified cheese flavor in a short time period under controlled conditions by the aid of enzymatic reactions. In the production of EMC, proteolytic and lipolytic enzymes are used. Although EMC production is the cheapest way, the enzyme types and incubation times should be optimized with respect to the targeted cheese flavor. In this study, the effects of the use of proteolytic enzymes on the cheese ripening parameters were investigated. The fresh white cheese was used as raw material and five different commercial enzymes including endopeptidases (Neutrase and Promod 215MDP) and exopeptidases (Flavourzyme, Flavorpro 937MDP, and Flavorpro Umami 852MDP) were tested in six different endopeptidase+exopeptidase combinations at three different incubation times (4, 8, and 12 hours). The soluble nitrogen fractions were analyzed and ripening indices were calculated. Moreover, the volatile compounds were identified and quantified. Additionally, the sensory analyses were performed. The most appropriate enzyme combination and incubation time were determined to produce the EMC with ripened white cheese flavor by using the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). The combination of proteolysis suitable for EMC production with ripened white cheese flavor was Neutrase and Flavorpro 937MDP and the incubation time was 12 hours. Results showed that tricholoroacetic acid-soluble nitrogen/water-soluble nitrogen and phosphotungstic acid-soluble nitrogen/ water-soluble nitrogen ratios can be used as parameters to stop proteolysis in EMC product development. This work was supported by The Scientific and Technological Research Council of Turkey (TUBITAK) [project no: 115O229].

Keywords: enzyme-modified cheese, ripening, proteolysis.

Agencies: The Scientific and Technological Research Council of Turkey (TUBITAK) [project no: 115O229]

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Enzyme-modified cheese technology and the production steps of enzyme-modified cheese with ripened white cheese flavor

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Abstract

Recently, in addition to the direct consumption, a significant portion of the cheeses are consumed as an ingredient in the product formulations of other foods. The main reason for using the cheese as an ingredient is its unique flavor. The cheese flavor is developed during the ripening period, which is a long and expensive process. Moreover, standardization of the product and its flavor is not easy during the ripening period. A variety of products have been developed to overcome these problems, such as synthetic flavor additives, cheese powders, and enzyme-modified cheeses (EMCs). Among these products, EMC becomes prominent in terms of its low-cost, stable, easy to use, and standard flavor ingredient with consistent cheese flavor properties. However, factors such as composition and type of the raw materials, types and concentrations of the enzymes and/or starter cultures, enzymatic process parameters and processing aids used during the production should be optimized with respect to the target cheese flavor. Therefore, research and development studies are important to achieve the intended cheese flavor in EMCs. In this study, the information about the EMC products and technology was shared and studies about the EMC production were reviewed. Moreover, some results of an ongoing scientific project focused on the production of an EMC with ripened white cheese flavor were given. This work was supported by The Scientific and Technological Research Council of Turkey (TUBITAK) [project no: 115O229].

Keywords: enzyme-modified cheese, ripening, proteolysis, lipolysis, powder.

Agencies: The Scientific and Technological Research Council of Turkey (TUBITAK) [project no: 115O229]

Theme: Food Science and Technology

GC-olfactometric characterization of the potent aroma-active components in traditional Moroccan fermented milk: Lben

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Abstract

Lben is one of the main traditional dairy products in Morocco made by empirical methods based on age-old experience. It is a fermented skimmed milk obtained by spontaneous fermentation from cow milk. Nowadays, it is broadly consumed as a refreshing beverage and plays a significant role in the food industry due to both their functional and nutritional features and their impact on taste, aroma and health. Although aroma is a main quality factor for this kind of fermented dairy products as a characteristic parameter, there is limited information about aroma profile of this product in the literature.

Many extraction techniques have been carried out to extract the aroma compounds of dairy products. Therefore, in this study, aroma compounds was extracted by different isolation methods including solid phase extraction (SPE), liquid-liquid extraction (LLE), static head space (SHS) and solvent-assisted flavor evaporation (SAFE). Among the extraction methods according the sensory analysis results, the SAFE was quantitatively and qualitatively detected as the most representative and reproducible method for the extraction of aroma compounds in the studied sample. A total of 19 volatile compounds were detected as aroma compounds. Based on the GC-MS-Olfactometry (GC-MS-O) technique using aroma extract dilution analysis (AEDA) method, 9 compounds were found to be the most potent odor-active compounds characterized the lben aroma.

Keywords: Lben, aroma-active compounds, SAFE, GC-MS-O, AEDA

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Application of *Inula viscosa* L. extracts on Bread and Antifungal Activitiy

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Abstract

Fungi are the most important problem in bakery industry, especially in bread. In unpreserved bread a shelf-life of 3–4 days may be expected especially if the hygiene in the factory is not sufficiently high (1). Fungi contamination determines not only changes in colour, taste, but also loss of the food quality as a result of possible formation of mycotoxins. Mycotoxins can cause a variety of adverse health effects in humans such as carcinogenic, mutagenic, teratogenic and allergenic (2). Today consumers demand less use of synthetic preservatives but still they expect food to be free from microbial growth, toxins and other quality deteriorating factors. Therefore, safe natural food preservatives have become a priority for human consumption and food industry (3). Since *Inula viscosa* L. has biological active compounds and antioxidant capacity, it has strong antimicrobial activity. In this study, three different methods such as ABTS (2,2′-azinobis-(3-ethylbenzothiazoline-6-sulfonic acid) diammonium salt), DPPH (2,2-diphenyl-1-picrylhydrazyl) and CUPRAC (cupric reducing antioxidant capacity) assays were used for determination of antioxidant capacity and bioaccessibility. In addition, we aimed to evaluate applicative effect of *Inula viscoca* L. aqueous and ethanol extracts and to investigate its antifungal characteristics against *Aspergillus* spp. and *Penicillium* spp. in bread production. Measurement of mycelial growth percentage and disc diffusion assay were done to determine antifungal activity. Ethanol extract of this plant showed better antifungal activity in bread production. The antioxidant capacity and bioaccessibility of bread with both I. viscosa extracts were higher than control. Because of high antioxidant capacity and possible antifungal activity, *I. viscosa* may be used as a natural preservative in bakery products.

Keywords:Bread, *Inula viscosa*, antioxidant capacity, bioaccessibility, antifungal activity,

Theme: Food Science and Technology

Effect of Active Packaging (Oxygen Scavengers) and MAP on the Physicochemical and Microbial Quality of Sliced Bread

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Abstract

The objective of this study is to extend the shelf-life of sliced sourdough bread by active packaging combined with modified atmosphere. The bread slices were packaged using BOPP/PVDC bags and six different groups were prepared as follows: MAP (100%N_2) and air atmosphere (21% O_2; 79% N_2) in combination with low (100 cc) and high (300 cc) capacity oxygen scavengers, and only MAP (50% CO_2; 50% N_2) and air atmosphere. The quality indices (headspace gas, color, texture, pH, water activity and visual microbial growth) of the packaged product were monitored for 18 days at 22˚C. The initial level of oxygen (21%) decreased quickly below 2% in 3 days in the package headspace containing high capacity oxygen scavengers, while it took 6 days for the packages with low capacity scavengers. L* value tended to decrease and a* and b* values tended to increase during increased storage for all applications. The compressive force (N) representing hardness increased in all applications during storage period possibly due to staling ($p \leq 0.05$). There was no significant difference between applications in terms of texture at the end of the storage ($p > 0.05$). pH values slightly increased for the product packaged with air during storage. The water activity of crumb did not change much between applications. However, the water activity of the crust increased during storage at all applications which could be related to the transfer of moisture from crumb to crust. There was no visual microbial growth observed on the product packaged with 100% N_2 in combination with high capacity scavenger for 12 days, whereas it was 9 days for the product packaged under air with high capacity oxygen scavenger. Overall, the sliced bread was acceptable for 12 days when packaged with high capacity oxygen scavenger combined with initial gas level of 100% N_2.

Keywords:Active packaging, MAP, oxygen scavengers, shelf-life, sliced bread

*This study is supported by Sakarya University (SAU-BAP 2017-50-01-019).

Theme: Food Science and Technology

Could Avocado be the New Alternative for Healthy Unsaturated Oil Source?

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Abstract

Oil is one of the mostly consumed food component where it plays a starring role while food processing and cooking. Oil is being used as a calorie source and texture supplier, as well as creating moist environment in the food and bonding fat soluble components. Despite nutritional and technical aids, oil source and oil production technology is being questioned by the consumers, who are looking for healthy options for the highest calorie giving substance as well as giving functional feature. Oil pressing technology is facing changes in the main manufacturing procedures nowadays by increasing expectation trend of cold pressing. For the other fruits such as olive oil cold-pressing became the usual manufacturing method while for the fruits such as avocado is relatively new for using as an oil source where consumers ask for cold-press process. Production volume of the avocado cold press oil is found to be 2000 tones/year. Despite the increasing demand on the unsaturated functional oils such as avocado oil, there are limited number of studies on the characterization of the avocado oil and determining the effect of the production technologies on the quality. The main reason for the cold-pressing demand is due to the easy and low cost manufacturing as well as maintaining the nutritional compounds unchanged. On the other hand, non-thermal applications of oil manufacturing were found to be useful for storing the physical and chemical characteristics of the oil. This study aims to highlight the oil pressing options of the avocado oil which is one of the best alternative fruit for the oil source with its high oil content. On the other hand this study will show the functional content of the avocado oil with its possible usage field.

Keywords: Avocado, Avocado oil, Pressing technology, Functional foods

Theme: Food Science and Technology

Effect of Triple Pot Still Distilation On The Volatile Compositions During the Raki Production

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Abstract

Raki is a traditional alcoholic spirit that distills from grapes/raisins distillate with aniseed (Pimpinella anisum) in copper pot still distillers. Raki is the most produced and consumed spirit beverages in Turkey and also have been honored with the distinction of Protected Designation of Origin (PDO). According to Turkish Distilled Alcoholic Beverage Regulation (2016/55), grapes or raisins based distillates so called "suma" is originated from grapes/raisins that is distilled up to 94.5% volume by continues still distillation with the purpose of keeping the flavor and smell of grapes. At the second stage, suma distills with aniseed by pot still distillation. During distillation, middle cut fractions are separated and used for raki productions and then diluted by water to 40-45% alcohol concentration. Lately, despite of classic production, triple pot still distillations as a new process is also used for raki production. Raki is a reach product in term of volatile compounds coming from grape distillate and aniseed. In this study, effect of distillation numbers on volatile compounds of middle cut fraction during the raki production was investigated. Minor volatile compounds of middle fractions were extracted with liquid-liquid extraction method and analyzed by GC-MS/FID. Major volatile compounds of middle fractions were analyzed by direct injection with a GC-MS/FID according to the European commission Reference Method. Odour-active compounds are also identified by GC-Olfactometer technique. 22 volatiles identified as a suma based compounds and 33 volatiles identified as an aniseed based compounds in middle cut fractions of simple, double and triple distillations. Amount of suma based volatile compounds are 1256.3 mg/L in the middle fractions of simple distillations, 1119.2 mg/L in the middle fractions of double distillations and 1112.9 mg/L in the middle fractions of triple distillations. Amount of aniseed based volatile compounds are 2555.9 mg/L in the middle fractions of simple distillations, 2571.2 mg/L in the middle fractions of double distillations and 2299.2 mg/L in the middle fractions of triple distillations. While the number of distillations increased, the amount of volatile compounds from aniseed and suma decreased and then the amount of higher alcohols, esters and aldehydes of middle cut fractions are decreased. The highest amount volatile compounds based on aniseed are determined as trans-anethole, estragole, cis-anethole and gamma-himachalene compounds. Odour-active compounds were identified as anethole, estragole, linalool, ethyl-2-methyl-butanote, gamma-himachalene and p-anisaldehyde. Off-flavors coming from suma as like pungent, woody, fishy smells are separated with increasing the number of the distillations.

Keywords: Raki, triple pot distillation, volatile compounds, aniseed, suma

Theme: Food Science and Technology

Effect of CMC and guar gum on oil absorption and sensory quality of banana (Musa acuminate) fritters during repeated frying

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Abstract

This study aims to determine the effects of carboxymethyl cellulose (CMC) and guar gum on the oil uptake and acceptability of banana fritters during repeated deep fat frying. Banana of variety "Awak" was deep fried intermittently in cooking oil for 6 hour daily without oil replenishment over 3 consecutive day at 170±5°C. The moisture, oil content and color were evaluated at first and every 10th frying cycles whereas the texture and sensory acceptability of banana fritters were evaluated only at the first frying cycle. Results indicated that the moisture and oil content of banana fritters were dependent on the frying cycles. The oil content increased while the moisture decreased with increased in frying cycles. There was significant reduction ($p<0.05$) in oil content of banana fritters dipped in batter containing guar gum compared to CMC and control. The highest reduction in oil content was banana fritters dipped in batter containing guar gum (73.20%) compared to CMC (62.77%). Guar gum treated banana fritters also had significantly ($p<0.05$) the highest moisture content (54.27%). The lightness value decreased with increased in frying cycle and 1% guar gum treated fritters had the lowest value. The treated banana fritters especially guar gum significantly increase the crust hardness (9.42N) compared to control (2.32N). No significant different ($p<0.05$) in the appearance, color, oiliness and taste between control and treated fritters. Despite the crispiness and overall acceptability of control and treated fritters were different, there is a potential of adding CMC and guar gum into the batter to reduce oil absorption in banana fritters.

Keywords: Banana fritters, CMC, Guar gum, Oil absorption

Agencies: UNIVERSITI TEKNOLOGI MARA

Abstract Theme: Food Science and Technology

The effects of hydrocolloids on the physical properties of sponge cakes.

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Abstract

The suitability of hydrocolloids as an improver in bakery products is still doubtful. The rheological characteristics (flow behaviour and viscoelasticity) of batter were studied to relate with the physical properties (volume, texture and microstructure) of sponge cake. The effect of xanthan gum (XG) and hydroxypropylmethylcellulose (HPMC) on cake volume, hardness and sensory evaluation scores of baked sponge cakes were investigated. Batter density and specific gravity were significantly ($p<0.05$) correlated with volume of cake ($r_{\text{batter density}} = -0.64$ and $r_{\text{specific gravity}} = -0.70$). Low complex viscosity was observed in hydrocolloids cake during heating at 25-95°C. Hydrocolloids cakes (both XG and HPMC) had significant ($p<0.05$) low volume compared to control cake. Consistency index and viscosity were significantly ($p<0.05$) correlated with hardness ($r_{\text{Consistency index}} =0.71$; $r_{\text{Viscosity}} =0.63$), which able to determine the crumb texture of sponge cake. For sensory evaluation, sponge cake containing xanthan gum was less preferred by the panellists compared to other sponge cake formulations since it presented the lowest mean score in overall acceptability (6.25).

Keywords: Hydrocolloids, Physical properties, Xanthan gum, Sponge cake

Agencies: Universiti Teknologi MARA

Theme: Food Science and Technology

Permeability of multilayer polymer active packaging films incorporated potassium sorbate

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Abstract

Moisture sorption isotherms, diffusivity, and permeability of the active (LDPE/polyamide/LDPE-2%potassium sorbate) and control films (LDPE/polyamide/LDPE) were investigated to estimate the moisture interactions between the formed films and moisture originated from environment or from the material packed. Dynamic vapor sorption analyzer (DVS) was used to estimate the sorption isotherms at 25°C. Peleg was found to be the best equation to describe sorption behaviors among other models (GAB, Oswin, and Halsey equations). Moisture diffusivity (D) of the films was examined from sorption data at each step of RH range studied. It was found that D values of the active films were lower than that of control films, especially the difference was important at higher RH's than 60% RH. This could be explained with potassium sorbate adsorbs moisture so the diffusion of moisture was decreased. Potassium sorbate incorporation did not result any significant difference in the mechanical and thermal properties of the films while it influenced moisture barrier properties positively.

Keywords: Active packaging, sorption, diffusion, permeability, mechanical and thermal properties.

Theme: Food Science and Technology

Textural Quality of Gluten-Free Breads formulated with Some Pseudo-Cereals

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Abstract

Celiac is a genetic disease seen in people that have the inability to digest prolamin that is a constituent of gluten proteins in the small intestine. Today, the only accepted treatment for celiac is removes of the possible gluten sources such as wheat, barley, and rye from the diet (lifelong gluten-free diet). Some new pseudo-cereals (PC) such as quinoa and amaranth are considered good sources for gluten free products because of high nutritional composition such as essential amino acids, fatty acids, high content in minerals and vitamins and more importantly PC are not contain any toxic prolamins for celiac patients. In this study, the aim was to observe the effects of usage of PS that are amaranth and quinoa on textural characteristics of breads. As control, gluten free breads (GFB) were formulated with corn starch, salt, xhantan, guar gums, methylcellulose (MC) and carbocxylmethyl cellulose (CMC) and fresh yeast. Along with that, amaranth and quinoa were added into formulation as two different ratios that are 10% and 30%. According to specific volume result, with addition of (PC), specific volume has diminished and with increasing the ratio of amaranth and quinoa, they have decreased more up to 278.00±7.83 cm^3/g for GFB containing 30% amaranth. Similarly, firmness has changed with addition of PC ($p<0.005$): firmness of control was 1622.00 ± 134.83 g while it was 1144.39±81.00 g and 1351.42± 106.55 g for quinoa with ratio 10% and 30%, respectively. Moreover, there is correlation between specific volume and texture results ($r=0.626$). As result, by using such these PC, textural properties comparing to wheat breads can be minimized and the quality properties of gluten-free breads can be improved, however nutritional, sensorial and shelf life studies should be done in future study to observe overall acceptability of GFB with amaranth and quinoa.

Keywords: Gluten free bread, firmness, quinoa and amaranth.

Agencies: Çukurova University Scientific Research Projects Coordination Unit

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Theme: Food Science and Technology

Phytochemical evaluation and antimicrobial activity of selected pigmented plants: *Garcinia mangostana*, *Clitoria ternatea*, *Ardisia colorata* var elliptica and *Syzygium cumini*

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Abstract

Phytochemical compounds in plants are the backbone of antimicrobial activity and natural pigment, therefore are gaining interest as natural preservatives and colourants in food industry to replace the synthetic ones. In recent years, because of the great consumer awareness and concern regarding synthetic chemical additives, foods preserved with natural additives have become very popular. There are concerns about using synthetic chemical additives because of the reported negative effects on human health. Hence, the main objectives of this study were to evaluate the phytochemicals and antimicrobial activity of selected pigmented plants namely, Garcinia mangostana peel, Clitoria ternatea flower, Ardisia colorata var elliptica fruit and Syzygium cumini fruit. The phytochemicals presences in the selected pigmented plants were determined based on the phytochemical screening and reverse phase high performance liquid chromatography (RP-HPLC) analysis, while antimicrobial activity analysis was carried out using the disc diffusion technique. Phytochemical screening revealed that Garcinia mangostana peel exhibited strongest indications for the presence of flavonoid, leucoanthocyanidin, quinone, tannin and anthocyanidin as compared to the other three pigmented plants studied. Findings from RP-HPLC analysis revealed that Garcinia mangostana peel possessed significantly high ($p<0.05$) amount of phenolic compositions which consists of protocatechuic acid, vanillic acid, chlorogenic acid, p-coumaric acid, ferulic acid, quercetin, rutin, epicatechin, catechin and cyanidin 3-sophoroside. The antimicrobial activity analysis also showed that among the four pigmented plants studied, Garcinia mangostana peel exhibited the strongest inhibition on the fungi Aspergillus niger and gram positive bacteria i.e. Bacillus cereus, Bacillus subtilis and Staphylococcus aureus with minimum inhibitory zone of 6.50 mm, 8.50 mm, 6.70 mm, and 7.20 mm, respectively. Therefore, our results suggested that the antimicrobial activity of Garcinia mangostana peel was associated with their specific phenolic compounds. From a practical point of view, Garcinia mangostana peel may be a good candidate for functional foods and pharmaceutical applications.

Keywords: Antimicrobial activity, phytochemical, pigmented plant, RP-HPLC.

Agencies: Malaysia Institute of Transport

Theme: Food Science and Technology

Kinetic Modelling of Drying and Osmotic Dehydration of Asparagus officinalis in Microwave

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Abstract

Asparagus officinalis is a spring vegetable contains flavonoids, amino acid derivatives, glycolic acid, tyrosine, vitamins, saponins and essential oils and it has health benefits such as prevent cancer, mutation, inflammation, and liver damage. Osmotic dehydration is one of the best methods to increase the shelf life of foods and preferred due to their vitamin and minerals, color, flavor, and taste retention property. The aim of the study was to find drying of asparagus slices in microwave and to study the effects of slice thickness (1 mm,2 mm and 3mm), microwave power(100 W, 200 W, and 300W). The main aim of this study is to investigate kinetic modeling of drying of Asparagus Officinalis. Exponential,Page,Lewis,Midilli and Kücük and simplified Fick's diffusion models were compared while modelling of the study was done. According to results, drying time of Asparagus Officinalis and osmotic dehydration decreased while Asparagus Officinalis slices declined.

Keywords: kinetic modelling, microwave, asparagus

Theme: Nutrition

Comparition of Chemical Composition of Pomegranate(*Punica granatum* L.) and Grape(*Vitis vinifera* L.) Seed Oils Obtained by Extraction

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Abstract

In this study, it was aimed to assess pomegranate (*punica granatum* L.) and grape(*vitis vinifera* L.) seed oil by comparing them physically and chemically. The fat output of the pomegranate (*punica granatum* L.) and grape (*vitis vinifera* L.) seeds was determined by the standard method of soxhlet extraction. Fatty acid composition was determined using refractive index, saponification number, iodine number, peroxide number and chromatographic method. Average refraction number, saponification number, iodine number and peroxide number for pomegranate (*punica granatum* L.) seed were found to be 1.499; 172.2(mgKOH/g); 134.5(wijs) and 21.1(meqaktif O2/kg), respectively. Average refraction index, saponification number, iodine number and peroxide number for grape (*vitis vinifera* L.) seed oil were 1.462; 178.23(mgKOH/g); 117.2(wijs) and 23.8(meqaktif O2/kg), respectively. Fatty acid composition of oils was determined by gas chromatography. Gas chromographic analyses of the pomegranate (*punica granatum* L.) seed samples showed that the fatty acids compositions were consisted of 28.92 % linoleic acid(C18:2); 19.01 % oleic acid(C18:1); 10.12 % palmitic acid (C16:0); 3.92 % beheric acid (C20:0). The grape (*vitis vinifera* L.) seed samples showed that the average fatty acid composition were consisted of 56.55 % linoleic acid(C18:2); 15.52 % oleic acid (C18:1); 3.77 % stearic acid (C18:0); 0.31 % linolenic acid (C18:3). Pomegranate(*punica granatum* L.) and grape (*vitis vinifera* L.) seed oil are required to be studied for health and nutritional assessment opportunities. Thus, an important food product for human health will be obtained.

Keywords: Fatty acid, grape seed, pomegranate seed

Theme: Food Science and Technology

GC-MS-Olfactometric Characterization of the Key Aroma Compounds of Olive Oils Obtained from Different Regions and Varieties of Turkey

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Abstract

In this research olfactometric characterization of the key aroma compounds of olive oils obtained from different regions and varieties were studied. The olive oil samples were collected from the South Marmara, South and North Aegean, West and East Mediterranean Regions by three phase extraction system during two crop season. The aroma and aroma-active compounds of Ayvalık (A), Memecik (M), Gemlik (G), Sarı Ulak (SU) and Beylik (B) olive oils were analyzed by gas chromatography mass spectrometry olfactometry (GC-MS-O). According to sensory analysis, the aromatic extract obtained by solvent assisted flavor evaporation (SAFE) was representative of olive oil odor. A total of 52, 58, 51, 57 and 54 aroma compounds (including alcohols, aldehydes, terpenes, acids, phenols, ketones, esters, lactones, hydrocarbones and furans) were identified and qualified in A, M, G, SU and B olive oils, respectively. Alcohols and aldehydes were qualitatively and quantitatively the most dominant volatiles in the samples. Aroma extract dilution analysis (AEDA) was used for the determination of aroma-active compounds of samples. A total of 31, 27, 24, 27 and 31 aroma-active compounds were identified in aromatic extracts of A, M, G, SU and B olive oils, respectively. Based on flavor dilution (FD) factor, the most powerful aroma active compounds identified in the extracts were hexanal (green-cut grass), (E)-2-hexenal (cut grass-green) and α-farnesene (balsamic-herbal) for A (FD:1024), (E)-2-hexenal (cut grass-green) for M (FD:2048), (Z)-3-hexenyl acetate (furity-green), (E)-2-hexen-1-ol (grassy-cool) and α-farnesene (balsamic-herbal) for G (FD:1024), (E)-2-hexenal (cut grass-green) for SU (FD:2048) and hexanal (green-cut grass), (E)-2-hexenal (cut grass-green) for B (FD:2048).

Keywords: Aroma compounds, aroma-active compounds, olfactometry, olive oil

Theme: Food Science and Technology

Surfactant assisted aqueous extraction of carotenoids from food materials

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Abstract

Carotenoids are important lipid-soluble pigments found in plants, algae, some bacteria and even animal tissues. They are important antioxidants act mainly by inactivating singlet oxygen. Besides their antioxidant potential, some carotenoids also possess vitamin A activity, which make them very valuable phytonutrients. Non-polar nature of the carotenoids limits their solubility in water and thus recovery from food matrix. Usage of organic solvents in carotenoid extraction however is avoided due to health and environmental considerations. Recent studies showed that some treatments such as liquefaction via enzymes, microwaves, pulsed electric field, ultrasounds, high pressure etc. could increase the rate of carotenoid extraction by water. Alternatively, food grade surfactants such as polysorbats have been employed to extract carotenoids successfully. The mechanism lay under this strategy is the formation of surfactant micelles, which encapsulate carotenoids and make them dispersible in water phase. If the concentration of the surfactant in water is very high (5-20%) it is named as cloud point extraction. In this method, carotenoid rich material is mixed with surfactant solution in water and carotenoids pass to the aqueous phase by time. Decantation is applied to promote phase separation. Lower pH and presence of NaCl were found to increase carotenoid recovery in this method. Another approach to this method entails physical disruption with the presence of relatively lower concentrations of surfactants. In this methodology, disruption methods such as high pressure, ultrasounds and high shear rate are applied along with the presence of surfactants lower than the level of 1%. Recently colloidal gas aphrons (CGA) have been used to extract carotenoids from food wastes. CGAs are surfactant-stabilised microbubbles obtained by intense stirring of a surfactant solution at high speeds.

Keywords: Carotenoids, Extraction, Surfactant, Water.

Theme: Food Science and Technology

Effects of Pure and Mixed Autochthonous Torulaspora delbrueckii and Saccharomyce cerevisiae on Fermentatıon and Volatile Compounds of Narince Wines

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Abstract

The cultivar of Narince is native white grape varieties of Vitis vinifera, grown in Tokat city, the Mid-Black Sea Region of Anatolia. In this study, effects of pure and mixed autochthonous Torulaspora delbrueckii and Saccharomyces cerevisiae cultures on fermentation behaviour and aroma compounds of Narince wines were investigated. Volatile compounds formed in wines were extracted using a liquid-liquid extraction method and determined by GC-MS-FID.

Narince grape must were fermented in duplicate: under the fallowing three conditions: two pure cultures of Torulaspora delbrueckii and Saccharomyces cerevisiae and the mixture of Torulaspora delbrueckii and Saccharomyce cerevisiae (1:1). The presence of non-Saccharomyces Torulaspora delbrueckii yeast slowed down the fermentation and produced lower level of ethanol, higher level of glycerol and volatile acid. Only the pure culture of Torulaspora delbrueckii was unable to finish fermentation. Saccharomyces cereviaise was found to be the best producer of hexyl acetate, ethyl octaonate, ethyl decanoate, octanoic acid, hexanoic acid and gamma butyrolactone. Pure Torulaspora delbrueckii produced highest levels of n-propanol, 2-phenylethanol, ethyl hydrogen succinate, isobutyric acid, 9-decanoic acid, 2-methoxy-4-vinylphenol and acetoin. The best profile of higher alcohols and esters were given by mixed culture. According to sensory analysis, wine fermented with mixed culture was more intense in herbal tea, citrus, tropical fruit and honey attributes whereas wine fermented with pure Torulaspora delbrueckii was more intense in tree fruit and cooked fruit attributes. Also, wine fermented with mixed culture was the most preferred wine and followed by wine inoculated pure Saccharomyces cerevisiae.

Keywords : Saccharomyces cerevisiae, Torulaspora delbrueckii, Narince wine, Autochthonous, Mixed culture

Agencies: Scientific Project Unit of Çukurova University, Project number: FL-2016-6851

Theme: Food Science and Technology

Characterization of Hot Air Dried Pomegranate Arils

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Abstract

Hot air (convective) drying of Hicaz type pomegranate arils procured from Hatay region was investigated on the basis of color, texture, rehydration, volumetric shrinkage, total phenolics, anthocyanins, tannins and flavonoids, antioxidant capacities (by DPPH and FRAP methods) and gallotannins. Arils which were separated from their husks were kept in a refrigerator at -18°C until experiments and dehydrated at 55, 60, 65, 70 and 75°C by a laboratory type tray drier. 6 different quality attributes (hardness, shrinkage, total phenolics and flavonoids, antioxidant capacity (FRAP) and gallotannins) were also modeled by response surface methodology (RSM). One factor design with 5 center points and 11 trials was used for creating model equations and graphs. Determination coefficients (R^2) of related mathematical expressions were in range of 0.64-0.92 and in all derived models except hardness contained the first power of drying temperature. 69.5°C was suggested by the software as the optimum temperature and this condition was successfully validated. The constraints were set as “minimize” for hardness and shrinkage, however the others were “maximize” in order to obtain the product with minimum quality and nutrient losses. The desirability function was equal to 0.59.

Keywords: pomegranate, drying, response surface methodology (RSM).

Acknowledgment: This study was supported by Scientific Researches Project Unit of Mersin University (Project number: 2016-2-TP3-1809).

Theme: Food Science and Technology

Glass Transition Temperature of Goose Meat. A DSC Study

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Abstract

Phase transitions in foods can be divided into two groups: First and second order phase transitions. At the first order transitions, such as crystallization and melting, the physical state of a material changes isothermally from one state to another by release or absorption of latent heat, however a second-order transition, such as glass transition, characterized by a discontinuity in physical, mechanical, electrical, thermal, and other properties of a material. These transitions are very important for the storage stability of foods. It has been suggested that glass transition affects the rates of diffusion controlled chemical and enzymatic reactions through changes in molecular mobility, which is extremely slow in the glass transition region because of the high viscosity of the food matrix. In this study, the glass transition temperature (T_g) as well as ice crystallization and melting temperatures and enthalpy values were determined for fresh goose breast meat by using Differential Scanning Calorimetry (DSC). A glass transition is observed as an endothermic step change in a DSC heat flow curve during heating. Such an endothermic step change was observed in heat flow curves in the experiments and it was regarded as the glass transition. The T_g value of the goose breast meat was detected as -15.98±0.11˚C (midpoint) and the ice crystallization and melting temperatures were determined as -9.43±1.63˚C and -1.29±0.18˚C respectively. These results are quite meaningful for the stability of goose meat stored in frozen conditions.

Keywords: DSC, glass transition, goose meat, ice crystallization

Theme: Food Science and Technology

Ultraviolet C (UVC) Radiation as a Practical Alternative to Decontaminate Thyme (*Thymus vulgaris* L.)

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Abstract

Thyme is an aromatic and medicinal plant that belongs to the genus Thymus of Lamiaceae family. It can be highly contaminated by microorganisms due to its growth conditions, harvesting methods, and postharvest processes. Fumigation with ethylene oxide, thermal treatment with steam and irradiation are the most common treatments. This research was purposed to examine the potential of UVC technology on microbial decontamination of thyme, as well as the effect of UVC on the physical, chemical and sensory properties of thyme.

A laboratory scale fluidized bed UVC reactor system was designed and manufactured to use for decontamination process of thyme. Firstly, the effect of UVC radiation on the natural microflora (total aerobic mesophilic bacteria, mold-yeast and Bacillus cereus) of thyme was studied. Then, the changes caused by the application of UVC treatment on physical, chemical and sensory quality of thyme were evaluated.

The UV intensity of the designed system was measured as 26.7 mW/cm^2. By varying the treatment time, four different UVC doses (25.7, 51.4, 102.8 and 205.6 J/cm^2) were studied. Microbial inactivation increased with the increasing UVC doses. The decrease in the TAMB, mold-yeast and B. cereus counts of thyme samples were 1.77, 1.29 and 0.31 log cfu/g after UVC treatment at 205.6 J/cm^2, respectively ($p<0.05$).

Total phenolic content of thyme samples was 79.81 mg GAE/100 g. There were no significant changes in total amounts of phenolics after UVC treatment with doses up to 205.6 J/cm^2 ($p>0.05$). The total antioxidant capacity of thyme samples analyzed by FRAP and DPPH methods were 181.18 and 121.69 mg TE/g, respectively. The differences in the total antioxidant capacities of thyme samples were found to be statistically insignificant at all UVC doses ($p<0.05$).

Lastly, the effects of UVC treatments on physical and sensory quality of thyme samples were examined. Moisture content of thyme samples were not significantly changed at all UVC doses (0-205.6 J/cm^2). There were slight changes in L*, a*, b* and ΔE values of samples treated with UVC according to chromometer results, but panelists did not recognize significant differences ($p>0.05$). In addition, all UVC treated thyme samples received similar sensory scores with the untreated ones ($p>0.05$).

As a result, TAMB, mold-yeast and B. cereus counts of the thyme samples treated with UVC radiation were reduced significantly, without any significant changes in the physical, chemical and sensory properties.

Keywords: thyme; decontamination ;ultraviolet C

Theme: Food Science and Technology

Partial Replacement of Sugar with Rebaudioside A in Blackberry Jam Production using Response Surface Methodology

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Abstract

In this study, it was aimed to use rebaudioside A (RA), one of the main sweetening compounds in stevia, in the manufacturing of reduced-sugar blackberry jam. Jam formulations were designed with response surface methodology (RSM) including 20 experimental points with 6 replicates for three independent variables namely pectin, sugar and RA in the ranges of 0.5-1 %, 15-50 % and 0.02-0.06 %, respectively. The dependent variables for the present study were color values in terms of L, a, b, hydroxymethylfurfural (HMF) content, rheological and sensorial scores of the product. Optimization results according to the overall acceptability scores of the sensorial analysis gave the formulation of reduced-sugar blackberry jam including 0.06 % RA, 0.3316 % pectin and 28.7969 % sugar. The total sugar content of reduced-sugar blackberry jam obtained by the validation experiments was determined to be 31.77 % lower than that of commercial jam samples. As a result of this optimization study, reduced-sugar blackberry jam formulation having the closest sensorial acceptance to the commercial jam samples was obtained.

Keywords: Reduced-sugar blackberry jam, rebaudioside A, response surface methodology, optimization

Theme: Food Science and Technology

Determination Anthocyanidin Profile and Antioxidant Capacity of Black Myrtle (*Myrtus communis* L.)

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Abstract

Myrtle (Myrtus communis L.) is an aromatic medicinal and evergreen shrub belonging to the family of Myrtaceae and is distributed in Mediterranean basin, Asia and and America. Myrtle is an annual plant and has been used for medicinal purposes and as food and spice since ancient times. This study was conducted to determine the type of anthocyanidins which are potential to be found and antioxidant capacity of Black Myrtle (Myrtus communis L.). For this purpose, total polyphenol content was extracted from black myrtle fruits by acidified methanol and then by using C_{18} Sep-Pac cardridge were used for further purification of anthocyanins. Acid and alkaline hydrolysis were applied for description of the purification anthocyanins. For description of anthocyanins, high-performance liquid chromatography which was equipped with recerse phased C18 mini column and DAD dedector adjusted to 520 nm wavelength was used for purified extract, saponified and acid hydrolised samples. Anthocyanins which are potential to be found in the Black Myrtle fruits were determined by comparing reference chromatograms of anthocyanidins extracted from grapes, strawberry, black plum and eggplant. Antioxidant activity of acidified methanolic crude extract was determined by using ferric reducing/antioxidant power (FRAP) method. According the results, the predominant anthocyanins of Black Myrtle is considered as cyanidin. Also solid content, total phenolic contents and antioxidant activity of fruit were observed %32.72, 0.45 mg gallic acid equivalent/g dw, and 2462.93 µg FeSO4/g dw respectively.

Keywords: Black Myrtle, Myrtus communis L., Anthocyanin, Antioxidant Activity, High Performance Liquid Chromatography.

Theme: Food Science and Technology

Use of High Pressure Processing for Brewing Cold White Tea and its Effects on Health-Related Properties of Cold White Tea

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Abstract

Being the second most common consumed beverage after water all around the world, tea and especially cold brewed tea with different flavor are getting more popular. Although brewing, flavor and tea itself present a great variety and diversity among different cultures, the most popular types are black, green, white (WT) and Oolong teas. The most distinct difference between the white tea and the others is that the white tea is an unfermented tea and made from very young tea leaves or buds while others are fermented tea and made from the mature leaves. In recent years, there has been a growing interest for the consumption of tea beverages due to the health promoting effects such as antioxidant activity (AA) and total phenolic content (TPC). However, there is lack of information on how health related properties of WT are affected by using high pressure processing (HPP). Therefore, effects of HPP on both AA and TPC of WT under different HPP processing parameters such as different solid/liquid ratio (0.01-0.03 %), magnitude of pressure (300-500 MPa) and infusion time (120-600 s) were prompted. Cold tea infusions were prepared by adding 100 mL of drinking water at room temperature to tea bags including different amount of tea leaves. Then these tea bags were placed into HPP chamber for infusion at different brewing time. Among the variables studied, pressure, tea leaves/water ratio and infusion time showed significant effects ($p<0.05$) on AA, whereas pressure and tea leaves/water ratio presented significant effects ($p<0.05$) on TPC. While WT had higher AA with the solid/liquid ratio of 0.03% at the 400 MPa pressure for 120 s, compare the control samples, TPC of WT was higher with the solid/liquid ratio of 0.03% at 300 MPa pressure for 600 s. Thus, it is concluded that HPP with different magnitude of pressure applications and treatment time provides brewing of WT at room temperature with higher AA and TPC revealing healthier drink for consumption.

Keywords: Antioxidant activity, white tea extracts, high hydrostatic pressure, cold brewing

Agencies: Funding for this study was provided by AIBU Scientific Research Project Unit, Grant No: BAP-2017.09.04.1169 at the Department of Food Engineering, Abant İzzet Baysal University, Turkey.

Theme: Aquaculture

Effects of Ultrasonication Time on Pigment Extraction from Spirulina platensis'ten Before Solvent Extraction

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Abstract

Interest on microalgae is increasing in food, pharmacy and cosmetic industries because of their high nutrient contents such as proteins, essential oils, vitamins and pigments. Phycocyanin and chlorophyll which are responsible for blue and green pigments of Spirulina platensis have high antioxidative activity and are used as colorant in food (dairy products, chewing gums, gellies etc.) and cosmetics. For high yield pigment extraction from Spirulina various methods are used such as solvent extraction, supercritical solvent, freezing/thawing, sonication and enzymation. In thid study, effects of ultrasonication process time on extraction of phycosyanin and chlorophyll-a before application of solvent extraction by methanol and aqueus sodium nitrate solution (1.5 % $NaNO_3$) and antioxidative potential (Ferric Reducing Antioxidant Power) of extracts were investigated. Ultrasonication for 1, 3, 5, 10, 15, 20, 30, 45, and 60 minutes were applied before methanol and $NaNO_3$ solvent extraction for 120 minutes at ambient temperature. Chlorophyll-a concentration was increased upto 30 minutes sonication and further sonication concentration remained constant. Chlorophyll-a concentration was calculated as 6.75 and 7.70 mg/g dry weight spirulina for control methanol extraction and 30 minutes sonication followed by methanol extraction respectively. Phycocyanin concentration was increased up to 45 minutes sonication and there were no more increase for further sonication time. Phycocyanin concentrations were calculated as 34.52 and 51.83 mg/g spirulina for control solvent extraction and 45 minutes sonication followed by $NaNO_3$ solvent extraction respectively. The highest antioxidative activity was obtained by 60 minutes sonic application. Antioxidative activity of chlorophyll-a and phycocyanin were calculated as 15.74 mg/g and 11.98 mg/g respectively for 60 minutes sonic application followed solvent extraction. As a result of this study, before solvent extraction for chlorophile-a 30 minutes sonication is recommended while 45 minutes sonication for phcocyanin.

Keywords: Chlorophyll-a, phycocyanin, ultrasonication, Spirulina platensis

Theme: Food Science and Technology

Environmental Monitoring Program Application in Frozen Food Industry

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Abstract

Nowadays, one of the most important nonconformities threatening the food safety in the frozen food plants is detection of pathogen microorganisms. The pathogen microorganisms (PMO) naturally exist inside water, sewage, dust, soil, animal feeds, fertilizer, rotten fruits, raw vegetables etc. Foodborne illnesses affect millions of people and cause thousands of fatalities every year (1) PMO are usually eliminated from contaminated vegetables via blanching process. However, the root causes for finding the PMO in the end product after heat treatment are related with environmental factors such as workers, device and equipment used in the line etc. Environmental Monitoring Program can be used at the food production plants in order to monitor hygiene and sanitation efficiency systematically. The main aim of this program is to prevent the PMO which occur due to cross contamination of the foods. The program is very useful to find the number, density and source of microorganisms which influence the indicator, pathogen and triggering the deterioration of foods. The main objective of this study is to eliminate the nonconformities in the end product especially for frozen food production plants by applying Environmental Monitoring Program.

Keywords: Environmental monitoring program, frozen food industry, pathogen microorganisms

Theme: Food Science and Technology

ComDim for multi-block data analysis of Cantal-type cheeses: Effects of salts, gentle heating and ripening

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Abstract

Considered as a flavor enhancer, NaCl is important in cheese manufacture, since it has an effect on specific functions such as taste, body, structure, texture, functional properties and shelf life extension. A simple reduction in NaCl without substitution with other salts adversely affects the cheese quality and consequently, leads to a decrease of consumer interest and a negative economic impact. Potassium chloride (KCl) represents the most frequent option as a feasible NaCl substitute.

This study aims to explore a new approach by using a multi-block method named "Common Components and Specific Weights Analysis" (CCSWA with ComDim algorithm) for analyzing in one shot the effect of salts (NaCl and KCl) and ripening on molecular structure (fluorescence and MIR spectroscopy), rheological attributes during gentle heating (20 to 60°C), gross composition, and color of cheeses. This chemometric method for multi-block data analysis was employed to evaluate five Cantal-type cheeses with different added salts (0.5%NaCl, 1%NaCl, 2%NaCl-control-, 1.5%NaCl/0.5%KCl and 1%NaCl/1%KCl) and ripened for 5 and 15 days. Before performing ComDim, ICA (Independent Component Analysis) a blind source separation method was applied separately on fluorescence and MIR spectra recorded during heating (20 to 60°C) in order to extract the relevant signal source and their associated proportions. ComDim was then applied on the 31 data tables corresponding to the proportion of the ICA signals obtained for each spectral methods and the global analysis of cheeses by the other techniques.

The ComDim results indicated that generally cheeses made with 1%NaCl or with 1.5/0.5% NaCl/KCl exhibit equivalent characteristics in structural, textural, meltabiliy and color properties compared to the control (2%NaCl). The proposed methodology demonstrates the applicability of ComDim for the characterization of the salt effects on cheeses with different experimental conditions (salting and ripening), and to identify the closest sample to the standard.

Keywords: Cheeses, ComDim, ICA, Sodium

Theme: Food Science and Technology

Effect of Varieties, Processing Systems and Regions on the Quality Parameters, Sensory Characteristics and Fatty Acid Ethyl Esters (FAEE) of Turkish Virgin Olive Oils

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Abstract

Quality parameters, FAEE and sensory characteristics of olive oils plays a relevant role in olive oil classification because they are required to allocate the legally recognized olive oil categories. Extra virgin olive oils with low contents of FAEE was sensorially considered as being of high quality. The FAEE is useful indicator for determining the quality of olives and the olive oils. In this research the effect of varieties and processing systems on olive oil free fatty acids (% oleic acid per 100 g of olive oil) (FFA), peroxide values (meq O_2/kg oil) (PV) and UV spectrophotometric indices (K_{232} and K_{270} measurements), sensory characteristics and FAEE were studied at the South Marmara, South and North Aegean, Mediterranean Regions, during 2014/2015 and 2015/16 crop seasons. Sensory analyzes were carried out by a panel recognized and accredited by the International Olive Council. Experimental study shows that FFA, PV, FAEE, and K_{232} measurements have significantly difference according to harvest year and peroxide values, FAEE, and K_{232} measurements are significantly difference in each harvest year according to olive varieties except FFA. While significantly difference was determined for K_{270} between two crop seasons, no significantly difference was found for each season according to olive varieties. For sensorial analysis, pungency values have significantly difference among olive varieties. Memecik variety has significantly higher pungency value than Ayvalık and Gemlik varieties. It is observed that, there is a significantly positive correlation between bitterness and pungency values, and there are no significantly differences between processing systems for all quality parameters.

Keywords: FAEE, sensory analyses, olive oil, quality parameters

This study is supported by General Directorate of Agricultural Research and Policies (TAGEM) of Turkey under the grant No. TAGEM/HSGYAD/14/A05/P01/51

Theme: Food Science and Technology

Atmospheric Cold Plasma Applications in Some Vegetables, A Review

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Abstract

In recent years, the studies are on going worldwide to develop new food preservation methods in order to effectively reduce microbial contaminant of foods without reducing the nutritive value and deteriorating the sensory quality. Atmospheric cold plasma (ACP) can be accepted as a novel decontamination method with potential applications for inhibition and elemination of microorganisms. ACP an ionized gas with near room temperature, generated at atmospheric pressure that offers a dry, rapid and minimal damage process. This technology could be used for large scale vegetable decontamination as an alternative to chlorine washing. There is two type plasma which are dielectric barrier discharge atmospheric cold plasma (DBD-ACP) and atmospheric cold plasma jet (ACP-jet) application in using decontamination of vegetables. Although dependent on different factors such as gas combination, relative humidity, voltage, flow rate, current, frequency, input power, treatment times, strains of test microorganisms, type of vegetables, and plasma production method; in the light of summarized literature, after 5 min DBD-ACP plasma application at 80 kV/40 mm distance in lettuce samples, it can be finally emphasized that the microbial reductions of different strains of E. coli, Salmonella, L. monocytogenes varies 3.3- 2.4 and 2.3 $\log_{10}$ cfu/g, respectively. On the other hand, in 1 min ACP-jet plasma treatment at 8 and 20 W/10 mm distance in some vegetables such as tomato, cucumber and corn salad leaves lead to reductions of between 2.0-4.7 $\log_{10}$ cfu/g. The purpose of this review is to summarize the results of all studies which carried out until today about atmospheric cold plasma for fresh cut and vegetables.

Keywords: Antimicrobial, atmospheric cold plasma, decontamination, vegetable

Theme: Postharvest Application and Technologies for Raw Materials

Biocontrol of Postharvest Fungal Diseases of Fruit and Vegetables by Antagonistic Yeasts

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Abstract

The ratio for postharvest losses of fruit and vegetables is considerable high if handling, processing and storage conditions are not optimal. It is known that losses representing up to 25% of total production in industrialized countries and more than 50% in developing countries (Nunes, 2012). Some of the reasons led to such a high amount of corruption in fruit and vegetables as follows; having large amounts of nutrients and water, low pH and the decrease in intrinsic decay resistance of raw materials after harvest. Fungal pathogens constituting a significant majority of post-harvest deterioration in fruits and vegetables are Penicillium, Botrytis, Aspergillus, Monilinia, Rhizopus, Alternaria, Fusarium, Geotrichum, Gloeosporium and Mucor.

Today, synthetic fungicides are mainly used to control the postharvest diseases of fruits and vegetables throughout the world. However, the possibility of fungicide resistance development in plant pathogens, increasing global concerns regarding their impact on human health and environment as well as regulatory restrictions over pesticide residues in food has prompted an urgent need for alternative control strategies with safer, good efficacy, low residues, non-toxic and eco-friendly features. Among the alternatives, biological control especially with yeasts instead of chemical fungicides is one of the most promising methods. Since, some yeast strains display many of the desirable attributes that make them ideal biocontrol agent. For instance; they are growing rapidly, genetically stable, having simple nutrition requirements, capable of surviving under adverse environment conditions, effective against a wide range of pathogens found in fruit and vegetables, non-producer metabolites harmful for human and resistant to pesticides (Liu et al., 2013).

Although the mechanisms of microbial antagonists not fully clarified, competition for nutrients and space is accepted as primary mode of action. Direct paratism, production of antibiotic, cell-to-cell contact, induced resistance in the harvested fruit and vegetables, secretion of antifungal compounds and recently reactive oxygen species in defense response are other biocontrol mechanisms reported in the literature. Pichia guillermondii, Metschnikowia fructicola, Candida oleophila, Aureobasidium pullulans and Metschnikowia pulcherrima are some of the yeast species effective in controlling fungal rot in fruit and vegetables.

Even though research on the biological control of harvest pathogens increased exponentially during the last two decades, this strategy is still its infancy period. Thus, the use of biocontrol system is expected to gain momentum in the coming years with further investigates.

Keywords: Antagonistic, biocontrol, fungal pathogen, postharvest, pesticides, yeasts

Theme: Food Science and Technology

Decontamination Efficiency and Antifungal Effect of Ultrasonic Washing in Raisin

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Abstract

In recent years, non-thermal technologies which carry out at low temperatures and decrease their adverse effects on food quality has started to be used. Ultrasound which does not cause unfavorable effect on nutritional value, sensorial and functional features of food is one of the non-thermal technologies besides it contributes to microbial safety. In this study, antifungal effect and decontamination efficiency of ultrasound has been tried to be given with wash treatment effect combinate with ultrasound application in raisin samples at different frequencies and times. The antimicrobial effect of ultrasonic washing applications at 25 and 45 kHz for 3, 6, 10 and 15 min (1:10 raisin/water ratio) and 3, 6 min (1:6 raisin/water ratio) were studied. In each raisin/water ratio, the mould counts obtained from the raisin samples which applied ultrasonic washing treatment were reduced approximately 1 log unit. From the stand point of the physicochemical characteristics, titratable acidity, water activity and moisture content were not statistically different while the water ratio and washing time increases the pH and color values of samples statistically increased ($P<0.05$).

Keywords: Antifungal, decontamination, raisin, ultrasonic washing

Theme: FOOD SCIENCE AND TECHNOLOGY

Detecting Adulteration of Extra Virgin Olive Oil by Chemometric Methods

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Abstract

Adulteration of extra virgin olive oil are important not only for consumers, but also for suppliers, retailers, regulatory agencies, and administrative authorities. Extra virgin olive oil is more susceptible of adulteration practices, being the most common one the addition of other olive oils of lower commercial value and/or seed and nut oils, such as sunflower, soybean and hazelnut oils etc. The rapid and reliable detection of adulteration is a very challenging issue in the field of virgin olive oil authentication. Detection of adullteration is not easily possible and requires precise, time consuming and expensive methods including sample preparation, analysis, data acquisition and processing have been developed and proposed to control the adulteration of extra virgin olive oils. Mathematical and statistical methods are used for processing and capturing the most important and relevant content within the multivariate data. The produced analytical data (spectroscopic, chromatographic, isotopic, sensorial, etc.) are often multivariate data matrices which demand appropriate chemometric analysis including; Lineear discriminant analysis (LDA), Partial least squares (PLS), Partial Least Squares Discriminant Analysis (PLS-DA), Principal component analysis (PCA), Artificial neural networks models (ANN), Target factor analysis (TFA), Soft Independent Modeling of Class Analogies (SIMCA) and K-Neares. In this respect, both infrared and mid-infrared absorptions (FT-IR, FT-MIR, NIR, and MIR) and Raman scattering, NMR spectroscopy, MS, biosensors, and DNA-based approaches represent promising alternatives for the adulteration and traceability of olive oil, because of their sensitivity, high-throughput, reproducibility and robustness in comparison with conventional methods

Keywords: Adulteration, Chemometric methods, Detection, Extra virgin olive oil

Supporting Agencies: The University of Cukurova

Theme: Food Science and Technology

Processed Food Products of Taro (*Colocasia esculanta*)

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Abstract

Taro is widely grown agricultural product in tropical and subtropical areas in the world. It has higher mineral content compared to the most popular fruit banana. Besides, the glycemic index of taro is lower than the most consumed crop white potato, which makes it healthy choice for the consumer. Taro is also highly digestible, used in infant foods and elderly people diets. However, it has hard texture compared to white potato and high amount of mucilage comes off during peeling and cutting. In addition, its postharvest shelf-life is short because of its high moisture content, mechanical damages during harvesting, physical and microbial spoilage in storage. Due to the difficulties in preparation and storage of fresh taro crops, they are processed into different varieties of food products such as flour, pasta, snacks etc. by maintaining nutritional values with extended shelf-life. Studies showed that taro may be a healthy alternative to white potato in processed food products.

Keywords: Food processing, Nutritional values, Shelf-life, Taro

Theme: Food Science and Technology

Determination of vitamin A (Retinol palmitate & all-trans retinal) losses in seabream (*Sparus aurata*) meat cooked by different cooking methods

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Abstract

Seabream is one of the main marine fish species cultured in Mediterranean Sea region. Because of its white meat color and desirable taste, consumption of seabream meat is increasing day by day. Seabream fish is usually eaten as cooked after the applying of various cooking methods such as boiling, steaming, baking, grilling or frying. Most abundant vitamins found in seafood meats are lipid soluble vitamins such as A, D and E. Vitamin A is naturally present as retinol palmitate and all-trans retinal in fish meat. Recommend Daily Intake for vitamin A is 700-900 µg/day for women and men. During the heat cooking some vulnerable compounds such as vitamins can be degraded as a result of cooking type. This study is aimed to determine possible effect of cooking methods on the vitamin A losses in seabream meat.

Retinol palmitate and all-trans retinal contents of raw seabream fish meat were found as 67.02 µg/g and 44.73 µg/g (dry matter), respectively. Both retinol palmitate and all-trans retinal content of seabass meat were significantly affected by cooking methods. Lowest vitamin A content (73,1 µg/g) was found in baked samples, whereas highest was determined in fried samples (109,6 µg/g). Highest vitamin A content of fried samples could be stemmed from absorption of vitamin A rich corn oil or fast denaturation of outer layer of fish meat as vitamin A seal during frying process.

Keywords: Cooking methods, Retinol palmitate, Seabream fish, Vitamin A

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Theme: Food Science and Technology

Skin ripening cheese: Turkish Tulum Cheese

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Abstract

Tulum cheese is a popular Turkish cheese variety produced from raw milk, processed and aged in goatskins traditionally. Recently, this cheese has been manufactured from skimmed milk, and the curd was salted and packed firmly in goat's skins (Tulum in Turkish) or in cloth sacks and ripened for about 3 months at 6–10 °C and 65–85% relative humidity. Tulum cheese has a cream colour, a high fat content and a crumbly and semi-hard texture. It has a buttery and pungent flavour. Type of milk used for Tulum cheese making was identified as the most important factor, followed by Tulum cheese's texture, price, salinity, fat content, origin and flavour. The ideal Tulum cheese profile for the overall consumers was made with cow milk, a hard texture, a low salt cheese, a full fat cheese, the regional cheese which belongs to Izmir region and a mild-flavoured cheese. Varieties of Tulum cheese are referred to by the names of the regions where they are traditionally produced such as Erzincan (Şavak), Divle, Çimi and Izmir (Salamurali) Tulum in Turkey. The cheese is normally placed in the inner lining of the goatskin, but in some cases, particularly in the Aegean Region, the outer skin is shaved, turned inside out, and filled. Tulum cheese characteristics are originated from intensive lipolysis and proteolysis. The permeability of the goat skin allows the loss of moisture from cheese which leads to the relative increase of the content of total solids in cheese. Increase of the total solids content during ripening is in the skin due to the porous structure of skin which allows the loss of water. The volatile compounds were detected by solid phase micro extraction and gas chromatography–mass spectrometry techniques in Tulum cheeses. We found total of 82 volatiles including 9% acids, 26% esters, 17% methyl ketones, 7% aldehydes, 17% alcohols and 24 miscellaneous compounds.

Keywords:, Goat skin, ripening cheese ,Turkey, volatile compounds

Theme: Food Science and Technology

Application of Thermal Analysis in Fats and Oils

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Abstract

Fats and oils form a part of almost all food products which are often submitted to thermal treatment during processing or storage. Heat-induced changes in fats and oils are fundamental to elucidating their physical and chemical properties, and very important from industrial and health points of view.

Thermal analysis (TA) represents a family of techniques in which a given physical property of the sample is recorded as a function of time, temperature, or both under a controlled gas atmosphere. Differential scanning calorimetry (DSC), Thermogravimetry (TG), and differential thermal analysis (DTA) are the most commonly used TA techniques. Enthalpy, mass, and temperature/time are the physical properties measured during a DSC, TG, or DTA experiment under isothermal or nonisothermal conditions. The application of TA techniques to fats and oils present several advantages, as they do not require time-consuming practices, chemical treatment of the sample, and the use of toxic chemicals.

Major areas of DSC application in the field of fats and oils are melting, crystallization, oxidative and thermal stabilities, authentication and adulteration, all of which are related to unique chemical composition and processes such as hydrogenation, interesterification and antioxidant addition. TG and TG/DTA are mainly applied to determine the quality of edible oil by providing mass loss and decomposition time/temperature which are used for the calculation of kinetic parameters.

In this presentation, the use of thermal techniques in edible fats and oils will be explored in detail with the help of literatures as well as primary results obtained in the laboratory for different vegetable oils.

Keywords: Fats, Oils, Thermal analysis

SUPPORTING AGENCİES: KAHRAMANMARAS SUTCU IMAM UNIVERSITY

Theme: Food Science and Technology

Processing of Turnip Juice By High Hydrostatic Pressure with Respect to Quality Parameters and Mıcrobial Inactivation

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Abstract

Turnip juice (shalgam), a red colored, cloudy and sour soft drink, is a trad itional lactic acid fermented beverage produced by using black carrot, bulgur flour, sourdough, salt, turnip, and water. Although it is mainly consumed in southern Turkey, its consumption is currently increasing in all over the country. Salt concentration of the juice is very high providing certain degree of shelf life extension but is not enough for the commercial production. Current efforts to extent shelf life of turnip juice made by heat processing end up with discoloration of the product and resulted in adverse changes in sensory properties especially taste and flavor. Thus, there is a need to investigate potential of alternative nonthermal technologies especially high hydrostatic pressure processing (HPP) on physical and sensory properties and inactivation on both endogenous microflora and spoilage bacteria

Both spicy and nonspicy turnip juice samples were processed by HPP with pressures, temperature and processing times ranged from 200 to 500 MPa, from 4 to 40°C and from 3 to 15 min, respectively. It is observed that physical properties of spicy and nonspicy turnip juice samples were somewhat different. But no significant difference was detected between the control and HPP- processed turnip juice samples on physical properties of pH, titratable acidity, color (L, a, b), hue, chroma, total color difference, color density, total antioxidant capacity, total phenolic content, total monomeric anthocyanin content for both spicy and nonspicy turnip juice samples ($p>0.05$). Increased pressure, treatment time and temperature caused an increase in total mold and yeast and total mesophilic aerobic bacteria as well as lactic acid bacteria ($p\leq0.05$). Sensory properties of both turnip juice samples were not also significantly changed by pressure applications. It is concluded that HPP can successfully be applied to process turnip juice.

Keywords: turnip juice, high pressure processing, sensory properties, physical properties.

Theme: Food Science and Technology

Processing of Hardaliye Drink by Ultrasonicatıon: Changes on Quality Parameters and Microbial Inactivation

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Abstract

Due to health benefits and unique sensorial properties there is a growing interest to traditional fermented products in all over the World. Turkey is one of rare countries that rich in different traditional fermented products. Hardaliye produced by lactic acid fermentation is a traditional beverage produced from grape juice and pomace with the addition of different concentrations of whole/ground or heat-treated mustard seeds and, of sour cherry leaves produced in a traditional way in Thrace, the European part of Turkey. Even though Hardaliye has very refreshing taste, unique color, health beneficial effects its production volume is low due to its limited shelf life. Heat processing of Hardaliye is not a feasible option since heat processing alter physical, sensory and nutritional properties of Hardaliye. Thus, there is a need to pursue processing of Hardaliye with alternative technologies. Among different technologies nonthermal ones such as high pressure processing (HPP), pulsed electric fields (PEF) and ultrasonication come forward due to their minimized adverse effect on product quality. For this reason processing of Hardaliye drink by US by different processing time, temperature and altitude with the measurement of physicochemical and sensory properties as well as inactivation of endogenous microflora was prompted. With change treatment time from 5 to 45 min, amplitude from 50 to 90 and processing temperature of 4 to 40C, minor changes were observed in pH, °Brix, conductivity, titratable acidity, color, total antioxidant capacity, total phenolic content, total monomeric anthocyanin content and sensory properties with no significant difference ($p>0.05$). Increased treatment time, amplitude and temperature provided significant amount of inactivation on both total mold and yeast and total aerobic mesophilic bacteria. It is concluded that US is a viable option to process Hardaliye without adversely affecting its sensory properties.

Keywords: hardaliye, ultrasonication, sensory properties, traditional drink

SUPPORTING AGENCIES: TAGEM

Theme: Food Science and Technology

Effects of Ultrasonication on Quality Parameters of Licorice Drink

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Abstract

Licorice root (*Glycyrrhiza glabra* L.) drink (LRD) or sherbet (LDS) is one of our traditional beverages that commonly consumed in South or Southeastern Region of Turkey especially in summer season. It has unique sweet taste due to glycyrrhizin or glycyrrhizin acid and yellowish-brownish color. It is prepared by immersing certain amount of root to warm water and soaking for 12-18 h and following filtering to separate water phase. Licorice drink is freshly prepared and must be consumed in 24 h as it has shelf life less than 48 h. Efforts made by heat processing resulted in undesirable changes in both physical and sensory properties. Thus, the potential of ultrasonication (US) to process LRD to extend shelf life by preserving its physical and sensory properties were studied. Freshly prepared LRD samples were processed by US with different processing parameters such as temperature, time and amplitude, and changes on important quality parameters and sensory properties were quantified. Generally, US processing did not cause significant changes in measured quality attributes. Sensory properties of the samples measured by 9-point hedonic scale were not also affected by US processing. Inactivation on natural microflora formed by total mold and yeast and total mesophilic aerobic bacteria was increased by both an increase on temperature, processing time and amplitude. It is concluded that US processing can be used to process LRD but more studies need to be performed to determine shelf-life extension

Keywords: licorice drink, ultrasonication, microbial inactivation, sensory properties, quality attributes.

SUPPORTING AGENCIES: TAGEM

Theme: Food Science and Technology

Certain Characteristics of Oleogels Prepared with Olive Oil and Olive Wax

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Abstract

Physical state of edible oils (liquid, solid or semi-solid state) determines the application areas of the oils in the food industry by affecting taste, nutritional quality, stability, softness, color, texture and shelf life of food products. Food processing i.e. fractionation, hydrogenation and interesterification have long been used to modify the physical state, and liquid oils have been converted into a semi-solid or solid form. However, these present technologies have certain disadvantages, such as decrease in unsaturated fatty acid, increase in trans fatty acids and increase in operation cost. Nowadays, oleogel, defined as a three dimensional, continue and thermoreversible gel which is formed by crystallization of oleogelator with low molecular weight into the vegetable oils, appears to be a promising technique to produce more nutritive and healthier foods.

The present study was conducted to evaluate the minimum gelation concentration, crystallization time, oil-binding capacity, color and storage stability of the oleogels produced from olive oil and olive vax at different concentrations (0.5-10%). The minimum gelation concentration of olive wax was 4%. Crystal formation time was decreased from 26 min to 6 min, and fat binding capacity increased from 36 to 83% when the wax content increased from 4 to10%. Peroxide value increased during the 60-day of storage; however, the higher the wax content the lower the rate of peroxide formation. Spreadability and firmness of the oleogels were in parallel to the wax concentration, and showed significant decreases during the storage. In color analysis, greenery, yellowness and brightness decreased with increasing wax concentration, resulting in opaque oleogels.

In conclusion, the oleogels obtain in this study can be used successfully to produce food products with low in saturated fatty acid and cholesterol, and high in unsaturated fatty acids.

Keywords: Oleogel, Olive oil, Olive wax

Theme: Veterinary Science

The Effects of Tuber Root of Maca (*Lepidium Meyenii* Walp.) Plant on Egg Production And Antioxidant Status of Hens

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Abstract

Maca (*Lepidium meyenii*) is a tuberous-rooted plant in Brassicaceae family such as broccoli, cabbage, turnip. It is endemic and traditionally cultivated in South America. It is consumed as a food supplement around the world. With the interest shown over the past decade, various food from yogurt to jam are produced from Maca which affects the reproductive hormones and antioxidant activity regard to several recent researches. A total of 150, 56 week-old, laying hens were divided into 3 groups with 10 replicates. Dried and powdered roots of Maca were added as 0 %, 0.5 % and 1 % to the diets (w/w) of control, Group1 (M1) and Group2 (M2) during 16 weeks, respectively. For the determination of antioxidant activity, egg production and quality, daily production, internal and external criteria of egg and serum glutathione peroxidase (GSH-Px) were measured and analyzed by using SPSS. Despite there were not significant differences for the production performance and egg quality of hens, Maca at the rate of 1% showed an antioxidant activity by increasing serum GSH-Px level of laying hens.

Keywords: Antioxidant activity, Egg quality, Lepidium meyenii, Maca

Theme: Food Science and Technology

Production of Yogurt by Adding the Maca (*Lepidium meyenii*) Powder and Propolis Extract

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Abstract

The aim of this study was to produce a yogurt with improved functionalities by using maca (*Lepidium meyenii*) powder and propolis extract, and investigate its edible properties. A total of four types of yogurts were produced and stored at +4°C for two weeks; 1) natural yogurt, 2) yogurt consists of 0.5% propolis, 3) yogurt consists of 5% maca, and 4) yogurt consists both of 5% maca and 0.5% propolis. Lactobacillus sp. was analysed by using conventional methods among the produced yogurts twice in a week interval. Their pH values were measured in 1., 7., and 14. days of storage. Additionally a hedonic test was applied to two groups of panelists in a week interval and analysed according to the products' sensory properties. Regarding to the results of microbiological analyses, no significant difference was found among the level of concentration of Lactobacillus sp. inbetween products. The highest pH level was measured in natural yogurt (4.05), and the lowest was the yogurt consists both of maca and propolis ($p<0.01$). According to the hedonic test, natural yogurt was the most approved, which was followed by yogurt consists of 0.5% propolis. In conclusion, the ratio of maca and propolis used in this study didn't induced Lactobacillus growth, however usage of 0.5% propolis in yogurts might be further investigate due to its acceptable taste according to hedonic test results, which might be a novel approach to produce a functional yogurt.

Keywords: Lactobacillus sp., Maca (Lepidium meyenii), propolis, yogurt.

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Theme: Food Science and Technology

Identification of volatiles compounds of *Nigella sativa* L. extract using purge and trap extraction system

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Abstract

Nigella sativa L. (black cumin) is a member of the Ranunculaceae family and commonly known as black seed. People use the seeds in cooking to add spice, and also consume powdered black seed and black seed oil for health benefits. Especially, black seed extracts have been used for medical purposes for centuries. The presence of chemicals in black cumin seeds that offer antioxidant benefits. Antioxidants rid the body of free radicals that cause cell damage and promote disease. A lot of scientific studies examined the effectiveness of black cumin seeds for cancer treatment, immune system benefits, anti-bacterial benefits and epilepsy benefits etc. Therefore, the objective of this study was to characterize volatile composition of Turkish *Nigella sativa* L. extracts by using purge and trap extraction system. For this purpose, a gas chromatography equipped with a flame ionization detector (FID) and mass spectrometry (MS) was employed. A total of 29 volatile compounds including different chemical classes such as acids (13), alcohols (6), phenols (3), esters (2), ketones (2), aldehyde (1), lactone (1) and terpene (1) were determined. The amount of volatile compounds was 20753 µg/L. The most abundant volatile compound was acetoin (9394 µg/L) followed by acetic acid (3088 µg/L).

Keywords: *Nigella sativa* L., purge and trap extraction, volatile compounds

Theme: Food Science and Technology

Determination of sterol composition of olive oil obtained from cv. Nizip Yaglik

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Abstract

Sterols constitute the majority of the unsaponifiable fraction in olive oil. They are important to virgin olive oil (VOO) quality regulation. In recent years there has been increased interest in the sterols of olive oil for their health benefits. Their health benefits are to help reducing cholesterol level by opposing its absorption in intestinal tract and also have preventive effect against some cancers. They also can be used to detect adulteration with another oils. The main sterols found in olive oils were β-sitosterol, Δ(5)-avenasterol, campesterol and stigmasterol. This study presents sterol composition of olive oils obtained from Nizip Yaglik cultivar. The fatty substance, with added á-cholestanol as an internal standard, is saponified with potassium hydroxide in ethanolic solution and the unsaponifiables are then extracted with ethyl ether. The sterol fraction is separated from the unsaponifiable extract by capillary-column gas chromatography. Total sterol content of olive oil was identified as 1708 ppm. The percentage of β-sitosterol was found in 95,725 %. The campesterol content of studied oil sample was determined as 2,547 % percentage.

Keywords: Olive oil, sterol composition, Nizip yaglik cultivar

Theme: Food Science and Technology

Effect of three different infusions in aroma compounds of endemic Iranian plant tea obtained from dried violet–blue petals of Borage (*Echium amoenum*)

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Abstract

Echium amoenum Fisch. & C.A. Mey. (Boraginaceae) or Borage is a large hairy annual plant mostly found in Northern parts of Iran and different regions of Europe. This plant is called "gole-gavzaban" (ox-tongue) in Iran. The flowers and the leaves of this medicinal plant are mostly used in treatment of stress and depression and demonstrate several medicinal properties. The dried violet–blue petals of Iranian Borage were used under study for preparation of tea.

Volatile constituents and total phenolic contents of Iranian Borage (*Echium amoenum*) teas, obtained from three different brewing techniques were studied with GC-MS and Folin Ciocalteu assay. The extraction of volatile constituents was performed with liquid-liquid extraction method. Two hot teas obtained and coded as BRG4 (4 minutes/98°C) and BRG16 (16 minutes/98°C), and one cold tea obtained and coded as BRG24 (24 hours/ambient temperature) were investigated. A total of 37 volatile compounds comprising alcohols, acids, volatile phenols, lactones, aldehydes, ketones, pyrroles and furanones were identified and quantified in the samples. Indeed, it worth noting that aroma profiles of Borage teas were similar. However, the effects of infusion techniques were clearly observed on the contents of volatile compounds and the highest total concentration was detected in BRG24. 3-Penten-2-ol was found in huge amount in all Borage teas. The total phenolic contents of BRG4, BRG16 and BRG24 were 3.47, 4.41 and 3.83 mg/kg gallic acid equivalents, respectively. Therefore, when compared Borage teas, BRG24 and BRG16 were found to be richer in aroma and total phenolic compounds, respectively.

Keywords: Borage, Echium amoenum, petals, tea, aroma, GC-MS, GC-FID, infusions

Abstract Theme: Nutrition

Determination of bioactivities of kefir by in vitro gastrointestinal simulation

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Abstract

Kefir is a fermented dairy product by inoculating cow, sheep or goat milk with kefir grains. Because of the microbial diversity of kefir, it has many important roles on the overall human health improving such as regulation of hypertension, decreasing the risk of obesity and coronary heart disease, anti-cancer and reducing osteoporosis. After fermentation and/or gastrointestinal digestion of kefir, large casein proteins might be hydrolyzed to shorter bioactive compounds that might have involved to regulation of several metabolisms.

In this study, traditionally produced kefir was digested in gastric and intestinal phase according to an in vitro digestion simulation method. Then, digested kefir samples were ultrafiltered with 3-10kDa molecular weight cut-off membranes. Biological activities of digested kefir filtrates and undigested kefir were compared by using antihypertensive (angiotensin converting enzyme inhibitor, ACE), antidiabetic (dipeptidyl peptidase IV inhibitor, DPPIV), antioxidant (2,2-diphenyl-1-picrylhydrazyl, DPPH; reducing power, RP) and antimicrobial activity methods.

The results indicate that the amount of total phenolic substance in undigested kefir increased from 43.76±0.05 mgGAE/L to 668.16±0.3 mgGAE/L in digested kefir. The antioxidant activities of undigested kefir also increased in digested kefir filtrates. A significant increasing was measured in digested kefir samples for ACE inhibitor activity (from 9.91±0.76% to 98.88±0.42%). DPPIV inhibitor activity was not detected in undigested kefir samples; however, it was measured as 19.91±3.2% in digested kefir filtrates. Antimicrobial effect was observed against E. coli in the digested kefir filtrates.

As a result, digested kefir generally causes an increase in the amount of bioactive compounds.

Keywords: Bioactivity, digestion, gastrointestinal simulation, kefir beverages

Theme: Food Science and Technology

Application of Processing Technologies on Avocado

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Abstract

Mostly avocado is grown in tropical, subtropical and Mediterranean climates due to its susceptibility to chilling injury. There have been several varieties of avocado but Hass and Fuerte are the two most common varieties in the international market. Avocado has potential health benefits with high amount of unsaturated fats and antioxidant activity, which contains proteins, minerals, vitamin E, carotenoids, serotonin. However, the composition of avocado changes depending on variety and ripening stage. Avocado ripens in a few days after it is harvested. Therefore, applications of processing technologies including modified atmosphere packaging, high hydrostatic pressure, microwave processing, ultrasound, UV and gamma radiation can increase shelf-life of avocado with remaining nutritional values and high quality.

Keywords: Avocado, processing technologies, quality, shelf-life

Theme: Food Science and Technology

Stabilization of emulsion of olive oil-in-water by ultrasound treatment

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Abstract

High power ultrasound application is an emerging technology in the food industry for its cost-effectiveness but its application parameters have to be optimized for product stability before use. Application of ultrasound for stabilization of emulsion of olive oil-in-water containing Na-caseinate and whey protein isolate was investigated. Emulsions were prepared by mixing olive oil and protein solution in two stages. Homogenization for 2 min with a ultraturrax probe-homogenizer was applied in the first stage and then ultrasound was applied for 2 min. Control sample was prepared by two-stage homogenization. Emulsifying activity index of emulsions was measured immediately. Creaming index of emulsions was measured after 1 and 7 days of storage. Na-caseinate had better emulsifying properties compared to whey protein isolate for all the treatments. Two-stage homogenized sample had inferior emulsion properties compared to those of ultrasound treated samples. Among ultrasound treatments 50% continuous, 50% pulsed and 20% continuous applications caused higher emulsifying activity index for both proteins. On the contrary, all emulsions have the lowest EAI at 20% pulsed treatment. Creaming index values of samples treated with 50% pulsed and 20% continuous ultrasound were lower than those of the other samples.

Keywords: Emulsion, ultrasound, Na-caseinate, whey protein isolate.

Theme: Food Science and Technology

Effect of inulin on physical properties of dried and reconstituted yoghurt

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Abstract

Yoghurt has poor reconstitution properties after drying. Use of inulin for improvement of reconstitution properties of dried yoghurt was investigated. Two different types (HPX and HP) of inulin was added to yoghurt, the mixture was homogenized and dried by freeze drying. Water activity, moisture content, dispersibility, higroscopicity of yoghurt powder were measured. In addition, serum separation and rheological properties of reconstituted yoghurt powder were determined. Inulin reduced water activity and moisture content of the yoghurt powder. Dispersibility of the yoghurt powder with inulin was higher compared to that of the control sample. Control sample was more hygroscopic compared to the inulin-containing samples and caking was observed after storage. Addition of inulin increased viscosity of reconstituted yoghurt. Serum separation values of control and inulin-HP containing samples were similar. On the other hand, the sample with inulin-HPX had the lowest serum separation. Both inulins were effective for improvement of physical properties of dried yoghurt. However, inulin-HPX improved physical properties of reconstituted yoghurt more than inulin-HP. More studies are required for optimization of formulation and obtaining physical properties for reconstituted freeze-dried yoghurt similar to those of fresh yoghurt.

Keywords: Inulin, dried yoghurt, physical properties

Theme: Food Science and Technology

Optimization of the Parameters of Microwave (MAE) and Ultrasound Assisted (UAE) Extraction of Purple Basil Leaf Phenolics

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Abstract

In this study, optimization of the MAE and UAE parameters of the purple leaf phenolics was conducted by Response Surface Methodology (RSM) and central composite design (CCD). The quadratic model was used to describe the effect of the process condition on the extraction yield of the phenolic compounds. Effect of the model parameters namely, time and microwave power was found to be significant ($p<0.01$). In MAE, power level and extraction time were set to be 300-600 W and 1-3 min. Total phenolic compounds (TPC) were ranged from 10.88 to 52.72 mg/g. Higher TPC value was obtained from the samples subjected to higher power and extraction time. Optimum process parameters were estimated to be 590.83 W and 2.98 min for MAE. Effects of the extraction temperature and time with highest ultrasound power (%100) on the extraction yield of TPC was determined by the quadratic model. Effect of model parameters on extraction yields was significant, and lack of fit was not significant. TPC value was 17.31-37.78 mg/g. Extraction yield of the TPC increased with increasing extraction temperature and time. Optimum process parameter was found to be 30 min and 60 °C. This study suggested that extraction yield of the phenolic compounds of basil leaf could be increased by using UAE method.

Keywords: Extraction, Phenolic, Purple basil, Response surface methodology.

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Theme: Food Science and Technology

Comparison of essential and non-essential amino acid variations in Einkorn and Emmer wheat cultivated in Turkey

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Abstract

The aim of the study was to compare essential and non-essential amino acid variations of some selected ancient wheat lines (forty-nine emmer wheat (Triticum dicoccum) and thirty-six einkorn (Triticum monoccocum L.)) cultivated in Turkey. Obtained results were also evaluated with control cultivars obtained from three durum wheat (Triticum durum). Essential (threonine, methionine, lysine, valine, leucine+isoleucine and phenylalanine) and non-essential amino acid profiles (arginine, histidine, aspartic acid, cysteine, glutamic acid, serine, proline and tyrosine) were determined by Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS). All of the tested mean essential amino acids were found to be higher in einkorn lines than those from emmer wheat lines and control cultivars. Total essential amino acid contents studied in the context of the research, were determined to be 1685.71, 596.26 and 312.24 mg kg^{-1} for einkorn and emmer wheat and durum wheat, respectively. It can be concluded that the einkorn lines is the most suitable wheat species for human nutritional quality.

Keywords: Amino acid, Einkorn, Emmer wheat, Nutrition

Theme: Food Science and Technology

Effect of Chickpea Type on Physical, Chemical and Sensory Properties and Aroma Profile of Simit Bread

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Abstract

In this study, effect of chickpea type (Hasanbey, Seçkin and Menemen) on commercially produced chickpea-leavened "simit bread" in Aegean Region was investigated. Physical (baking loss, specific volume, volume yield, bread yield, color, texture profile analysis), chemical (pH, acidity, moisture, aw) and sensory analysis were carried out. Aroma profile of breads from different chickpea types were also determined. Chemical analysis in simit breads showed that use of different chickpea types resulted in different pH (6.70 – 7.36) and acidity (0.98 – 1.36% lactic acid) values ($p<0.05$), while there was no difference in terms of moisture (34.31 – 34.81%) and water activity (0.96 – 0.96) of breads ($p>0.05$). Simit breads did not differ in terms of dough yield (152.44 – 152.91%) ($p>0.05$), while baking loss (10.20 – 11.78%), bread yield (139.98 – 145.09%), specific volume (1.97 – 2.38 cm^3/g) and volume yield (284.96 – 337.72 cm^3/g) were significanlty affected by chickpea type ($p<0.05$). Texture profile analysis of chickpea leavened breads were determined in terms of hardness, chewiness, springiness, adhesiveness and gumminess. Chickpea type affected all textural parameters significantly ($p<0.05$). Breads fermented with Hasanbey chickpea yeast resulted in harder and chewier breads than Seçkin and Menemen. Effect of chickpea type was significantly important in bread crumb color ($p<0.05$). Breads fermented with Hasanbey chickpea yeast resulted in increased L* and b* values. Sensory analysis showed that chickpea leavened breads had bright yellow crumb color, symetric pores, elastic, slightly hard and chewy texture. Aroma profile of breads showed that chickpea type was an important factor ($p<0.05$). Butiric acid (457.45 – 2772.50 ppb) and acetic acid (376.00 – 762.85 ppb) were higher than acetaldehyde (5.6 – 14.01 ppb) and 4-ethylacetophenon (18.86 – 33.94 ppb) in simit breads. Quantity of aroma components of simit breads fermented with 'Menemen' chickpea were higher and statistically different from 'Hasanbey' and 'Seçkin' types.

Keywords: Aroma profile, chickpea yeast, sensory analysis, simit bread, texture profile analysis

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Glucomannan compositions of salep powder for the determination of salep and its adulteration

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Abstract

Glucomannan is a water-soluble polysaccharide. It is a hemicellulose component in the cell walls of some plant species. Glucomannans are constructed from mannose residues as the primary sugar with glucose as the second sugar plus some acetylated residues. In food industry, glucomannan can be used as thickening and gelling agent in noodles and pasta, meat dishes, bread and biscuits, ice creams, jams and marmelates, beverages, souces and gravy, jelly cups and pudding / mousse. Native salep contain high levels of glucomannan and levels of the glucomannan can be used for the determination of salep adulteration ratio.

In this study, glucomannan levels were analyzed by an enzymatic method in real salep samples and some adulteration materials. The adulteration materials were classified in four groups as gums (guar gum, gum Arabic, locust bean gum, konjac gum and xantan gum), starches (wheat, corn, potato and rice starches), commercial additives (sugar, skimmed milk, vanilla and cinnamon) and miscellaneous adulteration materials (ground pasta, flour, ground rice, liquid salep aroma, solid salep aroma and carboxyl methyl cellulose).

Results showed that the glucomannan levels were in the range from 2.04 to 47.03 g/100g in real salep powder. Although, various levels of glucomannan were found in guar gum, locust bean gum and konjac gum, there was no glucomannan concentrations in other adulteration materials.

It can be concluded that the levels of glucomannan can be useful parameters for the determination of real salep concentration in salep powder samples.

Keywords: Adulteration, Glucomannan, Gums, Salep,

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Theme: Agriculture

Molecular Assessment of Tetraploid Wheat Genotypes With Low Cadmium Accumulation

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Abstract

In the first stage of the study, we characterize molecularly 71 durum wheat cultivars (Triticum durum Desf.), 24 emmer wheat (Triticum dicoccum L.) and 11 wild emmer (Triticum dicoccoides L.) genotypes via usw47 marker to select germplasm having low cadmium (Cd) allele. After molecular characterization, 14 cultivars selected among all genotypes for low and high Cd alleles were phenotyped by conducting a pot experiment with three replicates to verify the molecular data. The results showed that dose application (8 mg kg^{-1}) clearly increases Cd accumulation in grain. All cultivars used in pot experiment except for Amanos-97 and Sarıçanak 98 accumulated more Cd in grains after Cd application to soil. In addition to cadmium, phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), iron (Fe), zinc (Zn), copper (Cu) and manganese (Mn) concentrations were also determined. Moreover, not only for grain but also stem Cd concentration of almost all cultivars increased due to applied dose (8 mg kg-1) of Cd the in the pot experiment. In conclusion, cultivars such as Ege-88, Amanos-97, Sarıçanak 98, Sölen 2002 and Turabi with low Cd allele can be safely used as raw material to produce more healthier macaroni production.

Keywords: Durum wheat, pre-breeding, genetic resources, low cadmium content , phenotypic characterization

Theme: Agriculture

Effects of Different Liquid Fertilizer Applications On Bread Wheat Quality

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Abstract

The aim of this study was to find out effects of liquid organic and inorganic foliar fertilizer to grain quality of Sagittario bread wheat cultivar. The research was carried out in two different locations of Antalya under randomized complete block design with three replications during 2015-2016 growing period. Totally 11 different organic and inorganic liquid fertilizer combinations were practiced and some important quality traits such as volume weight (kg/l), SDS sedimentation (ml), protein ratio (%), wet gluten ratio (%) and gluten index (%) were determined. There was no any interaction between applications and locations in terms of grain quality parameters. Generally, all foliar fertilizer combinations have positively increased grain quality parameters but the difference was only significant for protein and wet gluten ratios. The highest protein and wet gluten ratios were obtained humic acid application before stem elongation (Z30) plus inorganic foliar application before heading stage (Z50) together with traditional chemical fertilizer at Konyaaltı and Döşemealtı locations, respectively. Protein and wet gluten ratios were 13.8% and 43.58% for control treatment while they were 16.3 % and 49.5 % for the treatment, respectively. These result showed that organic and inorganic liquid fertilizer can be applied to increase raw material quality of bread wheat.

Keywords: Bread wheat, humic acid, liquid fertilizer, protein ratio and raw material quality

Theme: Food Science and Technology

Development Functional Gluten Free Biscuits from Buckwheat, Amaranth and Quinoa Flour

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Abstract

Cereal is one the important nutrition sources all over the world with level of development, socio economic structures and nutrition habit of people of countries. Although grains are substantial for people, it can cause some disease such as celiac disease. Celiac disease is a systemic autoimmune disease triggered in genetically susceptible individuals by ingestion of gluten containing grains such as rye, barley and wheat. Celiac disease in debilitating symptoms, include gut musical damage and potentially serious medical complications. People who do not have enzymes to fully digest gluten, which, in the right genetic context, triggers inflammation and autoimmunity in the gut and other organs following deamination by the enzyme transglutaminase. Consumption of gluten containing foods in celiac patients causes inadequate absorption of various nutrients that the body needs, especially vitamins and minerals. Celiac disease is the only common autoimmune disorder with no approved meditation. Currently, the only available strategy for management of this disease is a long-life gluten-free diet. Gluten free products have to be consumed by celiac patients is limited in the market in despite of increasing researches on gluten free cereal products and celiac disease. In addition, the vast majority of gluten-free products are low in nutritive value due to their refined flour and starch base. In this research, seven kinds of biscuits are produced with kept constant 40% rice flour and combined in the rates of 30:20:10 buckwheat, 30:20:10 amaranth, 30:20:10 quinoa to complete 100% flour mixture were used. According to analysis, the average rate of moisture (3,58), ash (1,63), protein (7,23), fat (21,54), carbohydrate (66,02) was calculated as 486 kcal/100g. The average percentage of the products' energy from protein, fat, and carbohydrate were determined in order of 5,94; 39,82; 54,24 respectively. Moreover, cooking loss, spread ration, colour and sensory analysis were done. As a result, an alternative nutritional product that can be consumed by both celiac patients and healthy individuals has been produced.

Keywords: Functional foods, celiac disease, amaranth, gluten free biscuit

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Theme: Food Science and Technology

Impact of three parameters variation during cocoa post-harvest processing on microbial ecology and volatile compounds producing

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Abstract

Cacao is the one of the most traded agricultural commodities in the world, its quality depends on several parameters, such as tree variety, culture conditions, harvesting period, geographical origin and post-harvest processing applied. The variation in the post-harvest treatment stages, could value or degrade marketability and organoleptic qualities. The aim of our study is to verify the influence of cocoa post-harvest processing on both microbial communities structure and volatile composition. Cocoa beans samples carried out were extracted from pods stored at two different durations and fermented in wooden boxes in Ivory Coast at different time intervals with turning and without turning. Cocoa beans were analyzed using a molecular fingerprinting method PCR-DGGE targeting bacterial 16S rDNA and fungal 26S rDNA gene in order to detect the variation in microbial communities structure; this global analysis was coupled to SPME-GC-MS for assessing a cocoa volatile profile. The results showed that the main parameter that influence microbial communities structure was fermentation time, followed by turning, whereas, pods storage duration had a minor impact. Similar results were obtained for aromatic profile, except for pods storage duration that affect plus volatile compounds production. Global statistical analysis applied using Canonical Correspondence Analysis (CCA), showed the relationship between microbiota and volatile compound produced, furthermore, it allowed the identification of discriminating markers of cocoa post-harvest processing.

Keywords: Cocoa, post-harvest processing, microbial communities, volatile compounds.

Theme: Nutrition

Investigation of Antioxidant Activity of Two Tagetes Species with Potential Use as Food Additives

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Abstract

Edible flowers have been consumed or used since ancient times, as they provide colour, texture and vibrancy to foods aside with their medicinal properties. However, recently their consumption forms a new trend in human nutrition due to their bioactive phytochemicals with different chemical structures which are sources of antioxidants and protect against the damage induced by free radicals, and hence are beneficiary for human health. This trend highlighted the interest for the determination of bioactive nutrients in the edible petals and their activity to evaluate the flowers as natural source of antioxidants for human diet. In this study total phenolic content and antioxidant activity of ethanol, methanol and water extracts of two Tagetes erecta species (Narai and Eagle) of Asteraceae family were investigated. There was a positive linear correlation between antioxidant activity and total phenolic contents for all extracts. These findings pointed out that Tagetes erecta petals could be considered as new sources of safe natural antioxidants and colorants for food industry.

Keywords: Antioxidant activity, Tagetes, food additive

Theme: Food Science and Technology

GC-MS-Olfactometric characterization of key odorants in Moroccan Argan oil

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Abstract

Argan oil is, extracted from argan fruit kernels grown endemically in Morocco, used as a cosmetic, pharmaceutical and edible product. Argan oil contains mono-unsaturated (up to 80%) and saturated (up to 20%) fatty acids. As minor components, it includes polyphenols, tocopherols, sterols, squalene, triterpene alcohols and volatile compounds. In fact, argan oil known for its interesting nutritional value due to the high percentage of unsaturated fatty acids, and appreciated for its particular taste and aroma. Edible argan oil is produced from roasted kernels. Therefore, the roasted procedure can affect the formation of aroma compounds of the oil and especially its key odorants.

This research was done in order to determine the aroma profile and aroma-active compounds of argan oil. Purge and trap extraction system was used for the isolation of aroma extract. Then, aromatic extracts of the samples were analyzed by gas chromatography olfactometry (GC-MS/O) coupled with a flame ionization detector (FID) and mass spectrometry (MS). A total of 34 aroma compounds including different chemical classes such as alcohols, ketones, pyrroles, and pyrazines were determined. Besides, AEDA (aroma extract dilution analyze) were performed in order to identify the key odorants of Moroccan Argan oil.

Keywords: Argania spinosa kernel oil, Purge and trap extraction, Aroma profile

Theme: Food Science and Technology

Characterization of Aroma and Aroma-Active Composition of Gaziantep Cheese by Solvent Assisted Flavour Evaporation (SAFE) and Aroma Extract Dilution Analysis (AEDA)

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Abstract

Gaziantep cheese is a traditional and distinctive cheese of the south eastern part of Turkey. It is classified as a semi-hard unfermented cheese and made from milk of sheep and goat or mixtures of them. For the manufacturing, rennin is used to provide the coagulation. Once the stage is accomplished, the curd is cut into slices, left to drain in a cloth bag and pressed overnight to remove the whey. As for dairy products and especially for cheese, flavor is one quality components with particular importance for consumer acceptance and preference. It has been known for a long time that source of milk (cow, goat or sheep) can influence the flavor of the dairy product. Thus the aim of the study, extract the aroma compounds of the cheeses produced from cow, goat, and sheep milk by using the SAFE method and characterize the aroma and aroma-active compounds by the application of aroma extract dilution analysis (AEDA). For the characterization, the gas chromatography (GC) system consisted of chromatograph equipped with flame ionization detector (FID), mass selective detector (MSD), and a ODP-2 sniffing port were used. A total of 32 compounds were detected, 23 in the milk of sheep and 16 in goat. Of all aroma compounds detected in the samples, acids, and alcohols were present at the highest level, followed by ketones, aldehydes, and terpenes. Furthermore, the cheese produced from goat milk was overwhelmingly rich in terpene compounds than the other sample. It may due to the differences in the naturel feeding behaviors.

Keywords: Gaziantep cheese, aroma-active, SAFE, AEDA

Theme: Agriculture

Bio-Fungıcidal Activity Against some Plant Pathogens of Endemic Pyrus Serikensis Güner & Duman Leaf and Fruit Extract

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Abstract

Pyrus sericensis (Serik pear) plant species grow endemically in our country. The bio-fungicidal activities of ethanol extracts were determined obtained from leaf and fruit parts of this plant strain against plant pathogens (Fusarium oxysproum f.sp. cucumerium, Sclerotinia sclerotiorum, Rhizoctonia solani and Monillia fructigena) in cucumber, potato and apple. The biological activities of extracts from plant parts were determined under in vitro conditions. Experiments have been carried out with test doses of extracts at doses of 0.1, 0.5, 1, 2, 5 mg/ml against test organisms. In practice, the efficacy of extracts against test organisms was determined using the agar plate method. The activity values (mycelium growth, mycelium growth inhibition, Lethal dose) of the fungi against the extract were determined. According to these values, bio-fungicidal activity was observed against F. oxysproum f.sp. cucumerium, S. sclerotiorum and M. fructigena plant pathogens. However, no activity was noticed against the R. solani plant pathogen in the extracts. The highest effect was 100% MGE ratio at 5 mg/ml of leaf extract against M. fructigena. The most affected fungus species in both extracts was M. fructigena. For M. fructigena, lethal dose (LD50) was calculated as 0.48 mg/ml in leaf extract and 0.72 mg / ml in fruit extract. These rates were calculated against other tested pathogens. According to the results obtained, P. sericensis leaf and fruit extract has been found to have bio-fungicidal effects on the control of plant pathogens. Studies with plant extracts are important in terms of obtaining new alternative bio-fungicidal substances.

Keywords: Plant extracts, Plant pathogenic Fungi, Lethal dose, Pyrus serikensis, Serik pear

Theme: Agriculture

Antifungal Activity of Leaf and Fruit Extracts Obtained from Melia Azedarach L.

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Abstract

In this study, the possibilities were investigated for the use of extracts from leaf and fruit of Melia azedarach L. plant which grows naturally in our country flora to control plant pathogens. Fusarium oxysporum f.sp. cucumerinum (FOC) and Monilia fructigena plant pathogens cause dense crop losses in cucumber and apple plants. The efficacy of 100, 500, 1000, 2000 and 5000 µg/ml concentrations of leaves and fruit extracts of M. azedarach L. were determined against these plant pathogens. Efficiency studies were carried out in petri dishes containing potato agar desaturase under in vitro conditions. According to all doses, fruit extract was found to be more effective than leaf extract. The most sensitive pathogen to extracts is M. fructigena. Mycelial growth inhibition (MGI) and lethal dose values of pathogens were calculated against extracts. Antifungal activity was observed at all doses used. MGI ratios were 88% for FOC, 93% for M. fructigena, 86% for FOC, 92% for M. fructigena at 5000 µg/ml of leaf extract. Lethal dose value (LD50) was calculated as 1116 µg/ml against FOC and 1002 µg /ml against M. fructigena on leaves and 388 µg/ml and 475 µg /ml on fruit extract, respectively. As a result, it was determined that M. azedarach plant showed high antifungal activity against FOC and M. fructigena. It is thought that these results will be directed by the researches to be carried out later.

Keywords: Plant extracts, Lethal dose, Pyrus serikensis, Fusarium oxysporum f.sp. cucumerinum, Monilia fructigena

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Theme: Food Science and Technology

Characterization of Bioactive Compounds and Antioxidant Potential of Fermented Beverage: Shalgam

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Abstract

In the present study, the potential of bioactive phenolic compounds in commercially available shalgams was determined by a LC-DAD-ESI/MS^n. A total of 20 phenolic compounds were identified and characterized in a single analysis including anthocyanins, chlorogenic acids, flavonols, and phenolic acids. Within the anthocyanins, cyanidin, and cyanidin derivatives accounted for the highest amount of the total anthocyanins. Among them, cyanidin-3-xylosyl-galactoside and cyanidin-3-xylosyl-glucosyl-galactoside were the major anthocyanins. Six new anthocyanins (Peaks 3-4 and peaks 10-14) were also detected in shalgams for the first time. Chlorogenic acids, phenolic acids, and flavonols of shalgams were also evaluated for the first time in this study. The main subclass of chlorogenic acids in shalgams was 5-caffeoylquinic acid accounting for the largest part of the total chlorogenic acids content. Antioxidant activities of shalgams were measured using the ABTS and DPPH assays and the data obtained were in agreement with total phenol content. In addition, the chemical composition (sugars and organic acid contents) and colour parameters (L, a*, b*, C*, h) were analyzed in shalgams.

Keywords: Shalgam, anthocyanins, phenolic compounds, antioxidant capacity, DPPH, ABTS.

Author Notes: The authors would like to thank the Adana Science and Technology University for its financial support of the research project (No. MÜHDBF.GIDA.2014-16).

Theme: Food Science and Technology

Comparison of Volatile Compounds of Lemon Balm (*Melissa officinalis* L.) with Two Different Extraction Methods

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Abstract

Lemon balm (*Melissa officinalis* L.) is a well-known herb belonging to Lamiaceae family and is commonly consumed as tea. The use of M. officinalis is highly preferred not only its fragrance but also its beneficial health effects. This herb is reported to have a medicinal effect in the treatments of headaches, gastrointestinal disorders, nervousness and rheumatism. The name of "Melissa" is reported to come from the Greek words "meli, melitos" meaning honey and the name displays the attraction of the herb to the honey bees because of its pleasing odor. Although lemon balm has a unique and dainty odor, the researches carried out in lemon balm aroma is very limited in the literature. Therefore, the aroma composition of *M. officinalis* was investigated. In the study, two different aroma extraction methods were applied and the results were compared in between. Two different extraction methods were applied in obtaining the volatiles including liquid-liquid and purge and trap extractions. A variety of volatile compounds were detected in liquid-liquid and purge and trap extractions including terpenes and alcohols. In these volatiles, monoterpenes like (E)-citral, (Z)-citral, DL-limonene and terpenoids like caryophyllene oxide were found in excessive amounts in both extractions. These compounds are reported to be responsible for the aroma of citrus fruits. Regarding to extraction methods, the results of analysis were observed to be similar. Volatiles were obtained well in liquid-liquid extraction as the concentrations were higher. Yet, purge and trap method can be advised as there is less chance to be influenced by the presence of artifacts while liquid-liquid extraction method can isolate more than volatile compounds.

Keywords: *Melissa officinalis* L., lemon balm, volatile compounds

Theme: Nutrition

Cardioprotective effect of *Olea europaea* aqueous leaf extract against hyperhomocysteinemia associated oxidative stress in rat heart

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Abstract

Olea europaea (olive) leaves are widely used as traditional medicine in Asian and Mediterranean countries against a variety of human diseases due to their potentially content of bioactive compounds. This study was performed to investigate whether *Olea europaea* aqueous leaf extract can attenuate hyperhomocysteinemia-induced cardiotoxicity in rats. The antioxidant activity and total phenolic content of aqueous extract were quantitated respectively by DPPH radical scavenging and Folin-Ciocalteu methods. Male wistar albino rats (adult) treated with an intraperitoneal injections of DL-homocysteine (0.6–1.2 µM/g body weight) for 3 weeks were received during the second week (100mg/kg body weigh) of aqueous extract. Plasma homocysteine level, cardiac enzymes, endogenous oxidative parameters, proteasomal activities of cytosolic extracts and morphological structure of heart tissue were investigated. Results showed that aqueous leaf extract attenuated cardiac toxicity through decreasing level of cardiac enzymes (Creatinine phosphokinase (CPK), Lactate dehydrogenase (LDH), Aspartate aminotransferase (AST), Alanine aminotransferase (ALT)), malondialdehyde (MDA), protein carbonyls (PC) and increasing antioxidants components (superoxide dismutase (SOD), Catalase CAT), Glutathione (GSH)) and proteasomal activities. Cardiac histology was also less altered. These findings indicated that aqueous extract of *Olea europaea* leaves have protective effects and could be exploited for medicinal and food applications as a potential source of natural antioxidants during hyperhomocysteinemia related to cardiovascular diseases.

Keywords: *Olea europaea*, oxidative stress, biochemical parameters, hyperhomocysteinemia, heart

Theme: Food Science and Technology

Determination of The Best Antioxidant and Techno-Functional Chickpea Cultivars by Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) Analysis

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Abstract

Technique for order preference by similarity to ideal solution (TOPSIS) analysis, which is multi criteria decision making method, was firstly applied to determine the best water-soluble antioxidant and techno-functional potentials of 12 registered chickpeas to rank the most suitable cultivars based on determined parameters. Chickpeas were grown in trial fields of state research institutes in Adana and Erzurum regions which had mild-hot and cold climate conditions, respectively. The cultivars were analyzed for antioxidant potential such as total phenolic content (TPC), free radical scavenging (FRSA) and iron chelating (ICA) activities, and for functional properties such as water-soluble protein content (WSPC), water binding (WBC) and oil binding (OBC) capacities. The comparisons were conducted for the groups based on (i) harvest location of Adana in 2014-2015, (ii) harvest year of 2015 in Adana-Erzurum, and (iii) all harvest variables. Equal weights (0.17) were assigned for the parameters in TOPSIS analysis. However, cultivars of Aydın and Azkan respectively took first and second place having the highest closeness efficient in all groups, they individually had different ranking place in each determined parameter. Significant low positive correlations were also observed between TPC and other antioxidant parameters while there were not between the WSPC, OBC, and WBC ($P<0.05$). This study showed the usefulness of TOPSIS analysis in the multi criteria decision making process and the potential of Aydın and Azkan cultivars to be used as antioxidant or functional ingredient source which also can be grown in different conditions.

Keywords: Chickpea, antioxidant activity, functional properties, TOPSIS,

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Theme: Food Science and Technology

Determination of Some Pomological and Physicochemical Properties of Deer Apple Fruits (*Malus Trilobata* V *Eriolobus Trilobatus*) Grown in Mediterranean Region

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Abstract

Deer apple (*Malus trilobata* v E*riolobus trilobatus*) is an infrequent tree species which grows mainly on the Mediterranean coastal zone particularly in Greece, Bulgaria, Turkey and Lebanon [1]. There is no information found about properties of deer apple fruits in literature. The main purpose of this study was to determine some pomological and physicochemical properties such as color, diameter, length, weight, pH, brix, total phenolic and flavonoid content, total antioxidant activity, organic acid, phenolic compound, sugar, and aroma contents. In this study, fruit samples were chosen from Mersin, Turkey. Extraction optimization was performed by central composite trial design using Design Expert programme. Total phenolic content, total flavonoid content, and antioxidant activity analyzes were performed by using UV-Vis spectrophotometer. Antioxidant activity analyzes were done by using DPPH and CUPRAC methods. In organic acid, phenolic compound, and sugar analyzes HPLC methods were used. GC-MS was used in aroma analysis. All analyzes were performed at least two replicates and three parallel. The deer apple fruits have high fructose (356,4 mg/kg catechin equivalent), malic acid (27500 µg/g catechin equivalent) and epicatechin content (608 µg/g catechin equivalent). This study contributed information about deer apple fruits' pomological and physicochemical properties to the literature and aimed to increase the awareness of this fruits.

Keywords: Deer apple; Malus trilobata; Eriolobus trilobatus; pomological; physicochemical properties

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Theme: Food Science and Technology

Reserch of the Processes Drying Food Herbs Motor (*Allium Motor*)

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Abstract

The problems of high-quality processing of the herbal motor (*Allium motor*) are considered. The results of experiments on drying the herbal on the helio accumulation drying equipment developed are presented. During the drying process, the temperature was maintained at 46-54 °C for 13 hours. The engine is well dried and it is well preserved vitamins and carbohydrates, color and taste do not change. The optimum drying time has been determined. The dried product can be ground as needed to produce a powder.

Keywords: Drying, motor (*Allium motor*), safety, energy storage, helio drying equipment, quality

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Theme: Food Science and Technology

Comparison of The Residual Coagulant Activity in Different Blends of Calf Rennet and Camel Chymosin of White-Brined Cheese

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Abstract

Proteolysis is affected by coagulant kept in cheese curd during ripening. The purpose of this study was to determine residual coagulant activity values of white-brined cheeses made using five coagulant preparations during ripening. In this study, white-brined cheese was manufactured by using different blends of calf rennet and camel chymosin (0:1.0, 0.25:0.75, 0.50:050, 0.75:0.25 and 1.0:0) and the experimental cheeses were ripened for 60 days. The cheeses were evaluated in terms of residual coagulant activity during 60 days of ripening. Residual coagulant activity of the cheeses was influenced by different amounts of the coagulant. The residual enzyme activity detected in the white cheeses as a percentage of the peak area of the substrate converted to product. It was calculated as the ratio of the peak area of substrate of the peak area to product (as a percentage). The residual coagulant activities of the cheeses were expressed as peak area units per mg of cheese dry matter and per hour (PAU/mg h). Cheeses having high ratio of camel chymosin have higher residual enzyme activity calculated as percentage area than cheeses made by calf rennet.

Keywords: Camel chymosin, calf rennet, residual enzyme activity, white brined cheese.

Theme: Agriculture

Effect of Photoselective Nets on Harvest Quality of apples cv.' *Fuji*'

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Abstract

Global warming is one of the most important problems in terms of agricultural production. Especially in apple varieties, high solar radiation during the development period may cause different physiological problems during harvest. In this study, fruit quality parameters were examined during the harvesting period in Fuji apple variety grown under the conditions of pearl, red and white cover systems with special woven and pigment content to protect from sun radiation and control trees without any cover compared. Fruit peel color change (hue), fruit flesh firmness, fruit starch content change, respiration rate, ethylene production, antioxidant capacity and total phenol content were evaluated within this study. In addition, the effects of fruit average weight, yield value per tree and photosynthesis rate on the parameters of photosynthetic covering systems were examined.

Keywords: Global warming, apple, fuji, photoselective nets

Theme: Food Science and Technology

Development of Gluten Free Cracker Snacks Using Chickpea, Quinoa Flours

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Abstract

Celiac disease is an allergic disease of the digestive system that causes destruction of so-called villi, which leads to digestion in the intestine, thus inhibiting the absorption of food in the food and causing damage to the small intestine. Gluten protein in grains such as wheat, barley, rye, oats cause this disease. The only treatment is a lifelong gluten-free diet. In this study, chickpeas, buckwheat, quinoa, rice flour, flaxseed and whey were used to produce new gluten-free crackers acceptable for sensory and functional properties. In addition, the effect of cracker quality has been investigated. The study is designed by the reaction surface method which is experimental design method. The amount of fat (5-25%) and the amount of rice flour (5-24) were chosen as independent variables in the study. Nutritional analysis, sensory analysis and color analysis of the independent variables, crackers were done. The result of nutrient composition of crackers is the lowest% and the highest values are moisture (3,09-6,73); ash (2,01-3,15); protein (7,76-11,81); oil (10,53-41,25); carbohydrate (48,62-74,51) and the energy value (440-597) was calculated as CAL / 100 g. As a result, an alternative nutritional product that can be consumed by both celiac patients and healthy individuals has been produced

Keywords: Celiac Disease, Functional food, Celiac Disease, Nutrition

Theme: Food Science and Technology

Gluten Free Noodle Enriched with Chickpea and Quinoa: Cooking Property, Colour and Sensory Properties

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Abstract

Grain is one of the crucial nutrition sources all over the world. Whereas grains are important for human nutrition, it can be harmful for human in terms of health. Grain can cause some disease such as celiac disease. Celiac disease is a life-long intolerance to the gliadin fraction of wheat and the prolamins of rye (secalins), barley (hordeins) and possibly oats (avidins). The reaction to gluten ingestion by sufferers of celiac disease is inflammation of the small intestine leading to the malabsorption of several important nutrients including iron, folic acid, calcium and fat-soluble vitamins (concluded that celiac disease is the end result of three processes genetic predisposition, environmental factors and immunogically based inflammation) that culminates in intestinal mucosal damage. Celiac disease is the only common autoimmune disorder with no approved meditation. Currently, the only effective treatment for this disease is the strict long-life elimination of gluten from diet. However, a gluten free product which is necessary to be consumed by celiac patients is limited in the market. Moreover, a great majority of gluten free productions are low in nutritive value resulting from their starch base and refined flour. In this study, to produce gluten free noodles enriched with chickpea and quinoa were investigated. Protein, lipid, moisture, ash, colour analysis and sensory analysis were performed. The effect of the egg powder ratio both water holding ability and volume were found to be significant ($P < 0.05$). When the amount of egg powder increases, there is an increase in the water holding ability and volume. The effect of the rate of quinoa- buckwheat mixture flour and egg powder were found significant on general acceptability ($p<0.05$). As a result, alternative nutritional production was produced not only celiac patients but also healthy individuals.

Keywords: Gluten free, noodle, quinoa

Theme: Food Science and Technology

Using Chickpea-Quinoa-Chestnut and Dry Mulberry into Gluten-Free Biscuits: Nutritional, Antioxidant and Quality Characteristics

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Abstract

Celiac disease is a disease of the digestive system that disrupts the absorption of food by ingesting food that damages the small intestine. Gluten- containing grains are harmful for patients who have a celiac disease. Individuals who have celiac disease need to live gluten-free diet for their whole life. It is also recommended that celiac disease patients should be consumed gluten-free products. With the widespread the use of gluten-free production and the growing demand for gluten-free products, the gluten-free product market is also growing. Gluten-free products are known to be inadequate and unbalanced due to poor nutritional quality. The aim of this research is to produce gluten-free biscuits with natural food ingredients and functional qualities. For this purpose, chickpea flour, quinoa flour, chestnut flour, walnut, dry mulberry are used in the production of biscuits. Two independent variables, NK (chickpea, quinoa) (25-75 g / 100 g flour) and dry mulberry (10-20 g) were selected and the total 13 biscuits were produced. Food composition analysis, sensory analysis, texture analysis, antioxidant activity, total phenolic substance and colour analysis were performed in biscuits. The effect of NKK mixture on both protein and carbohydrate content was found to be significant in biscuits ($P < 0.01$). Moreover, the effect of the ratio of NKK mixture was found to be significant on the general acceptability of biscuits ($P < 0.01$). As a result, acceptable gluten-free biscuits with acceptable nutritional value have been produced.

Keywords: Gluten free, food fortification, biscuit

POSTER PRESENTATIONS

Theme: Food Science and Technology

Isolation and Identification of Fungi Responsible for Postharvest Decay of Tomato Fruits (*Lycopersicon esculentum* MILL) in Kura, Kano State, Nigeria

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Abstract

Tomato (*Lycopersicon esculentum* Mill.) is a popular vegetable worldwide and plays a vital role nutritionally because it is rich in vitamins, minerals, sugars, fiber and essential amino acids. It contain high amount of lycopene, a carotenoid with anti oxidant properties. Nigeria is the second largest producer in Africa and 13th in the world but estimated postharvest loss is about 60% .Fungi are the most important pathogens infecting tomatoes causing important losses during harvesting, transportation and storage, This study was conducted in Kura (latitude 11° 46′ N and longitude 8° 25′ E) between 25th March to 18th April, 2013 and 2nd March to 27th March, 2014. Analyses were conducted in the laboratories of Kano University of Science and Technology Wudil. The design was a 3x3x3 factorial laid out in RCBD with 3 factors at 3 levels replicated 3 times.Treatments consisted of 3 kg sound fruits. Fungi were isolated and identified from rotted tomatoes every 3 days for 24 days using Collins and Lyne (1976) and Snowdon (1989). Pathogenicity test as reported by Onunka and Ekwenye (2000) was conducted to prove that the organisms isolated were responsible for the decay. Results revealed five fungi namely Aspergillus flavus, Aspergillus niger, Aspergillus fumigatus, Mucor spp. and Rhizopus stolonifer. Mucor spp. has the highest occurrence of 29.2 and 30.4% followed by Rhizopus stolonifer with 29.2 and 26.1% in 2013 and 2014. Inoculation of isolates on fresh tomatoes revealed that the 5 fungi inoculated were pathogenic because they developed rots characteristics of the particular organism while the control remains firm and healthy after the 3 days. Further studies on ways to control the major postharvest fungi of tomatoes particularly using natural antimicrobials were recommended.

Keywords: Postharvest; microorganisms; tomato

Supporting Agencies: TETFUND NIGERIA

Theme: Food Science and Technology

Microcapsule characterization of phenolic powder obtained from strawberry pomace

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Abstract

Strawberries (Fragaria x ananassa) are widely used in food industry for production of juices. This causes production of high amounts of strawberry pomace because it was the residue obtained after strawberry juice production. It would be beneficial to develop a novel approach in the utilization of these waste materials because strawberries contain phenolic compounds which decrease the proclivity to several chronic diseases. Microencapsulation is one of the techniques that are used for increasing the stability of phenolic compounds. The objective of this research was to study the effects of different coating materials and different parameters of microfluidization on the efficiency and characterization of microcapsules having phenolic powder.

In this study, the obtained phenolic powder was encapsulated with different combinations of maltodextrin (MD) and gum Arabic (GA). High speed homogenizer (15000 rpm 30 sec) and high pressure homogenizer (MF) were used for microencapsulation. The particle size and optical microscopy analysis were performed. Total and surface phenolic contents (TPC) were investigated by means of Folin– Ciocalteu method. The encapsulation efficiency of capsules having MD:GA 10:0, MD:GA 8:2 and MD:GA 6:4 were found as 87,32%, 90,47% and 92,33%, respectively It was found that increasing GA ratio had significant effect on encapsulation efficiency ($p \leq 00,05$). It was found that 70 MPa pressure application led to a decrease in particle sizes- of capsules from 4,75 µm to 2,31 µm. Thus, 70 MPa was found to be better than 50 MPa application. For of all type of microcapsules, increasing MF pass number from 3 to 5 increased encapsulation efficiency significantly. Pass number of 5 was selected as duration of applied pressure. As a result, it can be concluded that encapsulation of phenolic powders by microfluidization was an efficient way of microencapsulation.

Keywords: Phenolic content, high pressure homogenizer, high speed homogenizer, strawberry pomace, encapsulation efficiency

Theme: Food Science and Technology

Ingredient effects on the stability of jelly gums during storage

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Abstract

There are various types of jelly gums present in the market with different ingredients. The studies related to storage stability of jelly gums are very limited in the literature. It is believed that there are interactions between gelling agents and sugars but the mechanism is still unknown. Hence, it is important to study the effects of type and concentration of gelling agent and sugar ratio on the storage stability of jellies.

In this study, the aim is to study the effects of ratio of glucose syrup to sucrose (1.1, 1.5), concentrations of gelatin (3%, 4.5%, 6%) and starch (0%, 1% and 1.5%) on the storage stability of jelly gums. Jelly gums were stored at 18±3.5°C and at 35±5% RH. Moisture content, water activity, pH, soluble solid and color of jelly gums were measured during 1 year of storage. Predictive equations were determined.

It was found that using glucose syrup:sucrose ratio of 1.5 increased the stability of jelly gums in terms of moisture content, water activity, pH and colour during storage. It was observed that glass transition temperatures increased during storage. Jelly gum with glucose syrup:sucrose ratio of 1.5, 1% starch and 6% gelatine was the most stable formulation in terms of total soluble solid content and pH. Hardness was affected by each ingredient significantly. Formulation with glucose syrup:sucrose ratio of 1.5, no starch and 6% gelatine was the most stable formulation in terms of hardness and gumminess. The highest increase in hardness was observed for jellies with glucose syrup:sucrose ratio of 1.1, no starch and 6% gelatine. This study showed that glucose syrup:sucrose ratio in the formulation had significant impacts on the quality properties of jelly gums as compared to the concentration of gelatine and starch.

Keywords: Jelly, Stability, Gelatine, Starch

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Changes in Nutritional Content and Quality during the Processing of Fruit Juice Concentrate

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Abstract

Fruits can be consumed fresh, frozen and dried, as well as processed in many products such as fruit juice, fruit preserves, marmalades and jams. As a matter of fact, the consumption amounts of these processed products are increasing every year depending on the variety. Accordingly, consumers tend to compare the effects of fruit and fruit processed products on nutritional value, quality and health. In this study, it was the tried to be indicated that the changes of the nutritional value, quality and functional properties during the processing of the fruit juice concentrate. Türkmen Özen (2015) reported that the anthocyanin profile, antioxidant capacity and other quality criteria has significant changes during the processing of grape juice concentrate from grape. Capanoglu et al. (2013) reported a reduction of about 83-92% in the antioxidant capacity from grape to concentrate. Klopotek et al. (2005) detected that reduction of the total amount of phenolic substances in pasteurization and mashing processes during the production of strawberry fruit juice, nectar, wine and mash. Capanoglu et al. (2012) identified that 67.5% and 71.3% decrease in total phenolic content and 73.1% and 74.4% decrease in total flavonoid content during pomegranate and black carrot concentrate processing, respectively. It was determined that the antioxidant capacity of pomegranate decreased by about 73% during processing. On the other hand, different from pomegranate and black carrots, in grapes; it was determined that the total antioxidant capacity increased 52-55% during the processing of grape concentrate.

For producing fruit juice concentrate; it is firstly necessary to select suitable and high quality raw materials, to improve the process conditions and to determine the optimum conditions to ensure that the nutritional value and quality losses are at a minimum level. For this purpose, further studies on the processes should be carried out.

Keywords: nutritional content, quality, antioxidant capacity, anthocyanin, fruit juice concentrate, processing

Theme: Food Science and Technology

Recent Harvested Gemlik Olive Oils: Quality Parameters

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Abstract

Turkey is the world's fourth largest producer of olive oil. Economically important Turkish olive cultivars are Memecik, Ayvalik, Gemlik, Kilis Yaglik, Domat and Uslu. Gemlik (also known as Trilye) is a widespread cultivated olive variety in Turkey but its main origin is Gemlik Gulf at Marmara region. It has from small to big-sized black olives with approximately 25% total oil content. There are two geographic indication applications about it. One of theirs name is 'Trilye olives' and the other is 'Gemlik olive oils'. But, none of them able to has a protection or guarantee certificate.

The chemical composition of Gemlik olive oil substantially differ many factors such as climatic and geographic conditions, maturity stage and technological practices. In this present study, Gemlik olives was harvested from Adana, Aydin, Bursa, Manisa cities at early (November) harvest season, 2017. The object of this study was to describe Gemlik olive oils some chemical composition parameters harvested from different growing areas in the Aegean, Marmara and Mediterranean regions. Basically, total phenols, peroxide value, free acidity, K232 and K270 values, color indices (L, a* and b*) were determined. Statistically significant differences were found based on chemical features among olive origins.

Keywords: Gemlik olive cultivar, geographic characterization, quality parameters, LC

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Theme: Food Science and Technology

The impact of acrylamide on probiotic strain of bacteria *Lactobacillus acidophilus* LA-5

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Abstract

It has been already shown that acrylamide can exert genotoxic and cytotoxic impact on human organism. However, it was not examined whether its negative effect may be related to the inhibition of beneficial species of intestinal microbiota. In our previous study we had proved that acrylamide in concentrations exceeding 5µg/ml can inhibit growth of some microorganisms present in food.

The aim of present study was to evaluate the impact of this compound on Lactobacillus acidophilus LA-5, a probiotic strain belonging to lactic acid bacteria.

The bacteria used in experiments originated from Chr. Hansen's (Denmark) collection of dairy cultures. Experiments were carried out in model solutions (0.45% NaCl and 0.45% bacteriological peptone) with the addition of various acrylamide doses (0-10 µg/ml). Solutions were inoculated with 1 ml of bacteria suspension (the final amount of bacterial cells was 1×10^6 cells/ml) and incubated in 37°C. The amount of bacteria was assessed by pour-plate technique in MRS agar after 24 h and 48 h. The model solution without acrylamide (9 ml) inoculated with 1 ml of bacteria suspension was the positive control. The impact of inoculum size, various pH (2-9) and various temperatures (4°C, 20°C, 37°C) on the growth of bacteria was evaluated as well.

All experiments were carried out in five replicates and results were expressed as means ± standard deviations. Statistical analysis was carried out in R, version 3.3.3 (2017-03-06) -"Another Canoe", copyright (C) 2017 The R Foundation for Statistical Computing.

It was observed that acrylamide in concentration exceeding 7.5 µg/ml stimulated growth of Lactobacillus acidophilus LA-5, both after 24 h and 48 h, but the differences between means were not statistically significant.

Tenfold increase of inoculum size (final amount of cell equalled 1×10^6 cells/ml) resulted in an increase in bacteria population after 48 h incubation in the presence of 7.5 µg acrylamide/ml, however obtained differences in most cases did not show statistical significance. Strong inhibition of growth of Lactobacillus acidophilus LA-5 at pH 2, 3, 4 and 9 has been demonstrated.

The incubation temperature (under cooling conditions of 4°C and at room temperature of 20°C) had no statistically significant effect on the number of bacteria after incubation in the presence of acrylamide. Only in the case of incubation of Lactobacillus acidophilus LA-5 bacteria under optimal conditions (i.e. 37°C, pH 6) it was shown that the presence of acrylamide stimulates the growth of these bacteria, which may indicate the possibility of using this compound as a source of carbon and/or nitrogen by these bacteria in optimal conditions.

On the basis of the results obtained it can be concluded that the presence of acrylamide in a concentration of 7.5 µg/ml positively affects the number of bacteria at pH 5, 6, 7 and 8. It can also be concluded that at pH 6 the bacterial count after 48h incubation is the highest, which confirms that it is the pH most favorable to bacteria. In the nearest future similar experiments will be carried out in real solutions (e.g., yoghurt, kefyr) to assess the impact of milk compounds on interaction between acrylamide and probiotic strains.

Keywords: acrylamide; probiotics; Lactobacillus

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The impact of apple varieties and yeast strain on the profile of volatile compounds and terpenes in wines

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Abstract

The quality of drinks is closely dependent on quality of the raw material, type of applied yeast and fermentation processes. Apple aroma profileconsists mainly of esters, alcohols, terpenes, aldehydes, ketones, ethers and free acids (mainly ethyl acetate with pleasant peach aroma, ethyl butyrate associated with the apple aroma and methyl anthranilate smell of grapes). Some substances are present in low concentrations, but they have a significant impact on sensory characteristics of apples, e.g. terpenes such as: eugenol (smell of cloves), geraniol (smell the roses), limonene (citrus aroma), linalool (aroma of rosewood) and myrcene (responsible for apricots, walnuts and oranges aroma).

The aim of the study was to evaluate the impact of apple varieties and yeast strains on the concentration of volatile compounds in the fermented apple musts.

Materials for the study were 3 domestic varieties of apples: Topaz, Rubin and Elise, which were chosen in previously conducted preliminary studies. Fermentation was carried out using different strains of wine yeast (Tipico F3, Veltliner F3, InterDry F3, Elegance), cider yeast (Cider Yeast, French Cider Gozdowa), distillery yeast (Red Ethanol, Spiriferm Arom) and selected wild yeast (Wild & Pure). The content and profile of volatile compounds and terpenes was analyzed by GC-FID (High-Performance Liquid Chromatography).

Among the volatile compounds amyl alcohols and isobutanol dominated in all wines. In the group of identified esters, the component of the largest amounts was diethyl succinate. The largest quantities of volatile compounds contained wines obtained from Rubin apples, while the smallest from the Elise variety. The amount of volatile compounds depended primarily on the yeast strain. Distillers yeast (Spiriferm, Red Ethanol) synthesized a significant amount of higher alcohols. In contrast, wines fermented with the use of wine and cider yeast had more esters. Wines obtained with selected wild yeast (Wild & Pure) were characterized by an extremely low concentration of volatile compounds, especially alcohols.

Pinocarveol dominated in wines made from apples of the Rubin and Topaz varieties, whereas terpen-4-ol in wines from the Elise variety. The concentration of terpen-4-ol in wines from other varieties was also high. In all wines, relatively large amounts of eugenol and isoeugenol were also observed. The concentration of terpenes in wines largely depended on their amount in the raw material used for their production. Wines made from Rubin apples contained the largest total content of these components in comparison to wines from Elise and Topaz varieties. The impact of the yeast strain on the amount of terpene compounds in the investigated wines was observed but it was less significant than the impact of fruit species. Wines obtained with selected wild yeast (Wild & Pure) contained small amounts of terpenes, while those fermented by Red Ethanol distillery yeasts had significantly higher amounts, even when compared with wines fermented with other distillery strain - Spiriferm. Cider's strain of yeast Gazdawa produced terpene compounds at a similar level to the wine strains (Vetliner, Elegance, Tipico), whereas the strain Cider synthesized lower concentrations of terpenes compared to used wine yeast.

Keywords: fermented apple must, cider yeast, volatile compounds

This study was supported by financial means on science in years 2016-2019 as the research project 2015/19/B/BN9/01352 funded by the National Science Centre (Krakow, Poland).

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Textural Characteristic of Vacuum Dried Onion Slices

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Abstract

The textural structure of a dried food material may conceivably influence humans' digestion and shelf life and transportability of the product. In this compact study, onion slices (Allium cepa L.) of 3 and 7 mm thicknesses were dehydrated under vacuum at 50, 60 and 70°C with or without pre-treatment application. The final moisture contents were nearly 0.300 kg water per kg dry matter. 8% of NaCl solution was used for immersion and dipping was proceeded about 40 minutes. Texture profile analysis (TPA) at 25% compression was applied into all samples and hardness, chewiness, springiness and gumminess values were determined. When drying temperature increased, hardness and chewiness values of slices were advanced. Pre-treatment also caused an enhanced effect on the same textural attributes. The minimum and maximum hardness levels were 0.228 N and 25.914 N belonging to 3 mm thick-intact sample dehydrated at 50°C and 7 mm thick-brined sample dehydrated at 70°C respectively. Stickiness were in range of between 0.073-20.109 N. The chewiness values of the vacuum dried onion slices fluctuated between in the gap of 0.031 - 8.183 mJ. Chewiness showed its maximum at 70ºC both in 3 mm thick and 7 mm thick brined slices. Intact samples depicted higher values than brined ones with respect to springiness. The minimum springiness (0.207 mm) was belonged to 3 mm thick-brined slice dried at 50ºC. As a consequence, most of studies available in literature have focused on one of the most important physical quality attributes -color-, this research may fill the gap about the other significant quality feature –texture- of a dried vegetable.

Keywords: Onion, texture, drying

SUPPORTING AGENCIES : Osmaniye Korkut Ata University, Scientific Research Projects Unit (Project number: OKÜBAP – 2015 - PT3 - 017)

Theme: Food Science and Technology

Effects of Food Matrix and Processing on the Bioaccessibility of Carotenoid from Fruits and Vegetables

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Abstract

Abstract- Carotenoids are lipophilic compounds naturally occurring in plant species where they exert their main biological role as photosynthetic pigments. Fruit and vegetables, in particular, are abundant sources of carotenoids in the diet. Many fruit and vegetables are subjected to various types of processing prior to consumption. The food industry finds it crucial to develop processing technologies, which at the same time will preserve and improve the nutritive value of foods and make the contents of bioactive compounds bioaccessible. In this review, food matrix, thermal and nonthermal processing on the bioaccessibility of carotenoids in fruit-vegetable products.

Keywords: Carotenoid, food matrix, processing, bioaccessibility

Theme: Food Science and Technology

A new pre-fermentative process of contact with lees. Effect on wine volatile composition

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Abstract

The chemical composition of wine depends on a wide range of factors including grape variety, environmental conditions and viticultural practices; yeast strains and oenological microflora; winemaking technologies and ageing processes. Ageing of wines on fine lees is a well-known vinification technique that gives wine with interesting organoleptic characteristics, increasing the complexity and enhance the structure of the finished wine. Once alcoholic fermentation is finished, yeast lees autolysis releases a number of substances to wine, which, together with volatiles formed during vinification, gives rise to complex balances of aromas that rebound in their quality (Bautista, Fernández, & Falqué, 2007). The contact of wine with lees can also decrease the content in volatile compounds and thus the fruity aroma of wines (Medina-Carnicer et al., 2002).

In this work, we have proposed a new process of lees contact with must before fermentation. Cool maceration with gross lees was performed at different temperatures and times to know the influence on chemical and volatile composition of Albariño wine. The results showed significant effect on 17 volatile compounds. However the trend was to increase the concentration of several families of volatile compounds (alcohols, volatile acids, phenol volatiles, lactones and carbonyl compounds) mainly when pre-fermentative contact with lees was performed during five at 8 ºC.

Keywords: lees; volatiles; wine

Theme: Food Science and Technology

Antibiotic resistance profiles of *S. aureus* white cheese isolates

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Abstract

Staphylococcus aureus (*S. aureus*) is one of the most significant bacterial pathogens for human health and commonly involved in bacterial infections and food poisoning outbreaks worldwide. Antibiotic resistance is an important issue for transmission of *S. aureus* isolates to humans and the usage of antibiotics as therapeutic purposes or growth promoters in animal husbandry. Several antibiotics are used to eliminate the diseases in animals and to protect the bacterial intoxication cases. The common antibiotic use for the treatment of animals and preservation of milk has caused development of antibiotic resistance. In this study, antibiotic susceptibilities of 3 isolates identified as *S. aureus* among 207 Staphylococcus isolates to 31 different antibiotics were investigated by agar disc diffusion method. All of the isolates were found to be susceptible to amoxycillin, ampicillin, cephazolin, chloramphenicol, ciprofloxacin, clindamycin, gentamycin, imipenem, kanamycin, levofloxacin, linezolid, ofloxacin, oxacillin, ripampicin, teicoplanin, tetracycline, tobramycin, trimethoprim-sulfamethazole, vancomycin, enrofloxacin. In our study it was found that 2 isolates were found to be resistant to Penicillin G. This can be related to common use of penicillin for treatment of infections in humans and animals.

Keywords: *S. aureus*; antibiotic resistance; cheese

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Theme: Food Science and Technology

The effect of location on oil contents and fatty acid composition of pistachio (*Pistachia vera*) nuts

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Abstract

In this study, oil content and fatty acid compositions of pistachio nuts growing in different locations (Siirt, Mut, Silifke, Gaziantep, Adıyaman) of Turkey were determined. The oil contents of pistachio nuts ranged from 36.10% to 58.00% ($P \leq 0.05$). The highest oil content was determined in Adıyaman sample (58.00%), followed by Siirt and Gaziantep, while the lowest oil content was found in Mut pistachio nut. The main fatty acids of samples were observed as oleic acid (61.06-75.55%), linoleic acid (10.98-24.38%) and palmitic acid (9.19-12.00%). The oil of pistachio nut collected from Siirt contained the highest amount of oleic acid (75.15%) and the minor level of linoleic acid (11.65%). The lowest oleic acid and the major linoleic acid contents were observed in oil of pistachio nut collected from Mut (in Mersin). The location caused the changes in both oil content of nuts and fatty acid composition of nut oils.

Keywords: oil content, pistachio nut, fatty acid composition, location, GC.

Theme: Food Science and Technology

The Effect of Heating Temperature on Antioxidant Activity, Phenolic Compounds and Fatty Acid Composition of Goji Berry Fruit

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Abstract

In this study, the effect of the heating process (at 50°C, 60°C and 70°C) on antioxidant activity, total phenolic content, phenolic compounds and fatty acid composition of goji berry fruits was investigated. The antioxidant activity of methanolic extracts of goji berry fruits were determined with DPPH (1,1-diphenyl-2-picrylhydrazyl). Antioxidant activity was decreased from 81.576% to 71.353% (heated at 70°C). It was seen differences at the antioxidant activities of heated fruits during drying. Total phenolic contents of goji berry fruits changed between 440.959 mg GAE/100 g (unheated) and 428.640mg GAE/100 g (heated at 50°C). Phenolic compounds of the control (unheated) sample varied between 0.068 mg/100 g (trans-ferulic acid) and 54.182mg/100 g ((+)-catechin). Gallic acid content of fruit decreased from 52.167mg/100g (control) to 20.238 (heated at 60°C). In addition, (+)-catechin content decreased from 54.182mg/100 g (control) to 48.852mg/100 g (heated at 70 °C). Linoleic acid was the predominant fatty acid (56.93–59.28%) during the heating period, followed by oleic and palmitic acids. These findings suggest that goji berry is a good source of natural antioxidants and could potentially be considered as a functional food. Moreover, heating process caused a reduction in bioactive compounds.

Keywords: Goji berry, heating, antioxidant, phenolic compounds, fatty acid composition.

Theme: Food Science and Technology

Quality of fresh raspberry (*Rubus idaeus* L.) fruit as affected by Ultraviyolet-C treatment.

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Abstract

Ultraviolet-C (UV-C) light treatment is a nonthermal process that can be used to inactivate microorganisms on the surface of fresh fruits and vegetables after harvest. Fresh raspberries (*Rubus idaeus* L.) are highly perishable fruit, but have excellent nutritional and health benefits for consumers. The effects of UV-C treatment on pH, color (L, a, b value), total bacterial count and total yeast-mold count of fresh raspberries was studied. UV-C light treatment was applied to the fruits at different doses of 33, 66 and 100 kJ/m^2 each delivered at two different dose rates (low and high). The quality parameters were evaluated immediately after the UV-C treatment and also after 2 days of refrigerated storage. The UV-C treatment of 100 kJ/m^2 dose at low dose rate resulted in higher pH of the berries. The UV-C treatment at the high dose rate caused significantly higher L, a and b values in the samples compared to the treatment at low dose rate. All UV-C light treatments at high dose rate resulted nearly 2 log reduction in total bacterial count and also 0,4-0,6 log reduction in total yeast-mold count compared to untreated fruits.

Keywords: ultraviolet light, raspberry, quality

Supporting Agencies: İTÜ-BAP

Theme: Food Science and Technology

Ultrasound Assisted Osmotic Dehydration of Persimmon Followed by Air Drying

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In this study, the aim was to determine the effects of ultrasound assisted osmotic dehydration on some quality characteristics of persimmon. A 250 g sample of the cubed persimmons was then placed directly into the ultrasonic bath containing 1 L of water. The ultrasound pretreatments were carried out for 10, 20, and 30 min at 30 °C (480 W and 35 kHz). The sample of the cubed persimmons was then placed directly into sucrose solution 45 °Brix (sucrose solution to fruit ratio was 4:1). Persimmon samples were taken from 45 °Brix solution transferred to 70 °Brix solution. All applications were put into shaking incubator at 100 rpm except osmotic dehydration (control group). All samples dried at 60 °C and 1.5 m/s air velocity in the tray dryer.

Consequently, it was determined that the drying times of ultrasound pretreatments for 10, 20, and 30 min in sucrose solution 45 °Brix were 360, 300 and 300 min, respectively whereas the drying time of control group was 420 min. When the °Brix of persimmon fruit-sucrose solution was in equilibrium, samples were taken from 45 °Brix solution transferred to 70 °Brix solution. The ultrasound assisted osmotic dehydration increased the water loss, sugar gain, weight decrease. It was determined that the ultrasound assisted osmotic dehydration (10, 20, and 30 min) increased the effective diffusivity compared to the control group (60 °C and 1.5 m/s air velocity). It was found that the ultrasound assisted osmotic drying applications preserved the quality characteristics of samples such as the total phenolic content, L*, a*, and b* in comparison with the control group.

Keywords: Persimmon fruit, osmotic dehydration, ultrasound pretreatment, quality.

Theme: Food Science and Technology

Isolation of Lytic Bacteriophages Infecting *Escherichia coli* O157:H7

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Abstract

The aim of this study was to isolate, purify and determine host ranges of bacteriophages infecting *Escherichia coli* O157:H7 from different environment such as river/stream water, sewage water, pool water of fish farms, raw foods, wastewater of food processing plants, and slaughterhouse wastewater. For screening of *E. coli* O157:H7 bacteriophages, 92 samples were used. It was found that sewage, food operation wastewater, slaughterhouse wastewater, creeks, fisheries, troughs and streams were significant sources of E. coli O157:H7 phages. A total of 37 phages were isolated and purified. It was found that phages counts of the purified samples were changed among $30x10^3$- $34x10^8$ pfu/ml. The isolated phages were generally infective against *E. coli* O157:H7 and *E. coli* strains and 81.08% of isolated phages (30 out of 37) formed clear plaques and were capable to lyse at least 2 out of 5 E. coli O157:H7 strains. In addition to *E. coli* O157:H7, some phages were capable to infect some *Salmonella enterica* serovars. This results show that inhibitor spectra of the phages were wide.

Keywords: Bacteriophage, *Escherichia coli* O157:H7, isolation, host range

Acknowledgements: This research was a part of project supported by the Scientific and Technological Research Council of Turkey (TUBITAK) (Project No: 213O035).

Phthalate Esters in Fish Species from the Gulf of Antalya

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Abstract

Plasticizers are added to plastic materials in large quantities in order to increase their flexibility, durability and transparency. The most commonly used commercial plasticizer is phthalate. Phthalate esters are endocrine disruptors; unfortunately they are added to commonly used PVC materials. As they are not covalently bound, they are easily released to the environment and cause human and animal exposure.

In this study, it was aimed to determine phthalate esters in commercial fish species consumed in Antalya. Fish species were obtained from fish markets considering different depth habitats in order to find out the effect of pollution and feeding regime (Table 1). DEHP: di-(2-ethylhexyl)phthalate (CAS 117-81-7), DBP: di-n-butyl phthalate (CAS 84-74-2), BBP: butyl benzyl phthalate (CAS 85-68-7), DINP: di-isononyl phthalate (CAS 28553-12-0) and DIDP: di-isodecyl phthalate (CAS 26761-40-0) were evaluated.

Table 1. Fish species

	Species	Lenght (cm)	Weight (g)
Demersal	*Brown comber (Serranus hepatus)	11,1 ± 1,05	47,06± 3,11
	Common sole (Solea solea)	20,2± 1,31	83,83± 6,46
	Black scorpionfish (Scorpaena porcus)	18,8± 1,70	76,6± 3,70
	*Bogue (Boops boops)	15,6± 0,87	50,62± 2,89
Pelagic	*Whiting (Merlangius merlangus)	17,1± 1,00	39,31± 3,52
	Atlantic mackerel (Scomber scombrus)	26,3± 1,57	121,9± 8,35
	*Anchovy (Engraulis encrasicolus)	10,2± 2,21	18,07±2,64
Bentopelagic	Redporgy (Pagrus pagrus)	19,3± 1,12	56,46± 7,22
	Horse mackerel (Trachurus trachurus)	23,8± 0,72	102,86± 8,20
	Saddled seabream (Oblada melanura)	22,3± 1,47	72,86± 2,41

*Number of fish species 10 (n=10), others 5 (n=5)

Antalya, which is a metropolitan city, is a touristic area and agriculture is a factor that increases marine pollution. However, the investigated fish species are not naturally exposed to detectible levels of phthalate esters and it is a positive result that phthalate esters do not reach to consumers. None of the phthalate esters were detected in any of the fish species. This situation is pleasing in terms of fresh fish consumers in Antalya. It is understood that the fishes offered to the sale are from the sea that is not exposed to the phthalate esters.

Keywords: Phthalate, fish, DEHP, DBP, BBP, DIDP, DINP

The Scientific Research Projects Administration Unit of Akdeniz University (Project number FYL-2017-2207) supported this research.

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Theme: Food Science and Technology

Antimicrobial Effect of Vinegar, Thyme Water and Eco-P5 Bacteriophage Against *Escherichia coli* O157:H7 in Lettuce

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Abstract

The aims of this study were to determine the inhibitory effect of apple vinegar, grape vinegar, thyme water and Eco-P5 bacteriophage against *Esherichia coli* O157:H7 in lettuce. For this purpose, samples were treated with thyme water, apple or grape vinegar solutions (10, 25 or 50%), Eco-P5 (about 10^8 PFU/mL) or tap water for 30 min after inoculation of lettuce with E. coli O157:H7 at the level of 5.66 log. E. coli O157:H7 were enumerated on selective media. The inhibitor effects of decontaminating solutions against E. coli O157:H7 were determined by spotting, disc and well diffusion methods. Also, color analysis was done in lettuce samples.

Eco-P5 phage showed a clear zone against *E. coli* O157:H7 in all inhibitory activity tests, but the inhibitor zone formed by the spotting method was observed to be larger than the other methods. Apple and grape vinegar just showed clear zones against *E. coli* O157:H7 by disc diffusion method. However, thyme water did not cause a clear inhibitor zone by any inhibitor activity tests. Application of the apple vinegar, grape vinegar or thyme water at 10, 25 or 50% concentrations reduced the number of *E. coli* O157:H7 by 0.87-2.65, 0.92-2.69 or 0.78-1.79 log, respectively. Eco-P5 phage at 15.2×10^8 PFU/mL caused 3.23 log reduction in the initial cell counts. Nevertheless, washing with tap water just decreased the cell number by 0.68 log. Also, all decontamination methods did not caused significant changes in L*, a* or b* values of lettuce samples.

As a conclusion, all the tested washing solutions were more effective in reducing the microbial load than water washes and bacteriophage application was the most suitable method for decontamination of *E. coli* O157:H7 from lettuce followed by grape and apple vinegar, and thyme water.

Keywords: E. coli O157:H7, vinegar, thyme, bacteriophage, decontamination, lettuce

Theme: Food Science and Technology

Characterization of Eco-Phages Infecting *E. coli* O157:H7

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Abstract

The objective of this study was to identify and characterize five different bacteriophages (Eco-P1, P2, P3, P4 and P5) infecting *Escherichia coli* O157:H7. It was determined that the stx1 and stx2 virulant genes in the genome of Eco-phages were absent and the genome sizes of Eco-phages were 33 kbp. In SDS-PAGE electrophoresis, the protein band profiles of Ecophages were found to be different from each other. As a result of TEM analysis, it was observed that all phages were tailed and belong to the Myoviridae and Siphoviridae family. MOI and mutant frequency values of Eco-phages were varied between 0.1-0.001 and 10^{-7}-10^{-8}, respectively. All phages were very infective against their host bacteria when applied at 20, 30 and 37°C and adsorbed to their host cells by 92.7-97.7% in the first 5 minutes of incubation, and also Ca^{+2} ions did not have a significant effect on their adsorption. The latent period, burst times and average burst size of the Eco-phages were changed between 10 and 15 min, 20 and 35 min, 72 and 144, respectively. Eco-phages were resistant to wide pH ranges and high temperatures.

Keywords: Bacteriophage, Esherichia coli O157:H7, characterization

Acknowledgements: This research was a part of project supported by the Scientific and Technological Research Council of Turkey (TUBITAK) (Project No: 213O035).

Theme: Food Science and Technology

Isolation of Lytic Bacteriophages Being Capable of Infecting *Salmonella Typhimurium*

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Abstract

The objectives of this study were to isolate, purify and determine inhibitory spectrum of a collection of lytic bacteriophages being capable of infecting foodborne pathogen Salmonella Typhimurium. River/ stream water, sewage water, pool water of fish farms, raw foods (milk, fruit, vegetable and meat), wastewater from food processing plants, wastewater from slaughterhouse, and water from troughs were used for the screening of bacteriophages. The richest sources in terms of phages infecting S. Typhimurium were found to be sewage, slaughterhouse wastewaters, food processing wastewaters, streams and fisheries wastewater. A total of 33 phages were isolated and purified from the screened samples. It was determined that host ranges of the isolated phages were quite wide. The numbers of bacteria types inhibited by S. Typhimurium phages were changed among 1-15. It was found that 75,8% of isolated phages (25 out of 33) formed clear plaques and were capable to lyse at least six Salmonella enterica serovars. Beside Salmonella enterica serovars, 15 out of 33 phages (45,5%) were also infective against E. coli strains including E. coli O157:H7.

Keywords: Bacteriophage, Salmonella Typhimurium, isolation, purification, host range

Acknowledgements: This research was a part of project supported by the Scientific and Technological Research Council of Turkey (TUBITAK) (Project No: 213O035).

Theme: Food Science and Technology

Properties of Gaziantep Pita

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Abstract

Bread is the most important food produced from wheat, which is the raw material of many foods. It is prepared by shaping and baking of the fermented or nonfermented dough obtained mixing flour,water and salt. In Turkish cuisine, bread has a great importance. The sacred bread is also the symbol of labor and fertility. It is the basic food stuff of the society because it is cheap, filling, it is a source of energy and it meets the protein need. One of the regional breads which has an important place in the traditional Turkish cuisine is Gaziantep pita. In 2017, the geographical sign registration certificate of the Gaziantep pita was awarded to Gaziantep which is among the UNESCO's "Creative Cities Network" in the gastronomy field by Gaziantep Commodity Exchange. Gaziantep pita which is pertain to Gaziantep, well cooked, distinctive in appearance, smell and color, is produced by kneading of flour, water, salt and yeast, fermentation of dough, then shaping appropriately and baking in stone/ wood ovens. The purpose of this review is to give information about the basic components of Gaziantep pita and components' properties, production stages, physical and chemical properties and shelf life of Gaziantep pita.

Keywords: Gaziantep pita; components; production; properties

Theme: Agriculture

Investigation of Agronomic and Fruit Quality Characteristics of Some Watermelon Genetic Resources

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Abstract

This study has been conducted to determine the fruit quality parameters such as sugar content and carotenoid content as well as plant and fruit characteristics of 11 local watermelon genotypes from watermelon genetic resources collection of Çukurova University, Faculty of Agriculture, Department of Horticulture. Crimson Tide F1 variety also used as control.

First and 50 % flowering period, main stem length, main stem diameter, number of nodes on main stem, total yield, fruit weight, fruit height, fruit diameter, fruit rind thickness, TSS, sugar and carotenoid contents were measured.

According to the research results, genotypes Kar 23 (4.28 kg/m^2), Kar 154 (4.25 kg/m^2) and Kar 59 (3.72 kg/m^2) took first places for their yield performance. As comparing TSS analysis, genotype Kar 147 (%8.03) had the highest value.. When the fruit quality parameters were examined, the highest total sugar content was recorded in genotypes Kar 147 (87.97 g/kg) and Kar 58 (81.59 g/kg). The genotypes with the highest content of lycopene was found to be genotype Kar 175 (145.26 mg/kg).

Keywords: Watermelon, genetic resources, yield, fruit properties, sugar, carotenoid

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Change in color values of fried doughs at different frying conditions

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Abstract

In this study, the effects of different frying conditions on the color values of fried doughs were investigated. Leavened doughs were rolled out and cut into pieces and fried in refined sunflower oil using kitchen fryer. Fifty repeated frying operation was applied in a day at different frying conditions. Frying oil temperatures were 160, 180 and 200 °C; dough salt contents were 0, 1 and 2%; and frying times were 1, 3 and 5 minutes. Twenty frying operations were done according to central composite design under response methodology. Color values (L*, a* and b*) of the fried doughs taken from fryer at 50th frying batch were determined.

L*, a* and b* values of the fried doughs were in the ranges of 46.84–74.73, -1.47–14.14 and 21.18–34.52, respectively. It was determined that the changes in the color values of fried doughs were in conformity with the quadratic model. Determination coefficients of the models for L*, a* and b* color values were 0.9232, 0.9036 and 0.9065, respectively. According to the results, the effect of frying temperature on L*, a* and b* color values of fried doughs was significant ($p<0.05$). On the other hand, the effect of frying time on b* value and the effect of dough salt content on L* value was not significant ($p>0.05$). When binary interactions were taken in to consideration, the interaction between frying temperature and dough salt content was significant for a* and b* color values. In addition to this, the interaction between frying temperature and frying time for a* and L* color values was also found significant ($p<0.05$). As a conclusion, frying conditions affected the color values of the fried doughs. For obtaining the desired color of the fried doughs, they should be fried in appropriate frying conditions.

Keywords: Frying conditions; fried doughs; color values; response surface methodology.

Acknowledgement: This research has been financed by the project 2015.09.04.921 from the University of Abant Izzet Baysal

Theme: Nutrition

Effect of Different Plant Activators on Total Lipid, Total Proteins, Fatty Acid and Mineral Elements of Snack-seed Pumpkin

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Abstract

Nusem and Beppo snack-seed pumpkin cultivars were used to determine the effects of different plant activators on chemical composition in snack seed pumpkin. Crop-set, EM1, ERS, Vitormone-Plus Drip, Bacillus subtilis (OSU 142), Bacillus megatorium (M3), Azospirillum sp. (SP 245), Spirulina platensis are PGPR's were used in this study. In the experiment, the plant activators were applied to the plants alone or in combination with each other and organic fertilizer. In control group organic and conventional fertilizers were used.

According to the results of chemical analyzes, variation was found in total amount of lipid, protein, fatty acid composition and mineral element content in the seeds. Mineral (P, K, Fe, Zn, Mn, Cu, Ca, Mg) element measurements in seeds have been found to affect different element levels of different plant activators.

Keywords: Snack seed, mineral, protein, fatty acids

Theme: Food Science and Technology

Bacterial Risk Assessment in Cold Storage and Frozen Fish

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Abstract

Fish, meat could quickly deteriorate because of its meat quality which had high protein level. The freeze processing method could be used for the keeping quality of fish from deterioration or the preservation of the meat quality. To be able to keep the properties of fresh fish meat quality would be the best method is freezing which is better than other processing methods. The microbial quality of frozen fish meat related to the method of the freezing and thawing processes. Psychrophilic bacterial growth could occur the temperatures between -1°C and 7°C and microbiological activities in these temperatures are rapid for bacteria. Activity of all types of bacteria could be observed below at -10 °C. Mesophilic bacteria couldn't show activity and stop dividing at temperatures between 0^0C and 4^0C. Frozen foods are stored at -18°C and the microbial growth prevented by using freezing method. The storage of food in low temperature keeps the mesophilic bacteria under control, but psychrophilic bacteria come dominant depending of the storage temperature. The some of psychrophilic bacteria can develop in cold storage conditions; Pseudomonas, Flavobacterium, Listeria monocytogenes, Shewanella putrefaciens, Brochothrix thermosphacta. It is better to use the storage methods for fish meat by using ice or individually quick frozen (IQF) applications for delaying microbial activity in fish. IQF is a method of keeping fish quality, best by using a cold air system between -30°C and -45°C temperatures. All fish are stored in ice and the filets of fish are kept by applying the IQF method.

Freezing method of fish is a better application to keep fish quality in a safe environment and long term storage. But there are a number of factors and practices that affect the microbial quality of the final product. In this review, the studies on cold storage and frozen processes for fish meat quality will be discussed.

Keywords: Psychrophilic bacteria, seafood, freezing, frozen storage

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The Effect of Flow Rate and Injection Time on Encapsulation Efficiency

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Abstract

The aim of this study was to encapsulate olive leaf extracts at different flow rates by extrusion method and determine the effect of different flow rates and injection times on the encapsulation efficiency of oleuropein which is a phenolic compound present in olive leaf extract. In this study, lyophilized olive leaf extracts were used as a core material. Sodium alginate (2% w/v) was used as a wall material and for cross-linking 2% w/v calcium chloride solution at 4 °C was used. The encapsules were formed by extrusion technique using a syringe pump at flow rate of 1 mL/min and 2 mL/min. Three different injection times were chosen for each flow rates. For 1 mL/min flow rate, the injection times were 2, 4 and 20 minutes and for 2 mL/min flow rate the injection times were 2, 5 and 10 minutes. After the encapsulation process, microencapsules were dried at fume hood for 24 hours and then encapsulation efficiency analyzes were performed by using HPLC. The highest encapsulation efficiency was 52,2% with 2 mL/min flow rate and 2 minutes injection time, while the lowest encapsulation efficiency was 31,2% with 1 mL/min flow rate and 20 minutes injection time. The results of our study demonstrate that the flow rate and injection time significantly affect the encapsulation efficiency.

Keywords: encapsulation efficiency; flow rate; oleuropein; olive leaf extrac; injection time

Theme: Agriculture

The Effect of Citric and Ascorbic Acid Dips on Storage and Quality Properties of Freshcut Kiwifruit Slices

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Abstract

The effect of %1 Citric acid and %1 Ascorbic acid solutions and dionize water (Control) dips on storage and quality properties of freshcut kiwifruit slices was investigated in this study. 2°C that were stored at all the fruits, washed and sterilized, peeled, sliced, and the slices packaged with stretch film by immersion in a solution. Kiwi slices packaged in the study were kept at 4ºC for 12 days. Physical and chemical changes such as weight loss, (%), flesh firmless (Shore), total soluble solids (%), titretable acidity (%), pH, flesh color (hº), vitamin C (L-Ascorbic acid), total fenolic compounds (mg gallik asit/L), antioksidant activity (%), appearance were determined in kiwi samples taken at intervals of 3 days during storage. Results showed that %1 Citric acid and %1 Ascorbic acid dips had a positive effect on overall quality parameters of kiwifruit slices.

Keywords: Kiwifruit; Citric acid, Ascorbic acid, fresh cut; storage

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Chitosan in Active Packaging of Meat and Meat Products

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Abstract

Meat and meat products are good sources of proteins and essential amino acids, nevertheless, they are very susceptible for spoilage especially arising from microorganisms. Active packaging is known a new generation packaging procedure because of supplying various quality and safety benefits in all kinds of food categories. In order to prolong shelf life, natural compounds have been often incorporated into packaging substances. Chitosan is an environmentally friendly polysaccharide which has the abilities of preventing microbial activities and cell growth. This useful polymer takes also part in active packaging applications owing to its excellent barrier characteristics against oxygen and carbon dioxide molecules and film forming capability. Active packaging applications containing chitosan have been recently tested in sliced fresh red meat, raw veal meat, ground beef, ham steak, fresh chicken, minced poultry meat, lean pork slice, pork sausage, cooked Sichuan sausage and bologna. As chitosan could be used alone, it could be combined with plant polyphenols like green tea, kombucha tea, cinnamon, oregano and ginger essential oils and propolis as well. Frequently, mentioned biopolymer has been incorporated into LDPE, LAE and PVA films, LDPE/CS composite films, nano films/pouches derived from cellulose or containing ZnO particles and paper. Researches in literature mostly demonstrated that the related applications were beneficial for human health and environment because of utilizing a biomaterial instead of synthetics.

Keywords: Chitosan, active packaging, meat, biopolymer

Theme: Food Science and Technology

Anthocyanin Enigma

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Abstract

The color is the first quality characteristic of a food product which highly affect the consumer acceptance not only for both fresh but also processed foods. Therefore, synthetic colorants have been used to improve the appeal of the food products because of having high stability with respect to oxygen, light, pH and temperature. In recent years, the legal restrictions applied to the use of synthetic colorants, due to the reason of causing serious health problems. So, food manufacturers have replaced the synthetic food colorants by their natural alternatives.

Anthocyanins are the most abundant found pigments in nature and have been categorised as the group of water-soluble colouring pigments in fruits and vegetables responsible for the characteristic colour ranging from blue to red. In addition to their functional role in food colorants anthocyanin extract may improve the nutritional quality of food and beverages. Anthocyanins have been used in food industry to color confectinary, jam and jellies, ice cream, fruit preparations, sherbets, yoğurt, desserts and bakery fillings. Thus, there has been a great interest in anthocyanins not only their colorant abilities and aesthetic value, but also their being rich in terms of bioactive compounds, beneficial effect from a nutritional standpoint and their potential role in reducing the risk of coronary heart disease, cancer and stroke. It has been reported that anthocyanins' usage in folk medicine have been shown to play an important role in treatment of diarrhea, vision disorders and microbial infections.

However, the main drawbacks in applications of anthocyanins in food matrix due to accelerated degradation of pigments, low stability to pH and temperature, incompatibility with food matrix, color loss during food and beverage processing and storage. Researches conducted, indicate that the main mechanism providing color stability is the molecular interaction between antocyanins and copigments. The most effective way of this interaction is provided with the acylation of aliphatic and/or aromatic over the antocyanidin nucleus via a sugar molecule, intra-molecular copigmentation. On the other hand, it is possible to improve the stability by the inter-molecular non-covalent interaction between anthocyanin and copigment molecules. The present stıudy aimed to review properties, beneficial effects, usage area and stability of anthocyanins,

Keywords: antocyanin; phenolics; bioactive compounds; usage of anthocyanins, stability

Theme: Food Science and Technology

Food safety perspective on the use of antibiotics in aquaculture

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Abstract

Aquaculture is becoming a more important industry. Infectious diseases are always a hazard and may cause significant stock losses and problems. Intensive aquaculture has led to growing problems with bacterial diseases. This has led to the use of intensive antibiotics. Antimicrobial agents are substances which kill or inhibit the growth of microorganisms. These are utilized in aquaculture production for prevention and treatment of bacterial diseases. Residues of antimicrobial chemicals could constitute a hazard to consumers of aquaculture products. The residue of antibacterial substances in fish and fish products constitutes an important problem for the public and regulators, particularly in developing countries. Unapproved drugs applied to aquaculture fish constitute a potential human health hazard. On the other hand, when approved drugs were used in concentrations over maximum residue level established by regulations also constitute a hazard. Improper withdrawal time is another reason of hazard for human. These drugs may cause carcinogenic, allergenic effects may cause antibiotic resistance in human. In terms of food safety these preventing actions should be followed: Dose permitted legally should not be exceeded, approved drugs should be used and the fish should not be harvested before required withdrawal period. Moreover HACCP principles should be applied in aquaculture production.

Keywords: Aquaculture, antibiotic, food safety, health

Theme: Food Science and Technology

Optimization of Iron-Oligofructose Formulation on Wheat Flour of a High Extraction Rate on Dough Rheological Properties

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Abstract

The aim of this study was to optimize the iron (FE) and oligofructose (OF) content in order to obtain wheat flour dough of a high extraction rate with the best rheological properties by using response surface methodology. The wheat flour used in this study was of a strong one for bread making with the fallowing chemical composition: 14.3% moisture content, 1.25% ash content, 14.3% protein content and 35% wet gluten content. The levels used for oligofructose variable were between 2.5 and 10% and for iron ions from lactate salt were between 3 and 5 mg/100g wheat flour. The dough rheological properties were analyzed by using the Farinograph, Alveograph Amylograph, Falling Number and Rheofermentograph properties devices. The response surface methodology (RSM) using central composite rotatable design (CCRD) was used for optimization. Dough development time, dough tenacity, extensibility, gelatinization temperature decreased with the increase level of oligofructose and iron addition. Iron salt from the lactate form presented a significant negative effect on dough development time and extensibility. Oligofructose presented a negative effect on water absorption and degree of softening and a positive one on dough stability and peak viscosity.

Keywords: wheat flour, rheological properties, oligofructose, iron salt, optimization

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Theme: Food Science and Technology

Effect of fermented feed enriched with polyunsaturated fatty acids and β-carotene on fatty acid profile, chemical content and oxidative stability of broiler meat

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Abstract

Biotechnological approach based on solid state fermentations (SSF) is one of the most perspective techniques to enrich cereals with desired metabolites. The main challenge of our research is to determinate possibility of usage fungal SSF bioproducts enriched with PUFAs (mainly gamma-linolenic acid), beta-carotene, coenzyme Q10, ergosterol and amylase as supplements for broiler chicken feed. The aim of this study was to confirm the effect of diet supplementation with 10 % (w/w) of dietary fungal fermented feed on the chemical composition, fatty acid profile and oxidative stability of produced breast meat during the storage in a refrigerator (4 ° C, 7 days). The fermented bioproduct was prepared by fermentation of corn scrap by filamentous fungi (Umbelopsis isabellina CCF 2412) in fungal SSF and gamma-linolenic acid and beta-carotene pigments have been developed in this process. In the experiment, 80 pieces of one day old chickens COBB 500 were used. Half of them (control group) were fed only with commercial feed. Chickens of the experimental group were fed with commercial feed and from the 10th day of age until the time of slaughter (39th day), 10 % of commercial feed was replaced by fermented feed. Supplementation of fermented feed into commercial feed positively influenced total protein content ($P < 0.05$) and profile of fatty acids in breast meat. The amount of gamma-linolenic, alpha-linolenic and oleic acids in fat of breast muscles was increased ($P < 0.05$). Profile and content of PUFAs did not change after thermal treatment of meat. Oxidative stability of fat during the meat storage (4 °C, 7 days) was not affected by fermented feed. The conclusion is that supplementation of 10 % (w/w) of fermented feed into commercial broiler feed is easy way to increase the content of important PUFAs in meat and produce stabile and healthier food.

Keywords: Broiler, solid state fermentation, meat, fatty acids

Agencies: The Slovak Research and Development Agency under the contract No. APVV-14-0397

Theme: Food Science and Technology

Effects of the spray drying conditions on the free fatty acid composition of the microencapsulated cream powder

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Abstract

Cream powder is the product obtained by the partial removal of water from pasteurized cream and contains minimum 42% of milk fat. For transforming milkfat into dried form, spray drying is a commonly used method. This well-established method results in a powder with good quality, small particle size, and low moisture content regardless of dryer capacity and heat sensitivity of the product. Free fatty acids (FFA) in dairy products are important precursors of catabolic reactions, which produce volatile compounds that contribute to flavor. The amount of the total FFAs in the powdered products can change according to the spray drying conditions. However, there is a lack of studies related to the FFA composition of cream powder and changes during the production process. In this study, FFA compounds of microencapsulated cream powder were determined by gas chromatographic analysis and the changes occurring with different spray-drying processing conditions (inlet temperature, feed flow rate, aspiration rate) on FFA compounds have been investigated. Drying experiments were carried out at the inlet temperature range of 150-190 °C, feed flow rate range of 9-30 mL/min, and aspiration rate of 50-100%. According to the results, total FFA content did not vary significantly with spray drying inlet temperature ($P>0.05$). However, the quantity of volatile FFA compounds was lowered as the inlet temperature increased. Moreover, the FFA compounds did not show significant difference with the feed flow rates ($P>0.05$), except for Butyric, Caproic, Palmitic, and Linolenic acids ($P<0.05$). The FFA compounds provided lesser values as the feed flow rate increased. While increasing the aspiration rate resulted in lower FFA quantities, the impact of aspiration rate on FFA quantification was obtained to be weaker than of inlet temperature and feed flow rate. Furthermore, the feed flow rate had the biggest impact on the FFA quantification of the microencapsulated cream powder. This work was supported by The Scientific and Technological Research Council of Turkey (TUBITAK) [project no: 215O948].

Keywords: cream powder, microencapsulation, spray drying, free fatty acid.

Agencies: The Scientific and Technological Research Council of Turkey (TUBITAK) [project no: 215O948]

Theme: Food Science and Technology

Potential use of Bacillus coagulans in Food Industry

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Abstract

Bacillus coagulans (B. coagulans) has recently attracting attention of researchers and food industry due to it has characteristics of both Bacillus and Lactobacillus genus. Nowadays, probiotic microorganisms are generally not used in products that are heat treated because commercially available probiotic microorganisms are sensitive to heat. B. coagulans is a spore forming bacteria and resistant to high temperature with its probiotic activity, thus diversity of probiotic foods can be increased by use of B. coagulans in heat-treated probiotic foods. In addititon, many studies have been carried out on the low-cost microbial production of L(+) lactic acid and various enzymes by B. coagulans which have been using in food industry.

In this review, the importance of B. coagulans in food industry was discussed. Moreover, some studies have been made about the products produced by B. coagulans and the use of B. coagulans as a probiotic in food products were summarized.

Keywords: Bacillus coagulans, probiotic, microbial enzyme

Theme: Food Science and Technology

Effect of Using Different Kinds and Ratios of Vegetable Oils on Ice Cream Quality Characteristics

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Abstract

In recent years, there is a high consumer demand on consumption of reduced or low-fat dairy products (Johnson et al., 2009). In this regard, vegetable oils is a promising ingredient for the food industry, particularly in dairy sector especially to produce ice cream (Goff, 2006; Crilly et al., 2008). The aim of this study was to develop ice cream products using different types of oils, develop a sensory ballot to focus on the textural attributes of new ice cream products, evaluate physicochemical properties of these products and physical measurements, characterise the changes that occur in a premium ice cream formulation made with different proportions and kinds of milkfat, hazelnut oil and olive oil.

Milkfat, hazelnut oil and olive oil were mixed at different concentrations for a total of 12% fat. Six ice cream formulations and one control were designed. Control sample contains 12% milkfat while the other formulations contain different proportion of milkfat, hazelnut oil and olive oil as the fat content. The combination of the different proportion of milkfat, hazelnut oil and olive oil are given as % milkfat, % hazelnut oil and % olive oil respectively as; 12:0:0, 0:12:0, 0:0:12, 6:6:0, 6:0:6, 0:6:6, 4:4:4.

The effects of oils and their interactions on physicochemical and sensory characteristics of the experimental ice cream were evaluated. Sensory analyses were conducted with 7 panelists. Results are reported as the mean from ice creams prepared in triplicate with error bars representing the standard error. Statistical analyses of the data were performed with SPSS 22.0 statistical package program.

The pH, titration acidity, total solid ingredient, ash ingredient, viscosity and volume increase rate were statistically significant ($p<0.05$). The type and ratio of using oil did not affect the fat ingredient, the protein ingredient, color parameters, firmness and initial dripping and complete melting times. Sensory analysis results showed that: samples were 50% milkfat-50% hazelnut oil had the highest color and appearance scores. On the other hand, the highest score in structure and consistency scores were belongs to the sample of used 50% hazelnut oil- 50% olive oil and 50% milkfat-50% hazelnut oil. Among the ice cream samples, the highest taste and smell score was obtained from a half of hazelnut oil and milkfat ice cream sample and the lowest score was obtained from 100% olive oil added ice cream sample. 50% milkfat-50% hazelnut oil the most preferred ones in total quality criterions.

Keywords: ice cream, vegetable oil, olive oil, hazelnut oil, physicochemical and sensory properties

Theme: Food Science and Technology

Determination of Prebiotic Properties of Chickpea Flour Extracts Obtained from Different Chickpea Varieties

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Abstract

Oligosaccharides, known as short chain carbohydrates that can not be digested by digestive enzymes in humans but can be fermented, are known as prebiotics. The development of probiotics depends on the presence of oligosaccharides. Besides various fermented products are producted from chickpeas which have rich in protein, mineral and vitamin content among the legumes and also a very important source of dietary fiber, chickpea flour can be used to enrich the nutritional value in extruded snacks (crackers, chips, etc.), cereal products (biscuits, waffles, breakfast cereals, cakes, etc.), bread, pasta and noodle products, crispy coatings, ready-made soup mixtures. In this study, total sugar and total protein quantities were determined in 3 chickpea flour extracts obtained from 3 different kinds of chickpea (Azkan, Seçkin, Hasanbey) cultivated in our country, and the amounts of protein and sugar were compared according to the properties of chickpea varieties. In addition, prebiotic properties of chickpea extracts were investigated using 2 different probiotic lactic acid bacteria (Lactobacillus rhamnosus and Lactobacillus casei Shirota) and the results were evaluated statistically.

Keywords: chickpea, prebiotic, oligosaccharide, probiotic

Theme: Food Science and Technology

Studies Regarding the Production of a novel yogurt using some local plant raw materials

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Abstract

In recent years, there has been observed an increase in the consumption of fermented dairy products, due to their nutritional value and for their therapeutic benefits. Generally plants are natural ingredients that can be used in order to improve nutritional value of yogurt. Plants presents great attentions due to the fact that are natural sources of different compounds that may contribute to the protection of cell from oxidative stress and preserve them from severe diseases. The aim of the proposed study is to generate original results on the achievement of a novel yogurt by harnessing some local vegetable raw materials with beneficial effects on consumer health and antioxidant activity, with a role in the stability of yogurt and thus in increasing their shelf-life. Yogurt enriched with different vegetable powder improves the rheological, textural, physicochemical and sensory properties of natural yogurt. The results of the study lead to the determination of the optimum formulation of a novel yogurt, with best sensory acceptance, rheological, textural and physicochemical properties. In conclusion the plants are certainly a potential raw material with a high economic importance in diversifying yogurt products.

Keywords: functional product, plant raw materials, rheological and textural properties

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Modified Atmosphere Packaging Applications in Bakery Products

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Abstract

Bakery products are ready-to-eat or pre-treated products prepared with cereal flours. Bakery products are classified mainly in two groups that moist and dry bakery products. Either groups have a shelf life due to their ingredients and processing conditions.

Owing to increasing demand of consumers for healthy products, it is growed the worriments againts to chemical food additives. In order to preserve foods with an harmless treatment, it has been studied on improvements of food processing and storage conditions. Modified atmosphere packaging (MAP) is one of the post production treatments in food preservation.

MAP is changing the inner ambient of the package with various gas combinations such as N_2, O_2, CO_2 and ethylene gas by injecting to the package or removing from the package. MAP applications include two methods that are passive modification and active modification. In passive modification, the level of CO_2 in the package is regulated by using respiration of the fresh fruits and vegetables. In active modification, desired gas combination is injected to the package or gas-scavengers and gas absorbents are used. Besides, packaging material also is an important parameter in MAP applications. Packaging material and the permeability of the film is chosen due to desired shelf life of the food. Several studies on MAP applications indicate that using CO_2 or CO_2/N_2 combination in the package ambient slowes down the microbial growth and the chemical deterioration, thus extending shelf life of the bakery products. In this study, some results of MAP applications in bakery products will be given.

Keywords: Modified atmosphere packaging, bakery, shelf life

Theme: Agriculture

Effect of diet suplemented with humic substances on performance and meat quality of broilers chicken

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Abstraact

Humic substances are currently used in livestock in treatment of many gastrointestinal disorders. They are also used in broilers fattening to improve production parameters and health of chicken. The addition of 0.8 % humic substances (mainly humic acids) to broilers COBB 500 diet during 39 days of fattening was evaluated in this work. We monitored the effect on production indicators, quality of produced meat and health of chickens. Broilers fed with addition of humic acids were compared with control group fed with standard diet. Feed consumption and feed conversion ratio were comparable in both groups ($P > 0.05$). Based on our results we can state that humic acids are suitable additive used in broiler breeding. The addition of humic acids had significant positive effect on body weight, carcass yield and yield of breast and thigh muscle in comparison to control group without humic substances addition ($P < 0.05$). The positive impact on broiler´s health status was also recorded and mortality was significantly lower ($P < 0.05$) in experimental group. Preventive administration of humic substances ensures improvement in production parameters due to antimicrobial, anti-inflammatory, antiviral and detoxifying properties. The great benefit is that the animal feed products do not contain residues of contaminants or undesired substances that require withdrawal periods.

Keywords: performance; broiler; humic substances

Agencies: This work was supported by grant VEGA 1/0408/17 from Ministry of Education, Science, Research and Sport of The Slovak Republic.

Theme: Food Science and Technology

Susceptibility to antibiotics of *Vibrio fluvialis*, emerging pathogen, from Marine Cultured Fish in seafood plant, Muğla Region

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Abstract

Vibrio fluvialis is a pathogen commonly found in marine environments. Vibrio-mediated infections frequently occur in countries where the raw seafood consumed. In many events, *V. fluvialis* was found associated with cholera-like diarrhea. *V. fluvialis* has been considered as an emerging pathogen for human. The aim of this study was the demonstrate the presence of *Vibrio fluvialis* in the cultured marine fish in Muğla region and also determine the antibiotic resistance of the bacteria. The isolates were obtained from fish samples during fish kept in the harvest tank and then processed product in seafood plant.

The strains of *V. fluvialis* were isolated from cultured gilthead seabream and European sea bass. The strains were first characterised by using morphological, physiological, and biochemical tests and then identified by API 20E strips. Sensitivity to antibiotics was performed by using the disk diffusion test. The following antibiotics were used: Ampicillin/sulbactam (20 µg), cefotaxime (30 µg), chloramphenicol (30 µg), tetracycline (30 µg),kanamycin (30 µg),vancomycin (30 µg),trimethoprim-sulphametoxazole (25 µg).

A total of 50 vibrio spp. were isolated from sea bream and sea bass. *V. fluvialis* were identified from all isolates. They were tested for susceptibility against seven antibiotics.

Keywords: Sea bass, Sea bream, Antibiotic resistance

Theme: Food Science and Technology

Evaluation of The Presence of *Aeromonas Hydrophila* in some Fishes Consumed in Adana

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Abstract

This study was conducted to reveal the presence and the prevalence of *Aeromonas hydrophila* in the samples of Rainbow trout, Sea bream and Perch fish. In the study, 63 fish samples were used from the 3 species of fish such as Trout, Sea Bream and Sea Bass, which were served as farm fish in the supermarkets located in Adana province center. Samples taken under aseptic conditions were brought to the laboratory under cold chain and analyzed within the same day. Muscle tissues, skin, and intestinal contents of fish specimens were investigated in terms of Aeromonos hydrophila.

It was accepted that, green colored colonies with a dark green button on the middle, were Aeromonas supicious colonies in selective medium. Selected 5 suspected colonies were seeded in Trypton Soy Agar (Oxoid CM131) for biochemical testing and incubated at 30 ° C for 24 hours.

In this study, 17 samples of 21 trout samples, 17 samples of 21 sea bream samples, 21 samples of 21 sea bream samples was determined that there are as Aeromonass spp suspicious colonies. When Aeromonas spp. suspected colonies were examined at species level, ıt was found that only in 1 muscle and in 1 skin of 9 Sea bream fish was found as Aeromonas hdyrophila. In addition to this, it is seen that Aeromonas salmonicida masoucida / achromogenes is also found in 1 muscle sample of Sea Bream. As a result, it was seen that the only species of fish that Aeromonas hydrophila was found is sea bream.

It was found that all of the colonies isolated from other samples believed to be positive for Aeromonas spp resulted in false positive results, and in total 32 samples, 25 of the analyzed samples in the API 20 NE identification kit, 22 of the suspected colonies were been seen that they were not Aeromonas spp.

Keywords: Aeromonas hydrophila, Rainbow trout, Sea bream and Perch fish

Theme: Food Science and Technology

Antioxidant Capacity and Antiradical Activity of Rosemary (*Rosmarinus officinalis* L.) Essential oil

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Abstract

The aim of this study was to determine the antioxidant capacity and antiradical activity of rosemary essential oil. Rosemary essential oil was obtained using hydro-distillation method. 2,2′- diphenyl -1-picrylhydrazyl (DPPH) radical scavenging activity, β-carotene bleaching test, reducing power and antioxidant activity in linoleic acid emulsion using conjugated diene methods were applied to different concentrations (0.25, 0.5, 1, 2, 5, 10, 15 and 20 mg/mL) of rosemary essential oil. Radical scavenging activity of the rosemary essential oil increased as the concentration increased, it reached to 17.4% at 20 mg/mL concentration. Radical scavenging activities of BHT was determined between 36.6% and 91.5% which were higher than those of the rosemary essential oil. Antioxidant activity of the essential oil in linoleic acid emulsion was in the range of 95.1 – 98.7% at the studied concentrations. In β-carotene bleaching test, antioxidant activity of the essential oil was found concentration dependent. Antioxidant activity of essential oil was 3.2% at 0.25 mg/mL, it increased to 50.5% at 20 mg/mL concentration. When considered the reducing power of the essential oil, low absorbance values (0.007-0.010) were obtained compared to BHT (0.106-0.913). In spite of the low reducing power and antiradical activity, rosemary essential oil had valuable antioxidant activity comparable to synthetic antioxidants.

Keywords: Rosemary essential oil; antioxidant capacity; radical scavenging activity; β-carotene bleaching test

Agencies: This study has been financed by the project 2011.02.02.412 from the Abant Izzet Baysal University.

Theme: Food Science and Technology

Antioxidant and Radical Scavenging Capacities of Some Phenolic Compounds

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Abstract

The purpose of this study was to determine the radical scavenging activities and antioxidant capacities of some phenolic compounds (rosmarinic acid, caffeic acid, gallic acid, catechin, quercetin, rutin and 3-hydroxytyrosol) at the different concentrations (10, 25, 50, 100, 250, 500 and 1000 ppm) and compare to those of BHA. For this purpose 2,2′-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging test and antioxidant activity in linoleic acid emulsion test were determined. Generally, DPPH radical scavenging activities of phenolic compounds increased as the concentration increased. Radical scavenging activities of these phenolics were higher than those of BHA except rutin. While gallic acid, quercetin and 3-hydroxytyrosol had above 90% activity at 250 ppm, rutin, rosmarinic acid, caffeic acid and catechin had above 90% activity at 500 ppm. IC_{50} values of DPPH radical scavenging activities of the phenolics were in the following order: Gallic acid < 3-hydroxytyrosol < rosmarinic acid < quercetin < caffeic acid < BHA < catechin < rutin. As low IC_{50} values indicate the high scavenging activity, the highest radical scavenging activity was found for gallic acid.

In contrast to the radical scavenging activities, the antioxidant capacities of the phenolics were low. Antioxidant activities of the phenolic compounds were not concentration dependent. Only, in 3-hydroxy tyrosol and gallic acid, antioxidant capacities increased as the concentration increased. The highest antioxidant capacities were found in BHA at all concentrations. It followed by rutin and quercetin and activities of these phenolics changed in the range of 65.8 - 88.8% and 49.4 - 70.8%, respectively. The antioxidant capacity of these phenolic compounds should also be determined by different antioxidant activity tests.

Keywords: Phenolic compounds, radical scavenging activity, antioxidant activity, linoleic acid emulsion

Theme: Food Science and Technology

The Stability of Mayonnaise Model System Incorporated With Black Cumin (*Nigella Sativa*) Seed Oil

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Abstract

Incorporation of black cumin (*Nigella sativa*) seed oil (BCSO) (0.5%, 1.0%, 1.5% and 2.0%) in palm oil in dispersion phase of mayonnaise model system is believed can preserve health by delivering beneficial bioactive compound within the BCSO known as thymoquinone. The physical analyses of mayonnaise model system involved the viscosity measurement using viscometer while the stability analyses included parameters such as: mean droplet size (D_{32}), droplet size distribution (DSD), creaming index (CI) and dispersion stability by using lumifuge analyzer. The oxidative rancidity test involved rancimat analysis and peroxide value (PV). All mayonnaise model systems showed no visible separation of oil until the end of storage day (day 28) in creaming index and these results were well correlated with creaming stability analysis. Significant changes ($p<0.05$) were observed in oil mean droplets size (D_{32}) for all mayonnaise model systems ranged from 4.14 µm to 6.43µm until the end of storage period. The droplet size distribution of mayonnaise model systems showed unimodal distribution up to day 21. Viscosity analyses indicated that there was a significance decrease ($p<0.05$) in viscosity of mayonnaise model system over time. The addition of BCSO in all mayonnaise model system shows no significant different in peroxide value and induction time measured at 110˚C and 120˚C in rancimat analysis. Thus, show no development of oxidative rancidity in mayonnaise model system over time.

Keywords:black cumin (*Nigella sativa*) seed oil, mayonnaise, oxidative rancidity, stability

Agencies: Ministry of Higher Education Malaysia

Theme: Food Science and Technology

Effect of Zeolite Incorporated Active Polyethylene Packaging on the Quality and Shelf-Life of Mushrooms

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Abstract

Mushrooms (Agaricus bisporus) were packaged using polyethylene (PE) bags incorporated with zeolite under passive modified atmosphere (21% O_2, 79% N_2), and stored at 4°C for 16 days to extent the quality and shelf-life. Products packaged in PE with no zeolite and unpackaged mushrooms were the control groups. Mass loss, headspace gas, color, texture, brix, pH, hat opening and sensory quality were monitored for 16 days. Mass loss of unpackaged samples was 19.6%, while it was negligible for both packaged groups (<1%) on the 16 th day of the storage. Equilibrium atmosphere was not reached for mushroom in control PE and zeolite containing PE bags possibly due to very high respiration rate of the product. O_2 level (%) in the headspaces of PE and zeolite incorporated PE bags decreased below 1% in 4 days with CO_2 level of 9-12%. Although there was a decrease in whiteness index (WI) and an increase in browning index (BI) for all applications throughout the storage, mushrooms packaged with zeolite added bags had significantly higher WI and lower BI comparing to the control groups ($p \leq 0.05$). The penetration force of unpackaged product increased during 8 th days due to dehydration, and then decreased for the rest of the storage possibly due to spoilage. There was no significant difference between packaged products in terms of brix at the end of the storage, however, the unpackaged product had the highest brix value due to dehydration. pH slightly decreased for packaged products during storage. The lowest hat opening was detected in zeolite added PE bags at the end of the storage. Based on sensorial evaluation, unpackaged mushrooms lost their acceptability after 4th day, however, the shelf-life of packaged mushrooms could be suggested as 8 days with active packaging providing less hat opening and better color.

Keywords: Active packaging, mushroom, polyethylene, shelf-life, zeolite

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Theme: Food Science and Technology

Use of Rosehip (*Rosa Canina*) on Physicochemical, Antioxidant Capacity, Volatile Composition and Sensory Properties of Yogurt

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Abstract

Rosehip hase been known as high amounts of some bioactive, positively affect human health due to their antioxidant activities. This study aimed to analyze the total phenolic content, organic acids, pH, color, total antioxidant capacity and volatile compounts present in rosehip added yogurt samples. The yogurt samples (produced with addition of 5,10,15, 20%) were analyzed after 1, 7 and 15 days during storage at 4 °C. Total solid content, pH and water holding capacity of yogurt samples changed from 12.00% to 20.63%, 3.65 to 3.97, 58.50% to 67.90% respectively. Rosehip addition increased the level of total polyphenols content and antioxidant activity in yoğurt samples. Yogurts with 20% of rosehip pulp addition characterized the highest antioxidant activity. Sample with rosehip pulp addition showed increasing and color characteristics (L*, a*, b*) of the samples are varied according to the rate of pulp used in yogurt. Fifty-nine volatile compounds were identified using GC/MS, and the major volatiles were acids (acetic acid, butanoic acid, hexanoic acid, octanoic acid). After sensory avaluation, 20% of rosehip pulp added yogurt sample had the highest overall acceptability.

In conclusion, it was determined that the use of rosehip pulp positively contributed to quality parameters such as water holding capacity of yoghurt, increased antioxidant capacity of yoghurt and positive effect on aroma profile and sensory qualities.

Keywords: Yogurt; characterization;volatile composition; antioxidant activity.

Theme: Food Science and Technology

Effects on Physico-Chemical, Proteolysis and Antioxidant Capacity Use of Capper in Cheeses

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Abstract

Capparis is called capers (Capparaceae) is a common perennial shrub in the Mediterranean regions, growing both wild and cultivated, with medicinal and aromatic properties. Caper plays an important role in the human diet. In this study, the effects of capers addition on some physico-chemical and functional properties of Model Cheese were investigated. Three batches of Model Cheese were produced: a control group with no caper addition (C), a group with whole (5%) minced caper addition (CP5) and a group with (10%) minced caper addition (CP10). Changes in chemical compositions, proteolysis (ripening index), free amino acids, and antioxidant capaciy of Model Cheese samples were analysed during the ripening period for 90 days at + 4 °C. According to the results obtained from statistical analyses, when compared to control sample, there was a significant difference by adding caper to Model Cheese for lactic acid %, and antioxidant capacity ($p<0.05$). Esspecially, as far as control group, caper addition had a significant effect on the dry matter contents ($p<0.05$). Protein contents of sample cheeses probably increased due to additions of caper. The contents of free amino acids such as alanine, cysteine, glycine, threonine, aspartic acid and valine were high in the control sample, while the contents of arginine, glutamik acid and proline levels were high in samples with caper addition. ABTS+ radical scavenging activities of samples showed that the highest capper concentration, was in C which is the hightest antiradical activity. Generally, the data obtained from this study showed that adding caper to Model Cheese reduced some quality characteristics, while some properties such as physicochemical were improved.

Keywords: Model cheese, ripening, caper, proteolysis, antioxidant capacity

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Change in specific absorbance values and tocopherol contents of oil during frying of leavened doughs

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Abstract

In this study, the effects of different frying conditions on specific absorbance values (K_{232} and K_{270}) and tocopherol contents of frying oil during deep fat frying of leavened doughs were investigated. Leavened doughs that contained various salt contents (0, 1 and 2 %) were fried at different temperatures (160, 180 and 200 °C) for different frying times (1, 3 and 5 minutes) in refined sunflower oil. At the end of fifty frying, oil samples were taken for the determination of specific absorbance values and tocopherol contents. The effects of frying conditions were evaluated according to central composite design under response methodology.

At the end of frying, K_{232} and K_{270} values of oils were in the range of 8.71-16.23 and 4.11-8.31, respectively. At these conditions tocopherol contents of oils were changed between 290.33 and 443.27 mg/kg. It was determined that the changes in the specific absorbance values and tocopherol contents of oils were in conformity with the quadratic model. Determination coefficients of the models for K_{232}, K_{270} values and tocopherol contents were 0.9036, 0.9210 and 0.9010, respectively. While the effects of frying temperature and frying time on specific absorbance values and tocopherol contents of oils were significant ($p<0.05$), the effect of dough salt content on these values was not significant ($p>0.05$). When binary interactions were taken in to consideration, the interaction between frying temperature and dough salt content was significant only for tocopherol content of frying oil. On the other hand, the interaction of frying temperature and time was significant for K_{232} values of oil samples. As a result, the most important factors were found as frying temperature and frying time on the specific absorbance values and tocopherol contents of frying oil.

Keywords: Frying conditions, frying oil, specific absorbance values, tocopherol content, response surface methodology

Acknowledgement: This research has been financed by the project 2015.09.04.921 from the University of Abant Izzet Baysal

Theme: Food Science and Technology

Microbial quality assessment of foods by a novel real-time PCR technique

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Abstract

Foodborne poisoning have become a major public health problem worldwide due to the significantly increased incidence of foodborne diseases over the last years. Since foodborne pathogens can be found in both raw and processed foods, it becomes important to detect foodborne pathogens before the consumption of these foods in order to provide safe food supply and to prevent foodborne poisoning. For a long period of time, microbiological analysis of food samples were based on conventional cultural methods which were considered as "gold standard". However, they are based on nonselective and selective enrichment, followed by biochemical and serological tests. Since current cultural methods require 4 days to presumptively identify the foodborne pathogens in a sample and a further 7 days to confirm the identity of the isolates and is also expensive, researches focus on detection methods of pathogens in food with a rapidity / cost ratio higher than that of them that will increase the chances of preventing foodborne diseases caused by these pathogens. For this purpose; various rapid methods, including rapid, specific, sensitive, and cost-effective PCR techniques have been used to supply the rapid detection of foodborne pathogens, but these methods suffer from a lack of ability to differentiate between DNA from live and DNA from dead microbial cells, which may cause false positive results leading to unnecessary food product recalls and economic losses. Therefore, this work reviews the microbial quality assessment of foods by a novel EMA-real-time PCR technique for the exclusive monitoring of viable foodborne pathogen prevalence along the food production chain. In this technique, dyes that penetrate compromised cell membranes and have a high affinity to bind covalently to nucleic acids are used to inhibit the amplification of DNA modified by the dye in order to exclude the signals originating from dead microbial cells.

Keywords: EMA-real-time PCR, food, microbial quality, viable microbial cell

Theme: Food Science and Technology

Effects of Using of Proteolytic and Lipolytic Enzyme on Some Properties of White Cheeses

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Abstract

In this study, the effects of addition of lipolytic (Piccantase A, derived from Mucor miehei, 0.05 and 0.10 g/100 L) and/or proteolytic enzyme (Neutrase, derived from Bacillus subtilis, 0.20 and 0.40 g/100 L) preparations to cheese milk at the different level, on composition of White cheese and its whey ripened for 90 days was investigated. It was found that pH, titratable acidity, dry matter, protein and lactose contents of whey were not affected significantly ($p>0.05$) by using of enzymes, on contrary fat content was affected significantly ($p<0.01$). Using of different enzymes in the manufacture of White cheese did not influence the pH value, titratable acidity, fat in dry matter ($p>0.05$), while the values for dry matter and penetration values were significantly influenced ($p<0.01$). The effects of ripening period on these properties found to be significant ($p<0.01$). The major (Ca, P, NA, K, Mg) and minor (Zn, Fe, Cu, Mn) minerals levels (Atomic Absorption Spectrometer) of cheeses decreased during ripening period, effect of enzyme application on these properties were found to be significant ($p<0.01$) except magnesium and manganese levels. It was determined that the highest major and minor mineral contents of white cheese were sodium, calcium and phosphorus; zinc and iron, respectively.

Keywords: White cheese, lipase, protease, mineral, ripening

Agencies: This study was supported by Çukurova University (Project no FBE200D. 124).

Theme: Food Science and Technology

Enhancing Beta-Carotene Recovery During Clear Apricot Juice Production

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Abstract

In this study the contribution of the surfactants on the passage of β-carotene from pulp to the clear apricot juice was investigated. With this aim, food-grade polysorbats (Tween 20, Tween 40, Tween 60 and Tween 80) having different lipophilic-hydrophilic balance value (HLB) were used. β-Carotene concentration was determined by spectrophotometer and HPLC in clear apricot juice obtained by the presence of various concentrations (0.05-1.0%) of these surfactants. The effect of some parameters such as temperature and time of the pre-heating, liquefaction enzyme concentration and dispersion method on carotenoid recovery during extraction were investigated. Particle size and zeta potential of the obtained microemulsions were measured by dynamic light scattering and laser doppler micro-electrophoretic methods, respectively. Total phenolic content and antioxidant capacity of clear apricot juices were determined by Folin&Ciocalteu and DPPH methods. According to the results of the optimization of pretreatment parameters in the production of clear apricot juice, optimum temperature and time were determined as 30 min at 50 °C and enzyme concentration was 0.05%. For particle size reduction, high-speed disperser, high-pressure homogenizer and ultrasound homogenizer were used and the highest carotene recovery was obtained from high-speed disperser. In this study among different surfactants used, Tween-20 gave the highest results. With the increasing rate of the surfactant, increasing carotenoid recovery was recorded. Particle size of clear apricot juices obtained via surfactant addition was measured to be in the range of micro/nano-emulsion (100-200 nm).

Keywords:Apricot, Carotene, Juice, Extraction.

Agencies: This Study was Supported by Inonu University Scientific Projects Coordination Unit with the project number: 2016/21

Theme: Food Science and Technology

Extraction of Orange Peel Carotenoids with Water

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Abstract

Carotenoids are important bioactive compounds that have antioxidant potential. Certain carotenoids also have vitamin A activity and other biological activities such as anticancer action. Food wastes are important sources for bioactive compounds due to their low economic value. Orange peel is rich in carotenoids and it is an important waste of orange juice production. In this study, it was aimed to extract orange peel carotenoids with a water-based system. With this aim, surfactant assisted microemulsion extraction technique was applied. In the presence of food grade surfactants having different HLB (Hydrophilic-lipophilic balance) values, carotenoids encapsulated in the micelles that dispersible in water. Total extractable carotenoid content and extraction efficiency were determined by successive extractions with water-based system. The effect of liquefaction enzyme amount, surfactant type and ratio, pH, salt concentration and the intensity of preheating on carotenoid recovery were determined. Different dispersion methods (high-speed wet milling, high-pressure homogenization and sonication) were comparatively investigated for the carotenoid recovery. Total phenolic content and antioxidant capacity of extracts obtained by different rates of different surfactants were also determined. According to the results, it was determined that optimum enzyme concentration was 0.01%, surfactant ratio was 0.4%, incubation temperature and time were 10 min at 50 °C. Among the surfactants used, the maximum and minimum recoveries were obtained by Tween-40 and Tween-20, respectively. High-pressure homogenization provided the highest carotenoid recovery compared to the other dispersion methods. The highest carotenoid extraction values obtained at pH 8.2 and 5% salt concentration. It was elucidated that surfactant type and ratio had no effect on total phenolic content and antioxidant activity of orange peel extracts.

Keywords: Carotenoids, Extraction, Orange, Peel.

Agencies: This Study was Supported by Inonu University Scientific Projects Coordination Unit with the project number: 2015/18

Theme: Food Science and Technology

New Concept in Packaging: Whey Protein Edible Films

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Abstract

The main function of food packaging is widely used for protection of food quality, to extend the shelf-life by preventing oxygen, moisture, light and provides microbial safety for consumers. The packaging industry are working on renewable, environmentally-friendly and biodegradable alternatives to replace petroleum-based packaging materials. Packaging becomes more important as a vehicle for communication system of product differentiation, content, and branding. Proper and effective packaging prevents any kind of contamination and facilitates storage and transportation by preventing moisture loss, aromas loss, solute transport, water absorption in the food. Edible films and coatings, have a rising interest in recent years, is a form of active packaging and are obtained from proteins (wheat gluten, soy protein, albumin, gelatin, collagen, casein, whey proteins, peanut protein and mung bean protein), polysaccharides, lipids or combinations of these components. Whey protein films are characterized by good mechanical resistance and have high water vapor permeability. Adding of plasticizers to protein-based film formulations are required to reduce film fragility, to confer certain plastic properties, to improve processability, to increase elongation and water vapor permeability and decrease film stiffness and moisture barrier ability of protein films. The aim of this article is to provide an overview of the main issues related to the importance, the principal functions and properties of new packaging systems and whey protein edible films.

Keywords: Packaging, whey protein, edible films

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Production of Lupine (*Lupinus Albus* L.) Added Chips Production and Determination of Quality of Final Product

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Abstract

In this study, the colors (L*, a*, b*, ΔE*) of lupine flour added chips produced with different cooking methods and different formulations were compared with commercial product. Lupine was dried at 39°C for 10 hours, it is milled as hulled and whole grain. By adding different ratios lupine (%25-60) to whole wheat flour and corn flour and seasoned with salt, thyme, red pepper were produced lupine added chips. Two different cooking methods were applied to the chips at 180°C in the bakery (15 minutes) and in the deep fryer (1 minute). The color of the samples was measured by colorimetric (Konica Minolta Chroma Meters) method from 4 different points on the chips surface.

The minimum and maximum color difference (ΔE*) values are 24.86 in baked commercial product (Yoghurt and Seasonal Greens Flavor), baked 25-30% Whole grain lupine flour + 55-60% Whole Wheat Flour + 3-10% Corn flour + 7-10% guar gum, respectively. L value of baked 25-30% Whole grain lupine flour + 55-60% Whole wheat flour + 3-10% Corn flour + 7-10% Guar gum formulated chips minimum 37.36 and L value of baked 55-60% Whole grain lupine flour + 35-38% Whole wheat flour + 5-7% Guar gum formulated chips maximum 53.58 was measured. The a values of the samples were found to be in the highest fried commercial product (Spicy) as 14.08 and generally varied from -3.35 to 14.08. b value is in fried 30-35% Whole grain lupine flour + 55-65% Whole wheat flour + 5-10% Guar gum formulated chips maksimum 28.81 and in fried commercial product (Spicy) maksimum 38.67. It is hoped that the lupine flour added chips will be adored by consumers due to the high L (brightness) and high b (yellowness) parameters.

Keywords: Chips, Cooking method, Formulation, Lupine flour

Theme: Food Science and Technology

Production of candied black myrtle (*Myrtus Communis* L.)

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Abstract

Black mrytle (*M. communis*) fruits which appear from November to December have dark purple color and the fruit is quite bitter and spicy with a pleasant flavor. Black myrtle fruits are rich in phenolic compounds, but they are hard to consume because of their astringent taste. The aim of the present study was to investigate the production of candied black mrytle (*Myrtus communis* L.), growing in South part of Aegean region of Turkey by using saccharose, corn syrup+saccharose, corn syrup in formulations and to determine the best formulation by sensory analysis. For this purpose, citric acid, ascorbic acid and calcium chloride were used as 1% of the fruit weight and fruit/sugar ratio as 1/1 in all three of the formulations. Appearance, sourness, sweetness and overall preference of candied samples were evaluated by ranking test. The brix values of the black myrtle candies produced by using saccharose, corn syrup+saccharose, corn syrup formulations were determined as 67.1, 60.2 and 67.6, respectively. The results of the statistical analysis of the ranking test of candied black myrtles showed that the samples produced by using corn syrup+saccharose preferred significantly ($p<0.05$) for appearance and sweetness. No significant difference ($p<0.05$) was determined between the candied black myrtle samples for overall preference, however the ranking sums of the black myrtle candies produced by corn syrup+saccharose found to be higher than the candied samples compared to other formulations.

Keywords: Black myrtle fruit, candied myrtle, *Myrtus communis* L., Myrtle fruit,

Theme: Food Science and Technology

A rising problem in seafood: development of antibiotic resistance in human pathogenic bacteria in seafood

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Abstract

Among different seafood types, cultured fish and shellfish contribute to almost 20% of the world's animal protein intake with an increasing demand for them in each year. However, this rapid expansion in aquaculture has resulted in economic losses due to the mortalities as a result of microbial diseases and changes in physico-chemical environment conditions and so force the blind use of antibiotics. But, antibiotics used in aquaculture ponds can lead to the development of resistance in pathogenic bacteria, especially enteric pathogens like pathogenic strains of Escherichia coli and Salmonella enterica, opportunistic pathogen Listeria monocytogenes, Campylobacter jejuni, and vibrios. The use of a large number of antibiotics in cultured fish and shellfish has a direct role in the development of antibiotic resistance in pathogenic bacteria that contaminated them. Therefore, seafood contamination with pathogenic bacteria has raised concerns on seafood-borne illnesses and has become a serious food safety issue in all around the world, especially in the countries where anthropogenic pollution of aquatic environments is a leading problem. Since the consumption of seafood harboring resistant bacteria may lead to transfer of resistance traits to intestinal microflora, the use of most antibiotics in aquaculture has been banned since 2005. Only a few antibiotics such as tetracycline, sulfadimethoxine-ormetoprim and florphenicol are approved by FDA for prudent use in aquaculture. Therefore, this work reviews the importance of use of even one antibiotic in aquaculture which may lead to the development of cross-resistance to multiple drugs in terms of public health awareness and responsible aquaculture practice.

Keywords: Antibiotic resistance, food safety, foodborne illnesses, pathogens, seafood

Theme: Food Science and Technology

Endemic Melon (*Cucumis Melo* L.) Varieties in Kizilirmak Basin and Melon Vinegar Production

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Abstract

This study has been conducted in order to determine both physical and chemical features of melon varieties cultivated in Kızılırmak fields in Çankırı. According to TUIK 2016 statistic data, actual production of melon was 1 854 356 tonnes in Turkey, and the %5 of the production was emerged from Çankırı. Three of melon varieties were used in this research namely Dalaman, Kırkağaç and Ondilim. At the first step, approximately one hundred kilos of each melon variety was harvested in 2016 season, transferred into laboratory and processed because of getting melon juice, seed, pulp and bark parts. Total dry matter and ash content (%), specific weight, free acidity (%), pH, % soluble dry matter as Brix, total fat (%) physicochemical analysis were done, respectively. The highest pH (4.57), soluble dry matter (8.4%) and specific weight (1.0343) values were found in Kırkağaç melon juice. However, the lowest free acidity was in Ondilim juices. Moreover, the highest dry matter value and total fat percentage were detected in Dalaman seeds. At the second step, the analyzed melon parts (bark, juice and pulp) were assessed for vinegar production. This is because elaboration of fruit vinegars represents, in many cases, a useful alternative for surpluses and second-quality fruits. On the other hand, acetic fermentation of fruit juices extends shelf life and improves organoleptic properties of vinegar. The quality of vinegar could be affected from the composition of the raw material and the environmental conditions (type, quantity and biological activities of the indigenous strains) from batch to batch. As known, alcoholic fermentation and acidification steps take place in the same media by indigenous yeasts and bacteria. In our production procedure, 10% starter culture (Saccharomyces spp.) and old-vinegar mixture were used for bio-fermentation process after ten-time dilution of raw material. So, the brix value was around 0.6-0.84. During the alcoholic fermentation process, the temperature was controlled and fixed to a maximum value of 24 °C. The final alcoholic content of melon wine was 5-7%.

Keywords: Endemic Melon Varieties, Kızılırmak, Melon Vinegar Production

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An Assesment of the Physico-Chemical and Microbiologic Quality of Şalgam Samples from Adana Market

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Abstract

Şalgam is a traditional Turkish beverage produced by lactic acid fermentation of black carrot (main raw material), turnip, rock salt, sourdough and drinkable water. Şalgam is originally produced in the Cukurova region of Turkey. It is traditionally made at home, besides manufacturing commercially on small and large scales. The aim of this study was to determine the general composition, colour values, minerals and vitamin contents and microbiological properties of şalgam samples obtained from Adana market.

Lactic acid content of şalgams changed between 5.68 to 7.21 g/L and all samples confirmed minumum 4.5 g/L lactic acid value specified in TS 11149 Turkish Şalgam Standard. pH and salt contents varied from 3.67-3.88 and 1.39 %-2.49 % as sodium chloride, respectively. The pH value in one sample and salt content in four şalgam samples did not meet the values reported in Turkish Şalgam Standard. Total phenol content varied between 178.6 and 318.1 mg/L as gallic acid while total anthocyanin content between 97.92 and 248.15 mg/L as cyanidin-3-glucoside. Colour properties were investigated with Hunter Lab and a* value, the density of red colour, were between 49.0 and 61.57 for examined şalgam samples. Number of lactic acid bacteria, total yeasts and total mesophilic aerobic bacteria were between 5.80-6.58 log cfu/mL, 2.36-4.32 log cfu/mL and 4.95-6.05 log cfu/mL, respectively. Coliform bacteria were not detected in any of the samples.

Mineral contents of the samples were analyzed with ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometry). Sodium, magnesium, calcium, phosphorus and zinc amounts of şalgam samples were determined in the range of 5416-6312 mg/kg, 47.0-68.1 mg/kg, 50.8-87.5 mg/kg, 33.2-72.5 mg/kg and 0.28-0.43 mg/kg, respectively. On the other hand, cadmium, arsenic, mercury, lead, iron and tin minerals were not detected in the samples. Vitamin B1, Thiaminchloride-Hydrochloride (Vitamin B1 Hydrochloride), Niacin (Vitamin B3) and Vitamin C contents were in the range of <0.1 and 0.13, 0.11-0.16, 2.45-3 and 3.8-4.8 mg/L, respectively. Vitamin A and Vitamin B2 contents of the all samples were less than 30 µg/ L and 0.1 mg/ L, respectively. According to the vitamin and mineral contents, a glass of şalgam meets daily requirements of some vitamins and minerals at different levels. In a glass of şalgam, there is 49.39, 2.95, 1.77, 13 and 8.1 % of the daily reference intake of sodium, magnesium, copper, vitamin B1 and niacin, respectively.

Keywords: Composition, ICP-OES, şalgam, vitamins

Theme: Food Science and Technology

The effect of natural and synthetic antioxidants on free fatty acids and peroxide values of potato chips fried in palmolein oil

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Abstract

In this study, the effect of natural and synthetic antioxidants on free fatty acid and peroxide values of potato chips fried in palmolein oil was investigated. Thyme (2%) and rosemary (2%) extracts were used as natural antioxidants, while butylatedhydroxytoluene (BHT) was added as synthetic antioxidant. After frying process, the potato chips were stored for 7 months and analyzed every month. According to results, peroxide and free fatty acid values of control samples (without any antioxidant) ranged from 0.94 to 2.30 meqO_2/kg; from 0.18 to 0.34%, respectively. The minor increase in both free acidity and peroxide values was determined in oils of chips added BHT (0.07-0.10%; 0.65-0.96meq O_2/kg). Moreover, free fatty acid and peroxide values of chips oil added thyme extract were between 0.07 and 0.12%; 0.55 and 1.50 meq O_2/kg, respectively. The results of chips oil added rosemary extract varied from 0.06 to 0.14% for free acidity; from 0.80 to 1.04 meq O_2/kg for peroxide values. It was not observed a significant difference in free acidity or peroxide values of chips when the antioxidants were added in frying oils. Accordingly, the addition of antioxidants increased the shelf life of crisps.

Keywords: Fryingoil, chips, free fatty acid, peroxide, antioxidant, BHT.

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Tomato Paste Industry Residues, Lycopen and Extraction Methods from Residues

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Abstract

In this rewiew; tomato and tomato production industry residues, this is an important agricultural raw and processed material in our country and world scale, some important nutritional compounds and their extraction methods from rediues were examined. In the production of tomato and products, high rates of carotenoid compound are exposed together with residues and these residues can not be used as required. Raw tomato and many different processed form of tomatoes (paste, ketchup, slicing tomato, tomato juice etc.) are a widely consumed in our country and in a world scale. Their products are extremely popular and both as a raw material and processed forms in other cuisines as well as the Mediterranean diet. Regular consumption of tomatoes and tomato products causes a decreasing effects on many different chronic degenerative diseases. Their products contain carotenoids, flavanoids, vitamins and phenolic compounds, that have a positive effect on health. Consumption of the raw tomato and tomato products in a regular diet can help protects of the body against cancer and cardiovascular disease.

Active compounds of their products that have a positive effect on health are carotenoids. The raw tomato and their products contains two main carotenoids. Most carotenoids contained in tomatoes, lycopene and β-carotene. In addition, raw tomatoes contain many different nutritional components as ascorbic acid, flavonoids, tocopherols and phenolic compounds. Lycopene is a color substance that gives the tomatoes a red color. It forms 80-90% of carotenoids in tomatoes. β-carotene is 10-15%. β-carotene is important in nutrition science, because of the activity of provitamin A. Also Lycopene has a high antioxidant activity as β-carotene.

Keywords: Extraction, Food Industry, Lycopen, Residue

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Theme: Food Science and Technology

Effects of Rye Sourdough Fermentation on Phenolic Components

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Abstract

Rye (*Secale cereale* L.) traditionally possesses an important role in the daily diet especially in Northern and Eastern Europe. Besides dietary fibre, rye grains are rich source of various phenolic compounds and phytochemicals such as phenolic acids, lignans, alkylresorcinols and benzoxazinoids. Phenolic compounds have biological activity as part of the human diet but are not used by body as nutrients. In cereal grains, these compounds are located mainly in the pericarp and they can be concentrated by decorticating the grain to produce bran, which can be incorporated into a food product (i.e., breads, cookies, and tortillas). Most studies on phenolic compounds about potential health benefits are related to their antioxidant activity.

Phenolic components were commonly reported in flours and consumed breads. Usage of the sourdough process for leavening is one of the oldest bio-technological processes in the production of rye bread. Sourdough fermentation has proved to be essential in rye bread making by ensuring the dough acidification and inhibition of amylases activity, as well as by improving the water binding capacity of starch. Furthermore, fermentation of rye sourdough improves the nutritional value of rye bread via increasing the levels of bioactive compounds including phenolic components. Many studies reported that phenolic content of the rye could be modulated during the bread-making process. Phenolic content of sourdough was significantly influenced by two points; the type of fermentation and the metabolic activity of lactic acid bacteria. This review reports the effects of sourdough fermentation on phenolic components of rye.

Keywords: Bread, phenolic compounds, rye, sourdough

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Textural Properties of Bologna Type Turkey Meat Sausages Produced with Different Levels of Sunflower Oil

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Abstract

This study was conducted to determine the effects of substitution of beef meat fat with sunflower oil on textural properties of Bologna type sausages produced with turkey meat. For this aim, five groups of Bologna type sausages with different levels of sunflower oil (beef meat fat/sunflower oil: 100/0, 75/25, 50/50, 25/75 and 0/100) were produced twice and analyzed in terms of instrumental texture parameters (hardness, adhesiveness, cohesiveness, springiness, chewiness, gumminess and resilience). It was observed that the substitution of beef meat fat with sunflower oil had very significant effect on cohesiveness and resilience values ($P<0.01$). The highest mean values of these parameters were detected in the group with 100% sunflower oil. The use of sunflower oil in the production also affected the hardness values of the samples significantly ($P<0.05$). While the highest hardness values were determined in the control (100% meat fat), the lowest values were detected in the groups with 75% and 100% sunflower oil. These results revealed that the use of sunflower oil in the production of Bologna type turkey meat sausages decreased hardness and increased cohesiveness and resilience among the instrumental texture parameters. It was concluded that beef meat fat and sunflower oil can be used together in the production of Bologna type turkey meat sausages when the textural properties taken into account.

Keywords: sausage, sunflower oil, texture, turkey meat

Theme: Food Science and Technology

Effect of Brewing on the Bioactive Compounds of Coffee

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Abstract

Coffee was introduced as an economic crop during the fifteenth century; nowadays it is the most important food commodity ranking second after crude oil. Desirable sensory properties make coffee one of the most often consumed and most popular beverages in the world. The coffee preparation method has a significant effect on flavor and composition of coffee brews. Three different extraction methodologies namely decoction, infusion and pressure methods have been used for coffee brew preparation. Each of these methods is related to specific granulation (coffee grind) of coffee powder, water-coffee ratio temperature and brewing time. Coffee is a mixture of 1500 chemical compounds. Chemical composition of coffee highly depends on brewing methods, coffee bean species and roasting time-temperature. Coffee contains a wide number of very important bioactive compounds, such as diterpenes: cafestol and kahweol, alkaloids: caffeine, theobromine and trigonelline, melanoidins, phenolic compounds. The phenolic compounds of coffee includes chlorogenic acids (quinyl esters of hidroxycinnamic acids), caffeic, ferulic, p-coumaric acid. In coffee caffeoylquinic acids, feruloylquinic acids and di-caffeoylquinic acids are three main groups of chlorogenic acids constitues 6% -10% of dry weight of coffee. The bioavailability of chlorogenic acids in coffee depends on the absorption and metabolization to biomarkers in individuals. Also the interaction of coffee polyphenols with other compounds such as dietary proteins affects the biomarkers. Since bioactive composition of coffee depends on brewing methods effect of coffee brewing method on bioactive compounds of coffee will be discussed in this study.

Keywords: bioactive compounds of coffee, biomarkers, coffee brew, effect of brewing

Theme: Food Science and Technology

Phenolic Acid Composition and Antioxidant Activity of Seven Wheat Varieties Grown At Four Locations in Turkey

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Abstract

Wheat has phytochemicals such as phenolic compounds and includes a wide a variety of phenolic acids. This study evaluated differences in phenolic compound and antioxidant activity. Phenolic acid composition and antioxidant activity (DPPH assay) were measured in seven wheat varieties grown at four locations in Turkey. Ferulic, syringic, vanilic, caffeic, p-coumaric, p-hydrobenzoic and cholorgenic acids were measured. There were significant differences between wheat samples and locations. Ferulic acid was the dominant phenolic acid in all wheat varieties. Ferulic acid content was the highest in the Toros 6 variety (554 mg/100g dm). Toros 6 also had the highest ferulic and syringic acid content. Vanilic acid was the second-most dominant phenolic acid in the Sagittario variety. The Adana 99 variety and wheat from Adana-Center had the highest antioxidant activity. Hence both genotype and location influence phenolic acid composition and antioxidant activity.

Keywords: Wheat, phenolic acid, antioxidant activity, genotype, growing location

Theme: Food Science and Technology

Sugar Reduction in Cookies Using Inhomogeneous Distribution

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Abstract

The aim of this study is to develop a cookie formulation with low sugar content without changing the sweetness perceived by the consumer. The cookies are known for the high amount of sugar in their formulations among the snacks. Due to the negative effects of excessive sugar consumption on human health, studies have been accelerated to reduce the amount of sugar contained in foods. For this purpose, 15% and 30% reduced sugar cookie formulations were prepared with inhomogeneous distribution. Inhomogeneous sugar distribution is achieved by creating layers with different sugar contents. Sensory analyses were applied to cookies with inhomogeneous distribution and control sample using ranking test. Sweetness, firmness and preference of samples were evaluated by 20 panellists. In terms of sweetness, 15% reduced sugar cookie sample with inhomogeneous distribution was found to be statistically sweeter than the other samples. 15% reduced sugar cookie sample with inhomogeneous distribution were selected as the most preferred sample. It was determined that there was no statistical difference in hardness between the samples. As a result of this study it was determined that the content of sugar in cookie formulations could be reduced by 15% using an inhomogeneous distribution.

Keywords: cookie, inhomogeneous distribution, sugar reduction

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Use of Different Fruit Kernels and Flour as a Potential Component in Cake

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Abstract

Fruit wastes are used in many different areas, and waste materials are produced during the food production and processing stages. In this way, evaluation of side product and wastes and using with different productions are commonly used nowadays. Fruit kernel and fruit flour which are exposed as waste have high protein, fat phenolic and dietary fiber contents. Vitamins, minerals and antioxidants found in the structure of the kernel are also important for human health. New food productions are provided using kernel flour and the demand for these products are gradually increasing by consumers. The products obtained by grinding and flouring the fruit kernels also have a functional structure at the same time. One of the most consumed foods among the bakery products in the world, the cake is preferred due to its satisfying character and delicious taste. In some studies, pomegranate kernel flour, pumpkin kernel flour and apricot kernel flour have been used and the products developed have been stale during the shelf life, the softness has been preserved and the most important nutrient content has been enriched. By drying process, microbial deterioration and biochemical reactions are prevented by decreasing water activity. The most commonly used techniques are spray drying, vacuum drying and freeze drying. When fruit flour is used in new food productions, positive results are obtained in terms of taste, smell and color. The most common fruits in the food sector are bananas, strawberries, melons, oranges and peaches. Tangerines, apricot dumplings, squash powder, and pumpkin kernels are some of the studies done using fruit pulp. In this review, it was aimed to evaluate the processes involved in the enrichment of different fruit kernel flours and fruit flour production of cakes, and the transformation of fruit and kernels into flour.

Keywords: fruit flour, fruit kernel, cake production, wastes

Theme: Food Science and Technology

Rheological Properties of Dessert Sauces of Cornelian Cherry, Pomegranate and Blackberry: A Response Surface Approach

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Abstract

The objectives of this study was to examine the effects of hydrocolloid type and concentration (0 to 0.60 %) on the rheological properties of cornelian cherry, blackberry and pomegranate sauces prepared with locust bean gum (LBG), xanthan (XA) and i-carrageenan (i-CARR)) at varying concentrations. Rheological observations were done at 25 °C in the controlled rate of shear mode and, results gave satisfactorily Power law fittings ($R^2 > 0.9222$). Response surface methodology (RSM) was used to analyze the effect of hydrocolloid type and concentration on rheological responses of consistency index (K), flow index (n), apparent viscosity (n_{app}). Sauces without hydrocolloid showed near-Newtonian behavior and, hydrocolloid added sauces showed non-Newtonian shear-thinning ($n < 1$) behavior. Increasing hydrocolloid concentration increased the n_{app} by the thickening effect of hydrocolloids in the bulk phase, and hence the K of the sauces. In the sign of rheological observations and regression analyses, it can be concluded that both the type and concentration of hydrocolloid have noticeable effect on rheology of sauces. In general, the overall effect of hydrocolloid concentration was curvilinear in nature, which accompanied by both linear and quadratic effects. As the hydrocolloid type changed, extend and trend of the effect were also changed.

Keywords: hydrocolloid, rheology, response surface method, sauce.

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Theme: Food Science and Technology

Effect of Different Preservation Methods on Quality Parameters and Antioxidant Compounds of Olive Oils Obtained from Table Olives

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Abstract

The purpose of this study was to determine the effect of preservation methods on olive oils quality parameters and minor compounds obtained from green table olive processed with different chloride salts. Domat olives were harvested in the Olive Research Institute of Ministry of Food, Agriculture and Livestock in Izmir/Turkey, in 2014/15 and 2015/16 crop seasons. These olives were fermented in different brines ((I) %7 NaCl (control), (II) %3,5 NaCl+%3,5 KCl, (III) %3,5 NaCl+%3,5 $CaCl_2$, (IV) %3,5 NaCl+%1,75 KCl+%1,75 $CaCl_2$) and packaged with pasteurisation, potassium sorbate and ozonation. The olive extraction process was applied to olives during storage time (0., 120. and 240. days) and determination of free fatty acidity, peroxide values, carotenoid and chlorophyll content, α-tocopherol content and oxidative stability analyses were performed. Olive oils were extracted by using Abencor laboratory oil mill (Mc2 Ingenieria y Sistemas, Sevilla, Spain) equipped with fruit crushing, malaxation and centrifuge parts. All oil samples were filtered and stored in the amber glass bottles and at +4˚C until they were analyzed. This study revealed that some chemical parameters of olive oils obtained from table olive were affected by preservation methods and storage time.

Keywords: Domat, olive oil, ozonation, pasteurisation, potassium sorbate.

Theme: Agriculture

Effects of Modified Atmosphere Packaging and 1-Methylcyclopropene During Storage and Shelf Life of Sweet Cherry cv. 0900 Ziraat

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Abstract

In this research, modified atmosphere packaging (MAP) as standart commercial treatment, combination with consumer size trays (T) MAP + 500 g T, and 1- Methylcyclopropene combinations with both treatments as MAP + 1- MCP and MAP + 1- MCP + 500 g T were compared during storage and shelf life of sweet cherry cv. 0900 Ziraat. Fruits were hydrocooled after harvest and diveded into mentioned treatments. Treatments were stored at 0 ºC, 90- 95 % relative humidity conditions for 35 days and subsequently they were waited at 20 ºC 2 days for shelf life. Quality analyses were done weekly intervals. Weight loses, TSS, peel elasticity, total decay, L*, a*, b*, C*, pH and antioxidant amounts were increased where as there were decrease in stem chlorophyl, TA and Hº. The amount of total phenolic components were preserved. As a result, MAP and MAP + 500 g T were maintained fruit quality equal as MAP + 1- MCP and MAP + 500g T + 1- MCP.

Keywords: MAP, 1-MCP, 0900 Ziraat, Sweet Cherry, Storage

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Bitter Orange (*Citrus aurantium* L.) for Health and Food Preservation

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Abstract

Bitter orange is known as sour orange, *Citrus aurantium*, Seville orange, Aurantii cortex, Aurantiiamari cortex, and Bigarad orange in the world. In the current mini-review, the general properties of bitter orange and an overview of studies related to human health and use of bitter orange in food preservation are presented. In human nutrition, bitter orange is important source of phytochemicals such as ascorbic acid, vitamin A, thiamine, riboflavin, niacin and minerals of calcium, phosphorus, and iron. Besides their nutritional value , citrus fruit flavonoids, limonoids, essential oils, glucaric acids, fiber and pectin has been a functional food components since they have many health promoting properties such as being anti-carcinogenic, anti-viral, anti-oxidant, anti-allergic, anti-tumor and etc. Bitter orange has received great interest in recent years for its use in the prevention of obesity and, it has been a safe alternative to ephedrine, and the importance of the use of bitter orange in dietary products has increased. p-Sinephrine, primary protoalkoloid of bitter orange, commonly used to control weight, weight loss and strengthen stamina in sports performance products. Bitter orange or its components can be used for food preservation since it has antimicrobial, against a variety of Gram-positive and Gram-negative bacteria, antifungal and antioxidant activity.

Keywords: Bitter orange, Citrus aurantium, food preservation, health.

Theme: Food Science and Technology

The Biological Properties Some Bee Products

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Abstract

In recent years, there has been increased interest in functional foods and natural treatments in order to extend the life span and improve the quality of human life. Bee products such as honey, pollen, bee bread, royal jelly and propolis, which are defined as apitherapic products, are rich in proteins, simple sugars, essential amino acids, monounsaturated fatty acids with other valuable components (1). Biological activities of honey, propolis, and royal jelly are mainly attributed to the phenolic compounds such as flavonoids and the essential components of these products like proteins and fatty acids (2). Bee products have antioxidant, antimicrobial, anti-inflammatory and show immunomodulator effect. These features strengthen the immunity, help the body fight actively with bacteria and stimulate the quality tissue regeneration, and consequently protect overall body health and treat it (1, 3). In addition, their antitumor, vasodilative and hypotensive activities properties play a role in the prevention of various diseases such as cancer, cardiovascular diseases and diabetes (4). Because of these beneficial effects, pollen, bee bread, royal jelly and propolis have commonly been used for health protection. Using proper techniques to not lose the biological properties of raw material in production and conservation of bee products, have become a necessity in the bee products industry. For this purpose, it is important to know the biological properties and study the mechanisms of action.

Keywords: bee products, biological activity, apitherapy, functional foods

Theme: Food Science and Technology

Extension of mushroom shelf-life by using chitosan as an edible coating

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Abstract

The mushroom is a food with a short shelf life. There are some studies on extending the shelf-life of fruits and vegetables in literature. The functional advantages of using edible coating that is one of these are slower respiration rate, extended storage periods, firmness retention and controlled microbial growth. The use of chitosan as an edible coating material is preferred due to its good biocompatibility, biodegradability, antibacterial and antifungal activity, membrane forming capacity and safety. In the present study, edible coatings including 1, 2 and 3 % chitosan were used to coat fresh mushrooms and respiratory intensities, weight losses, percent open caps, total soluble solids, pH values and vitamin C content changes were compared between control group and edible coated groups during storage. Analyzes were performed every 5 days during 20 days of storage at 4°C. As a result of coating the mushrooms with chitosan, their respiratory rates, weight losses and numbers of open caps decreased, while their ratio of total soluble solids increased. At the end of the storage, the pH values of the coated mushrooms varied from 4.70 to 5.10 and the pH of control group was 6.30. The vitamin C content of mushrooms during storage decreased from 3.06 mg ascorbic acid/100 g (fresh mushroom) to 0.89 mg ascorbic acid/100 g for control group, 1.13 mg ascorbic acid/100 g for coated mushrooms with 1% chitosan, 1.91 mg ascorbic acid/100 g for coated mushrooms with 2% chitosan and 1.66 mg ascorbic acid/100 g for coated mushrooms with 3% chitosan. It has been determined that the investigated properties of mushrooms are best preserved by the treatment of 2% chitosan coating. Additionally, the findings show that the use of chitosan as a coating agent can improve postharvest quality of mushroom during storage.

Keywords: Chitosan, edible coating, mushroom, prolonged shelf-life.

Theme: Food Science and Technology

The use of chitosan as an edible coating agent in food industry

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Abstract

Nowadays, both healthy eating and healthy lifestyle are highly demanded at global level. This concept has revealed the need for better preservation of the foodstuff such as fruits and vegetables which are an abundant source of bioactive compounds, vitamins and minerals. The use of bio-based coatings is thought as an efficient and eco-friendly way to extend the shelf life of food products. It has been proven that they retard physiological processes such as respiration, degradation of cell wall, transpiration and also restrict microbial action. So, they can preserve the quality of foods. Recently, many studies has been carried out on applications of various types of edible coatings which are generally based on polysaccharides, proteins and lipids for extending the shelf life of different horticultural commodities. One of these coating materials, chitosan, gains popularity day by day. Chitosan as the second most abundant polysaccharide after cellulose, is one of the edible coating materials used to preserve food quality in storage due to its unique properties such as non-toxic, biocompatibility, antimicrobial activity and film-forming properties. It creates a semipermeable membrane and forms a modified internal atmosphere, thus, reducing respiration and transpiration in fruits and vegetables. There are numerous research articles in the literature about the applications of chitosan as an edible coating agent on fresh-cut fruits and vegetables such as peeled litchi, peeled prickly pear, mango fruit slices, Chinese water chestnut and papaya for preservation of postharvest quality and prolongation of shelf-life. Considering the favorable characteristics of chitosan and its positive results obtained in the results of studies, it is inevitable that chitosan will be a frequently used agent in the food packaging industry.

Keywords: Chitosan, edible coating agent, food packaging industry.

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Texhniques to Remove Pesticide Residues from Foods

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Abstract

More foodstuff is needed depend on the increasing world population. Agricultural areas and agricultural production have decreased due to utilization of agricultural areas for settlement, road and industry. Use of fertilizers, agrochemicals and irrigation operations have increased in order to provide higher yields from less agriculture areas. Among these methods, the most widely used and effective method is usage of pesticides. These chemicals are formed from a single substance or mixture of substances, used to prevent plant diseases, contend with harmful insects and weeds and increase crop yields. Besides these advantages, the usage of pesticides have some disadvantages. Pesticides can accumulate in agricultural products as a result of unconscious usage. These residues can cause harmful effects on environment, humans and other living things.

Pesticide residues are reduced to some extent by period between pesticide application and harvest, the post-harvest storage period and applied various industrial processes. But it is not possible remove the residues completely. The number of research on new techniques to remove pesticide residues has increased recently. For this purpose; ultrasound, high hydrostatic pressure, ozone application, ionizing radiation, adsorbent materials, membrane filtration application and various solution washing techniques have been applied to remove pesticides. The selection of the optimum method is determined by pesticide characteristics, environmental conditions, type of plant and food. Use of ultrasound energy, high hydrostatic pressure, ozone, irradiation and adsorbent is effective removing semi-systemic and systemic pesticide residues while washing and heat treatment application is more effective removing contact pesticides.

The removal of pesticide residues, lowering the amount of pesticide below the maximum residue limits (MRL) or the reduction of usage of pesticide can ensure the safety of agricultural products and foodstuff. In this review, it was aimed to mention about removal of pesticide residues with different techniques.

Keywords:Pesticide residue, agricultural production, new techniques, removal of pesticides

Theme: Food Science and Technology

Alternative Method Development to Reduce Application of Sulphure Dioxide in Winemaking

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Abstract

In this study, it was aimed to reduce usage of sulphure dioxide in wine, which is a negative effect on health, by ultrasound and/or pasteurization application. The wine produced from Öküzgözü grapes were obtained from Diren Winery (Tokat). Six different techniques [i. 15 minute ultrasound application (37 kHz) at 25°C; ii. 15 minute pasteurization application at 60°C; iii. 2 minute pasteurization application at 72°C; iv. 15 minute ultrasound application (37 kHz) at 60°C; v. 2 minute ultrasound application (37 kHz) at 72°C; vi. Sulphure dioxide application] were applied to wines. The wines were filled in 330 mL glass bottles and analyzed zeroth and sixth month. pH value, total acidity value (% tartaric acid), Hunter colour values (L^*, a^*, b^*), alcohol content (v/v %), total and free sulphure dioxide (mg/L), total phenolic compounds quantity (mg gallic acid equivalent (GAE)/L) and total anthocyanin quantity (mg cyanidin 3-glucoside (C3G)/L) were determined.

The highest quantity of total phenolic compound was determined for both zeroth and six month in consequence of ultrasound application for 15 minutes at 60 °C. It was determined for zeroth and sixth month as 3552,94; 2929,41mg GAE/L, respectively. The highest quantity of total anthocyanin was determined as 65,24 mg C3G/L in sulphure dioxide application at zeroth month and 60,00 mg C3G/L in ultrasound application for 15 minute at 37 kHz at 25°C. Moreover alcohol content ranged from 12,55%-13,12% for wine samples at sixth month.

Keywords: Red wine, Sulphure dioxide, ultrasound, pasteurization

Theme: Food Science and Technology

Some Characteristics of Black Tea Extracts Obtained by Classical Infusion Method

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Abstract

Tea processing has undergone many changes in the last century as plain tea, blended tea, packet tea, sachet tea, soluble tea and finally ready-to-drink tea (RTD). One of the most important problems encountered in the production of soluble tea is the formation of tea cream. Industrial, the tannase enzyme is most widely used in the production of soluble tea. Enzyme is used to enhance the antioxidant properties of tea catechins by facilitating biotransformation and to improve the color and sensory properties of tea products by reducing creaming. In this study, some properties of black tea extracts obtained by classical infusion at 90 and 100 °C at 10 and 20 minutes and at different tea: water ratios (1:100, 2.5:100, 5:100, 10:100) and tannase enzyme was applied were determined. At 90 and 100 °C for 10 and 20 minutes brewing conditions at 1:100, 2.5:100, 5:100, 10:100 tea: water ratios of the samples soluable solid dry matter, turbidity and total phenolic material values were in the range of 0.20-2.85 °Brix, 3.17-44,85 NTU and 3.06-4.95 g GAE/100 g dry black tea for first extracts, while it varied between 0.55-2.90 °Brix, 0.29-1.76 NTU and 3.25-5.08 g GAE/100 g dry black tea for the tannase-treated samples.

Keywords: Cream, Soluble tea, Tannase, Turbidity

Theme: Food Science and Technology

Some Characteristics of Black Tea Extracts Obtained by Ultrasonic Infusion Method

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Abstract

Tea cream is a precipitate formed by cooling the tea extract obtained by hot extraction to temperatures of 20-30 ° C or lower. Two important factors for reducing the formation of cream in black tea are tea:water ratios and temperature. Extraction is the first important process step for tea beverage production. High temperature application in extraction may lead to an increase in pectin and protein, which constitute tea cream, causes a decrease in sensory quality of tea. Cold extraction is not suitable for industrial drink tea production because of the length of extraction period and the low efficiency of extraction, although it enhances chemical and sensory qualities of tea. The ultrasonic technique may contribute significantly to the shortening of the processing time and the increase of the extraction efficiency by reducing the solvent consumption. For this purpose, tannase enzyme was applied to extracts obtained from black tea by applying ultrasonic method at different tea: water ratios (1:100, 2.5:100, 5:100, 10:100) at 50 and 70 ° C for 10 and 20 minutes brewing time. In the samples, soluble solid dry matter (SSC), turbidity and total phenolic substance values were determined. At the indicated brewing conditions, the SSC values of the samples were 0.20-2.90 °Brix in the first extracts and 0.50-2.60 °Brix in the tannase enzyme treated samples, turbidity values were 6.30-13.25 NTU in the first extracts and 0.30-4.14 NTU in the tannase enzyme treated samples, total phenolic substance values were 1.95-3.69 g GAE / 100 g dry black tea in the first extracts and 1.99-3.89 g GAE/100 g dry black tea in the tannase enzyme treated samples. It was observed that an increase in soluble solid dry matter values due to the increase in tea:water ratios, and a decrease in turbidity and total phenolic material values.

Keywords: NTU, Tannase, Total Phenolic Substance, Ultrasound

Theme: Food Science and Technology

Effect of Solvent Type To Extraction of Oleuropeın from Olive Leaf

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Abstract

Oleuropein which is most abundant bioactive compounds in olive leaves. It is a phenolic secoiridoid glycoside which composed of a polyphenol, commonly known as hydroxytyrosol, a secoiridoid called elenolic acid and a glucose molecule. In this study it was aimed to extract oleuropein from olive leaves using different solvents.

Olive leaves were used as material which were gathered in Aegean Region (Manisa Province) in December. Phenolic extraction from olive leaves were realized by using ethanol, methanol, ethyl acetate and water. Olive leaves were subjected to solid-liquid extraction technique with methanol, ethanol and water. After then, methanol, ethanol were removed from phenolic extracts. Part of of aqueous were lyophilized with using lyophilizer. Remaining part of aqueous filtrate was subjected to liquid-liquid extraction with ethyl acetate.

Crude olive leaf phenolic extract yields were determined. The amount of oleuropein present in the crude extracts obtained using different solvents were determined using LC-MS/MS.

Crude olive leaf phenolic extract yields of ethanol, methanol, ethyl acetate, water (lyophilized) were determined 31,07; 54,42; 0,89; 8,4 %, respectively. Oleuropein amounts obtained olive leaves using ethanol, methanol, ethyl acetate, water (lyophilized) were determined 5,87; 9,20; 0,26; 0,71 g oleuropein/100g dry leaf, respectively.

Keywords:Oleuropein, olive leaf, solvent type, LC-MS/MS

Theme: Food Science and Technology

Proteomics Applications in Cheese Characterization and Recent Developments

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Abstract

The components of milk proteins are analyzed for more than 60 years. Despite the amount of studies in this area, most of the questions related to the expression of milk proteins, structere of them and their modifications have remained unclear until now. One of the procedure to find the answers about related questions is proteomics. The application of proteomics has emerged with the term 'proteomics' of Australian researchers Williams and Wilkins in 1994 and has found a widespread application area in many areas including the food industry.

Proteomics reveal which proteins are excreted by each tissue type. It also provides for the investigation of differences in protein composition of different tissues. From the dairy technology standpoint, proteomics assays are used for the in-depth and extensive investigation of the quality of many products and their probiotic effects in dairy products, from natural fermented dairy products to complex fermented milk products such as cheese. Proteomics have been successfully applied to the milk protein studies and the milk proteom have been characterized.

Proteomics applications have played important roles such as; determination of casein hydrolysis, determination of whey proteins and their truncated forms, screening of casein degradation products, selectivity of enzymes, specificity of microbial proteinases, proteolysis during cheese maturation, identification of microflora released proteins, production and quality evaluation.

In this review, our aim was to provide informations about proteomics, its use in milk technology and cheese production.

Keywords: proteomics application, milk proteins, cheese.

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The Role of Nutraceuticals on Health

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Abstract

The nutraceutical term is combination of ''nutrition'' and ''pharmaceutical'' words. Nutraceuticals which have strong physiological functions and bioactivitie, can protect health and restrain some diseases, is regulated as drug, dietary supplement, food ingredient or food. They show protective or physiological benefits against chronic diseases, but they are not considered as medicines.

Gamma-aminobutyric acid (GABA), hyaluronic acid (HA), glucosamine (GlcN), N-acetylglucosamine (GlcNAc), glutathione (GSH), alpha-ketoglutaric acid (αKG), vitamin B12, folate, riboflavin, carotenoids (β-carotene, lycopene, lutein, zeaxanthin etc.), glutathione (GSH), oleic acid, docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), arachidonic acid (ARA), conjugated linoleic acids (CLAs), γ-linolenic acid, coenzim Q_{10}, β–glucan, ascorbic acid, caffeic and gallic acid, catechins, phytosterols, minerals (zinc, calcium etc.), resveratrol, quercetin, oleuropein, hydroxytyrosol, capsaicin, inulin, fructooligosaccharides (FOS) can be given as example of nutraceuticals. Nutraceutical have shown many effects such as antoxidative, anticancerogenic, anticholosterolemic, antidiabetic, antiinflammation, antiaging, antidepression, antiulcer, immunity booster, detoxifier, etc.

Nutraceuticals are usually obtained by chemical synthesis and extraction from natural sources. Microbial synthesis is more convenient for nutraceutical production due to the fact that chemical synthesis and extraction from natural sources have some disadvantage such as requirement high energy, occurrence of toxic by-products. GRAS (Generally Regarded As Safe) strains are used for microbial synthesis of nutraceuticals. Lactic acid bacteria, propionibacteria, Saccharomyces cerevisiae, Yarrowia lipolytica, Spirulina from GRAS strains used production of common nutraceuticals such as hyaluronic acid, trehalose, folate, riboflavin, carotenoids, conjugated linoleic acids (CLAs), γ-linolenic acid, gamma-aminobutyric acid (GABA).

Nutraceuticals are generally considered safe, but they can be harmful if taken at high doses. Moreover, people which posses special conditions such as chronic patients, pregnants should consult their doctor or pharmacist before using nutraceuticals. In this review, it was aimed to mention about nutraceuticals and their effects.

Keywords: Nutraceutical, nutrition, bioactivitie, health

Theme: Food Science and Technology

Nanotechnology in Food Science: Development of Polyphenol Bioactive Compounds Delivery Systems

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Abstract

Nutrition scientists offer suggestions for consumption of nutritious foods that have important functions in the mechanisms that regulate metabolism and health. However, besides the nutrients in foods, bioactive components that have positive features on health have become important. Nowadays, with an increase in the importance of healthy nutrition consumers are beginning to towards on functional foods rich in phenolic components. The use of phenolic compounds in processed food products is very limited due to their sensitivity to various factors such as heat, light and pH. In addition, the bioaccessibility and bioavailability of phenolic compounds are very low due to the rapid metabolism and low absorptions in the gastrointestinal system. One of the important struggles in the functional food industry is to increase bioavailability by providing bioaccessibility by releasing the food component in the desired region of the body. This thought has given a new direction to the applicability of nanotechnology in the field of food. Nanotechnology has become one of the most promising technologies to revolutionize food science and the food industry. Functionality of food nanotechnology determines its range of applicability. Food nanotechnology can affect the bioavailability and nutritional value of food on the basis of its functions. Nanodelivery systems can increase the bioavailability of bioactives in various ways. The use of delivery systems to improve the bioavailability of polyphenol bioactive compounds as nutritional food in some studies. The bioactivities of polyphenols, such as anticancer, antioxidant, and antiinflammatory activities, have been reported to be enhanced after encapsulation with food macromolecule nanoparticles, also demonstrating the enhanced polyphenol bioavailability. In this review that present recent trends on the encapsulation of polyphenol bioactive compounds, their increased bioavailability and stability focus on novel applications as delivery system.

Keywords: bioavailability, nanoencapsulation, polyphenol

Theme: Food Science and Technology

Determination of the Minor Components and Oxidative Stability of Virgin Olive Oils Obtained from Different Regions of Turkey*

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Abstract

In this work the effect of different growing areas, varieties and processing systems on virgin olive oil minor compounds and oxidative stability were determined. The olive oil samples were collected from the South Marmara, South and North Aegean, Mediterranean Regions by two and three phase extraction systems during 2014/15 and 2015/16 crop season. A total 107 extra virgin olive oil samples were evaluated for this study. The total phenolic contents, α-tocopherol contents, total cholorophyll and carotenoid contents, phenolic profiles and oxidative stability of olive oil samples were analyzed. The total phenolic content and total cholorophyll and carotenoid content of olive oils were analyzed with spectrophotometer (UV-1700 spectrophotometer). α-tocopherol and phenolic profile analyses were performed with HPLC system. Oxidative stability of olive oils was measured with Rancimat equipment. Experimental study was performed to see the differences between two crop seasons and among four Regions. According to the results, total cholorophyll, α-tocopherol contents, and carotenoid contents are significantly different for two crop seasons and four Regions. Rancimat equipment has no difference between two crop seasons. Yet, it has significantly different values for four Regions in 2014/15 crop season. Principal Component Analysis was also applied to phenolic profile for two crop seasons. As a result, using three principal components shows the distriction of regions and olive varieties. The distriction is also seen for each crop season.

Keywords: antioxidant, minor compounds, olive oil, oxidative stability, phenolic profile

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Theme: Food Science and Technology

Chemometric Characterization of Turkish Virgin Olive Oil Based On FAME and TAG Composition Data Stored in National Olive Oil Database*

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Abstract

Olive oil is one of the crucial agricultural food products in Turkey. The quality control of this product is so difficult. It is necessary to trace the properties on geographical characteristics of different olive oil varieties during the years. This study aims to design a database and characterize Fatty Acid Composition (FAME) and Triacylglycerol Composition (TAG) for three Turkish cultivars (Ayvalik, Memecik, and Gemlik). This study was performed on 107 extra virgin olive oil collected from the South Marmara, South and North Aegean, Mediterranean Regions, during 2014/2015 and 2015/16 crop seasons. FAME analyses were performed with Gas Chromatography; TAG analyses were performed with High Performance Liquid Chromatography systems. The data obtained is analyzed statistically using Kruskall Wallis test, Mann Whitney U test and Principal Components Analysis (PCA). As a result, a database called as 'National Olive Oil Database' is designed and the experimental study shows that FAME and TAG compositions of the olive oils can be separated into three distinct groups according to olive varieties.

Keywords:Olive oil, geographical characterization, chemometrics, FAME, TAG.

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Some Characteristics of Instant Tea Produced from Mint (*Mentha Piperita* L.)

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Abstract

Mint (*Mentha piperita* L.) is widely consumed as herbal tea in Turkey. Mint which is a very old culture plant, take parts among the medical plants due to its biological effects such as anti-inflammatory, cardioprotective, antioxidant, antibacterial. In this study, it was aimed to enhance alternative methods for instant mint tea production. Instant tea powders were obtained by spray drying and freeze drying techniques from watery extract of mint. Some physical and chemical properties of these tea powders were investigated. Solubility in water, moisture content, yield, Hunter colour values (L^*, a^*, b^*), total phenolic compounds and total sugar quantities, antioxidant activity, some individual phenolic and flavor compounds were determined. Moreover, instant mint tea powders were evaluated for their sensory properties. The results were compared with traditional brewing method. Solubility in water of mint tea powders by using freeze drying and spray drying techniques were found 96.23; 98.33 and moisture content were found 5.56; 0.24%. Yield of tea powder produced from mint (traditional; freeze dried; spray dried) were found 13.77; 23.53; 23.28%. Moreover, the hunter colour values of mint teas prepared by using traditional brewing, freeze dried tea powder, spray dried tea powder were 26.04; 26.19; 26.56 L^*, 3.81; 4.06; 4.48 a^*, -3.65; -2.45; -1.82 b^*. Total phenolic content of tea produced from pepermint (traditional; freeze dried; spray dried) were found as 12.01; 30.85; 34.24 mgGAE/100 mL and total sugar quantities were found as 36.07; 40.98; 44.94 mgGE/100mL. FRAP activities were found as 2936.73; 3774.64; 4323.66 µmolTE/100 mL. The amount rosmarinic acid (major phenolic of mint) determined 5,73; 15,17 and 15,58 mg/100 mL, respectively. The amount of phenolic compounds obtained by spray drying and freeze drying techniques are higher than traditional brewing method. However, spray dried herbal tea powders had less flavoring agents because of heat application during drying. When the results of the sensory analysis were examined, the highest average was obtained by traditional method and followed by freeze drying techniques, spray drying, respectively.

Keywords: Mint (*Mentha piperita* L.), instant herbal tea, spray drying, freeze drying

Theme: Agriculture

Endangered Medicinal and Aromatic Plant Species of Albania

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Abstract

Palynology evidences show that an important change of the Mediterranean climate with summer drought, occurred approximately 3.2 Million year ago causing the Mediterranean-type of vegetation organization. The variation of geomorphology, climate and terrain create favorable conditions for a number of endemic and sub-endemic species. It is host to 30% of the entire European flora. Albanian flora can be divided into four categories: Mediterranean, Balkan, European and Eurasian. As evidenced by the fact that about 25% of Mediterranean origin, 22% Balkan, 18% European, 14% Euro-Asian species, Euro-Siberian 4%; with the rest of anthropogenic activity: cultivated plants species 5.5%, cosmopolitan (4.5%), and the rest 8% non-specified. Albania's flora includes around 3250 different plant species belonging to 165 families and 910 genders. In Albania grow about 47% of Balkan herbs and 30% of European plant species. The growing medical and aromatic plants in Albania have a considerable potential and 90% of them grow in natural state. They are represented by about 310 plant species belonging to about 62 families. They constitute a significant potential of biodiversity with ecological, economic, aesthetic and ethical values. Cultivation and export of medicinal plants are an important monetary resource for the country's economy. Albania is considered to be the second largest exporter of Medicinal-aromatic plants in South-East Europe, after Bulgaria. A considerable number of rural inhabitants are engaged in the cultivation and collection of medicinal and aromatic herbs. Most of these residents harvest wildfowl, but their interest has also increased considerably for the cultivation of some plants that are highly demanded by the international market. For the realization of this study it was necessary to collect and combine the biological, geographical, cartographic, technical data etc. Providing this data was made possible by a host of institutions, individuals and experts, in addition to the research of existing literature.

Keywords: Flora, aromatic medicinal plants, species, genus, family

Supporting Agencies: Agricultural University of Tirana

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Effect of Drying Methods on Essential Oil Content and Composition of Bay (*Laurus nobilis* L.) Leaves

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Abstract

Laurus nobilis L. (bay), an evergreen shrub that is widely cultivated in Mediterranean countries for its aromatic leaves. It is known one of the most important aromatic plant exported from Turkey. The leaves with strong aroma are commonly used as a flavouring and also in essential oil production. Quality of leaf essential oil is related with its composition which depends on plant species, cultivar, growing region, harvesting time, and processing methods like drying. Appropriate drying method and type of dryer are very important factors for essential oil composition of bay leaves. In this study, to determine the effect of drying methods on content and chemical composition of the essential oil, bay leaves were dried in shade, by hot air in oven at 50 °C, microwave oven at 600W and by infrared drying. The essential oils of fresh and dried samples were extracted by hydro-distillation in a Clevenger apparatus and analysed using gas chromatography-mass spectrometry (GC-MS). Results showed that oven dried leaves at 50 °C and infrared dried leaves at 150 °C have higher essential oil content than dried leaves under shade and in microwave oven. The highest essential oil content (v/w on wet basis) were obtained by hot air oven drying (2.92%) followed by infrared drying (2.59%), microwave drying (2.15%) and shade drying (2.09%) as compared with fresh sample (1.7%). The main components of all essential oils consisted of: 1,8-cineole, sabinene, α-pinene, β-pinene, limonene, ɣ-terpinene, cymol and myrtenal. The most prominent component is 1,8-cineole and its percent concentration in essential oil content of fresh leaf, shade dried, oven dried, microwave dried and infrared dried leaves are 70.7, 60.89, 64.94, 70.84, 67.17, respectively. An analysis of variance indicated that the drying method had a significant effect on oil yield and chemical composition ($p < 0.05$). It can be concluded that, drying of bay leves by hot air at 50 °C in oven dryer is the suitable drying method with short drying time and high essential oil content compare to drying under shade, in microwave and infrared drier.

Keywords: Drying methods, essential oil and laurus nobilis L.

Supporting Agencies: Scientific Research Projects Unit of Mersin University

Theme: Food Science and Technology

Nutritional Value of Black Mulberry (*Morus nigra* L.) Jam

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Abstract

Usage of food as health promoter beside its nutritional function is a wide issue in recent years. Especially dark-coloured fruits attract great attention due to their high content of bioactive compounds with antioxidant characteristics.

Berry fruits such as mulberry, strawberry, blueberry, raspberry, blackberry are recognized as being healthy. In addition, more recently, there is an increasing interest in mulberry fruits that may improve human health or lower the risk of disease. Mulberry fruits have some important substances such as phenolic compounds and organic acids. They are determinated as having antioxidant, antimicrobial and antiinflammatory properties. *Morus nigra* is a member of Morus genus in the Moraceae family. Today, due to its nutritive value, black mulberry is consumed both as fresh and in processed forms. Mulberry fruits are mostly eaten fresh but also used in jam, marmalade, jelly, juices, molasses, fruit leather, churchkhela, liquors, pulp, ice-cream, syrup, fruit sauce, vinegar and cake production.

In this study, some nutritional compounds including total phenolics (TP), total monomeric anthocyanin (TMA) and antioxidant activity (TEAC, trolox-equivalent antioxidant capacity), of black mulberry jam were investigated. Raw materials (black mulberry fruit) were harvested from Tokat region of Turkey. Our objective was investigation of inluence of processing on the total phenolic content and antioxidant properties of fresh black mulberry fruit and jam.

Total phenolic content were observed in black mulberry jams between 1420-1967 µg gallic acid equvalents /g (µg GAE/g). Average antioxidant activity of jam samples was found 13,37 µmol trolox equivalent/g (µmol TE/g). As regards to anthocyanin content, results were obtained 370,92 µg cyanidin-3-glucoside/g fresh weight (cy-3-glu/gfw) on average. These results provide valuable insight for the variation of biochemical composition of black mulberry jam during processing.

Keywords: Antioxidant activity, black mulberry, jam and total phenolics

Theme: Agriculture

Experimental Study for Modelling of Infrared Drying Kinetics of Bay Leaves (*Laurus nobilis* L.)

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Abstract

Bay leaf is one of the most important medicinal and aromatic plant in the world. Fresh bay leaves can't be supplied in a profitable way to all over the world-wide because of their short shelf life and that's why bay leaves can be dried to increase shelf life and for marketing. In addition to extended shelf life, drying also effects essential oil content/composition and quality of bay leaves. In this study, experimental study of thin layer infrared drying kinetics of bay leaves was determined in a laboratory infrared tunnel dryer at 80, 100, 150, 200, 250, 300, 350 and 400^{0}C drying temperatures. Fresh leaves were harvested from southern Turkey (Tarsus province) in October and leaf samples were brought to laboratory for infrared drying experiments. Experimental drying data were fitted to four different thin layer drying models which are Lewis, Page, Midilli et al., and Henderson-Pabis equations. The compatibility of these models were compared according to the highest adjusted R-square (R^2) with the lowest reduced root mean square error (RMSE) between the experimental and predicted moisture ratios of bay leaves versus drying time. Among these models, the model of Midilli et al. was showed the best agreement with the experimental data obtained from the experiments with R^2 ranged from 0,9624 to 0,9998 and the RMSE ranged from 0,0065 to 0,0518 for all drying temperature. As a result, it can be concluded that the Midilli et al. model adequately described the thin layer drying kinetics of bay leaves in an infrared tunnel dryer.

Keywords: Bay leaves, infrared drying, modelling

Supporting Agencies: Scientific Researc Projects Unit Of Mersin Unıversıty

Theme: Food Science and Technology

Some Artisanal Cheeses in Turkey: Karataş District

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Abstract

Traditional cheeses are preserved in historical heritage, which have been able to reach the day-to-day life by filtering through thousands of years of culture and have unique characteristics. The preservation and diversification of our traditional products in cheese production has a great prospect for the development of cheese technology. The geographical position of our country has a rich variety in milk products, especially cheese varieties because many civilizations are homeland. Depending on local conditions, especially cultural habits, animal species and breeds, various regional cheeses are produced with different construction techniques in Turkey. There are more than 100 regional cheese varieties, each with its own unique chemical and sensory qualities. In recent years, efforts have been made to transfer medium- and small-scale industrialization of many traditional product manufacturing methods in order to increase product diversity, contribute to the regional economy and improve product safety in many countries. In this review, traditional production methods and compositional properties of Dilim (sliced) cheese, Basma cheese with black cumin and spicy Çökelek cheese, which are produced and consumed extensively in the Karataş district of Adana province, Gölkaya and Bahçe villages, are given.

Keywords: Basma Cheese, Çökelek cheese, Dilim cheese, Traditional cheeses, Turkey,

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A Research About Quality Evaluation of Dried Apricots Sold in Osmaniye Region

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Abstract

Dried apricot is an important commercial product/snack in Turkey and our country sits in leader position in world trading. 14 different dried apricot samples (8 types of sulphured and 6 types of naturally sun dried) were collected from local markets in Osmaniye and some physical (color, texture, rehydration ratio, electrical conductivity) and chemical (moisture and total phenolic contents and antioxidant capacity by DPPH method) analysis were performed in order to determine quality characteristics. Chroma and hue angle values of dehydrated fruits with sulphur were approximately 2.5 and 1.25 times more than intacts. Hardness was the primarily tested textural property and there was only discrimination about 0.5 N between two groups. 754.50 and 856.35 µs/cm were mean electrical conductivities belonged to sulphured and unsulphured fruits. Also, rehydration ratios (circa 2.54) and moisture levels (circa 26%) of both batches were nearly equal and averaged phenolic contents of naturally and sulphured dried apricots were 1793.42 ppm and 1963.81 ppm gallic acid equivalent (GAE) on dry basis respectively. However, the antioxidant capacities of sulphured ones (about 26.95%) were greater than other category (about 21.12%) per one ml of extract and this indicated that total phenolics and antioxidant capacity were not directly correlated with each other in apricots.

Keywords: Apricot, drying, quality, phenolics

Theme: Food Science and Technology

Determination of the Presence of Listeria monocytogenes in Kashar and White Cheese Consumed in Bilecik, Turkey

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Abstract

Listeria species are very common in nature, especially Listeria monocytogenes, which can be contagious with food consumption, is a very hazardous microorganism and causes a bacterial pathogen for animal species and human. It has been reported that some foods, especially milk and dairy products, play an important role in Listeria infectivity and it is almost impossible to completely eliminate Listeria monocytogenes from any food. This study aimed to determine the composition of kashar and white cheese, to investigate them in terms of hygiene and to constitute a risk profile for Listeria monocytogenes that is accepted as a risk factor for human health. In this study, 100 cheese samples (50 white cheese and 50 kashar cheese) were collected from different markets in Bilecik, analyzed by using the method recommended by FDA (Food and Drug Administration) for Listeria monocytogenes isolation and identification and investigated in respect of Listeria monocytogene. In the results obtained in these studies, it was shown that found to be positive for listeria in 7 of 50 white cheese samples (14%) and 3 of 50 kashar cheese samples (6%) on retail sale. In addition this, Listeria monocytogenes was isolated from 4 (16%) and 1 (2%) from these cheese samples, respectively.

In this study, it was showed that the isolation of pathogenic Listeria monocytogenes from cheese samples. As a result, it can be said that there is a potential hazard for the population of this area of the country and new safety programs should be used and developed for the risk factors associated with contamination of cheese by Listeria monocytogenes.

Keywords: Listeria monocytogenes, Kashar Cheese, White Quince Cheese

Theme: Food Science and Technology

Evaluation of Lipid Oxidation Level in Salami Produced From Poultry Meat Consumed in Bilecik, Turkey

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Abstract

Lipid oxidation is formed as a result of a chain reaction of free radicals and this is a leading cause of quality deterioration in muscle foods. Some studies have indicated that the lipid oxidation potential of muscle tissue may vary among animal species. Generally meats containing polyunsaturated fatty acids in their structure is highly susceptible to oxidation. So, poultry meats containing too much polyunsaturated fatty acids are susceptible to oxidative deterioration. Malondialdehyde (MDA) is a toxic compound, which is formed in advanced oxidation formation, is the substance that determine the severity of oxidation. Thiobarbituric acid (TBA) test for MDA determination is the most commonly used method for assessing lipid oxidation in muscle foods. In this study, to determine the levels of oxidative deterioration, 35 salami samples collected from different markets in Bilecik. Lipid oxidation levels of samples was evaluated by measuring the formation of a pink complex with maximum absorbance at 532 nm formed with the reaction between TBA and MDA produced from lipid hydroperoxide decomposition. TBA levels of salami samples were found to be between 0.349-1.385 µgMA/g. According to the current study, it may be concluded that new safety programs should be used and developed for retardation of lipid oxidation because lipid oxidation is a leading cause of quality deterioration in poultry meats.

Keywords: Lipid oxidation, Salami, TBA

Theme: Food Science and Technology

Investigation of Some Chemical Properties of Kashar and White Cheese Consumed in Bilecik, Turkey

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Abstract

Kashar and white cheeses are the most popular and widely-consumed traditional cheeses in Turkey. They are produced with sheep's, or cow's milk based on the region where it's produced and, generally, there are no standardized techniques used in their manufacture. Therefore, chemical properties of these types of cheese are the critical parameters and must be checked often to ensure the standard chemical quality of these cheeses. The aim of this study was to determine the chemical characteristic of Kashar and white cheeses purchased from the markets in Bilecik and to evaluate suitability of the obtained findings according to Turkish Standards Institute (TS 3272 kashar cheese and TS 591 white cheese). For this purpose, 100 cheese samples (50 white cheese and 50 kashar cheese) were randomly collected from different market in Bilecik, The obtained cheese samples were analyzed to determine some chemical properties. According to results obtained in these studies, pH, total acidity (based on lactic acid, %), dry-matter (%), protein (%), ash (%), fat (%) and salt (%) for white cheese samples were determined as 5.67±0.74, 0.24±0.06 %, 44.98±5.35%, 18.02±3.64%, 3.86±1.07%, 25.40±7.11%, 5.20±2.03%, respectively. The same data for kashar cheese were determined as 5.96±0.37, 0.27±0.05%, 55.93±3.76%, 23.95±5.79%, 4.63±3.64%, 29.06±6.28%, 4.96±1.64%, respectively. All found other values except dry-matter (%) were found to be within the specified criteria determined by the Turkish Standards Institution.

Keywords: Chemical Properties, Kashar Cheese, White Cheese

Theme: Food Science and Technology

In Bilecik grown, by obtaining a variety of products from the buckwheat flour; use without gluten-free feeding

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Abstract

Buckwheat is very popular in recent years, so it can be easily found in large markets, as seeds or flour. However, because of its popularity, different products can be sold under the name of buckwheat in many places. When buckwheat is consumed in the right amount, it does not hurt. But especially if you need to be fed gluten-free, it is important that you pay attention and use it in consultation with your doctor. In this study; In Bilecik Gölpazarı long years of growing buckwheat, gluten-free nutrition system was aimed at creating. Wheat flour made into flour, flour, cake, baked goods such as cookies can be turned into flour components were formed. The resulting flours were tested on 55 people without gluten-free diet and the results were compared.

Keywords: gluten-free diet, Buckwheat,greçka

Theme: Food Science and Technology

Non-linear viscoelastic properties of dough prepared with quinoa/wheat flour mixtures

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Abstract

In this study, non-linear viscoelastic behavior of the dough samples prepared with quinoa/wheat flour mixtures at various ratios (10/90, 20/80, 30/70 and 40/60, respectively) was investigated. The rheological measurements were carried out using air-controlled rheometer (Anton Paar,MCR-302) and rheoplus LAOS (Large Amplitude Oscillatory Shear) module attached with 25 mm sand-blasted plate to minimize wall-slip effect at a gap of 2 mm at 25°C. A deformation (from %0.005 to %200) was applied to the dough samples at 10 rad/s frequency to obtain storage and loss modulus (G′ and G″, respectively) values. Also, elastic (e3/e1), and viscous (v3/v1) Chebyshev coefficients were calculated using the Chebyshev polynomials and Fourier transformation (FT-rheology). The FT rheology results showed non-linear zone and strain stiffening behavior with a strain of 0.05%. Also v3 values showed v3>0 (shear thickening) up to a point where strain was 1.26% and from this point, it was changed to v3<0 (shear thinning), as could be observed by the use of LAOS module. Regarding the effect of quinoa on LAOS properties of the dough samples, their dominantly G′ values and slightly G″ values were observed to increase with increase in quinoa ratio in the mixture, which was thought to be due to increase in protein content by increase in quinoa content in the mixture ratio.

Keywords: Quinoa and Wheat Flour, FT rheology, Large Amplitude Oscillatory Shear, Non-linear viscoelastic properties of dough

Theme: Food Science and Technology

Fatty Acids in Fish Oil Capsules

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Abstract

Marine derived organisms are rich in polyunsaturated fatty acids that contain more than one double bond in their long carbon chain. These fatty acids play crucial role in human health in relation with cardiovascular system, brain and eye function in infants, immune systems and so on. EPA (20:5n3) and DHA (22:6n3) are the predominant omega-3 fatty acids in fish oil. World Health Organization (WHO) and European Food Safety Authority (EFSA) recommend the intake of EPA+DHA should be higher than 250 g/day. In order to meet this requirement fish oil supplements are demanded by consumers.

The aim of the present study was to reveal the fatty acid composition and especially omega-3 content of fish oil capsules. Fish oil capsules were obtained from different commercial companies and coded with different letters. Fatty acids were investigated by gas chromatography after esterification of fish oils. It was found that EPA and DHA were used as the main the source of omega-3. Meanwhile, there was fish oil capsules enriched with linolenic acid (18:3n3). It may be thought that the necessity of omega-3 can be compensated by linolenic acid instead of EPA and DHA. The basic fatty acids other than omega-3 were oleic acid (C18:1), palmitic acid (C16:0) and stearic acid (18:0), respectively. PUFA/SFA ratio ranged from 0.549 to 7.897 and n6/n3 ratio was recorded between 0.003 and 1.237. These findings overlap with the recommended values.

Consuming natural foods is always a good approach. However, the odour and possible chemical contaminants makes the fish oil capsules take part in our diet. In spite of health benefits, omega-3 capsules should be consumed consciously and not taken overdose.

Keywords: Fish oil capsules, omega-3, EPA, DHA

Supporting Agencies: The Scientific Research Projects Administration Unit of Akdeniz University

Theme: Food Science and Technology

Determination of Some Quality Characteristics of Cheese with Addition of some plants Dill, Garlic, Grape Seed and Flaxseed

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Cheese is one of the most notorious food and containing high levels of fat, protein, calcium and vitamins. It is gained some levels of functionality after certain ripening period by containing low molecular weight of peptides as a result of proteolysis. Recently, some herbs or plant have been used in the manufacture of some dairy food to enhance of their health benefits, e.g., antioxidant activity, antimicrobial activity, bioactivity, etc. In this study, we aimed to enhance bioactive properties of cheese and increase product-diversity by addition of dill, garlic, grape-seed and flaxseed in the manufacture. The sensory evaluation, chemical composition and pH of the cheeses and also proteolysis were determined during 45 days of ripening with 15 days intervals. Use of these plants and seeds changed the flavour, appearance and proteolysis. Reversed-phase HPLC peptide profiles, urea-PAGE gel electrophoretograms and levels of water and 12% trichloroacetic acid-soluble nitrogen fractions of the cheeses were showed that flaxseed added cheese exhibited higher proteolysis than the other cheeses. In sensory evaluation, the cheese produced with addition of a mixture of dill and garlic were scored higher points than other cheeses.

Keywords: Cheese, plant addition, proteolysis

Theme: Nutrition

Impact of food behaviour on children's health. Case study

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Abstract

The current study evaluates the impact of eating foods rich in vitamins and dietary fibbers on health of children. The incidence of respiratory infections, gastrointestinal disorders, and food allergies was monitored in a group of children between 0 and 14 years of age depending on their eating habits and diet. Parents of 212 children, patients in St. John Children's Hospital of Galati, Romania, completed questionnaires containing 14 questions about diet, eating habits and the incidence of childhood affections. The results obtained showed that the incidence of gastrointestinal disorders is about 64.3% higher in the children with an unbalanced diet based on highly processed foods, and fast food foods. Furthermore, the children who regularly consume fresh fruits and vegetables are 72.8% more resistant to respiratory infections than children with a diet low in nutrients. On the other hand, food allergies are present at a frequency greater than 3 times a year in a proportion of 63.6% in children consuming salty foods and excess sweets. This study provides new and compelling evidence regarding the importance of a balanced diet on the health of children and also on the potential disease prevention through a correct diet is substantial.

Keywords: fast food diet, respiratory diseases, food allergies, gastrointestinal disorders.

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Theme: Food Science and Technology

Honey Powder Dried By Mixing With Main Ingredients of Chocolate

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Abstract

The use of high-moisture ingredients in chocolates negatively affects the processability of the by-products, the stability and the eating habits of the final products. The presence of high water content in the chocolate changes the viscosity and pour point of the liquid chocolate, prevents its proper crystallization during solidification, reduces the melting point and causes the recrystallization of sugar in the final product. Such problems are disrupting the surface appearance and eating quality of chocolates. Therefore, it is desired that the chocolate has less than 1% moisture in the final product.

In this study, the use of honey as an unrefined natural sweetener instead of sucrose in chocolate has been studied. Honey can't be used directly in chocolate due to moisture content of approximately 20% (w/w). The moisture content of honey must be reduced to below 3% to be used in chocolate. Due to the high stickiness caused by glucose and fructose contained therein; it is not possible to directly dry honey to this humidity level. For this reason, honey can be dried by mixing with some absorbant powders such as starch, maltodextrin, gum, gelatin, etc. But these absorbants are not suitable for the definition of chocolate and disturb the taste of chocolate.

By the developed method and semi-finished product, this problem has been overcomed and it is possible to make chocolates sweetened by 100% with honey. Firstly, honey is mixed with the main ingredients of chocolate such as milk powder, whey powder, cocoa powder and dried to the desired moisture level by current methods, and then tested in chocolate. In addition, there is no extra production steps such as encapsulation, honey powder can be produced with fewer steps.

New generation chocolate products can be developed with this honey powder maintained its natural flavor and nutritional properties by the developed method.

Keywords: chocolate, high moisture, honey, honey powder.

Theme: Food Science and Technology

Micro-emulsification of alpha-tocopherol

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Abstract

Emulsion-based delivery systems for lipophilic bioactive compounds can be designed to improve the water-dispersibility and increase the bioaccessibility. One of the common emulsion-based delivery systems for lipophilic bioactive agents are microemulsions. Microemulsions differ from other type of emulsions namely nano- and classical emulsions due to their lower particle size, higher thermodynamic stability and clear appearance. Tocopherols are important antioxidants and meanwhile act as vitamin E, which makes them important food additives. Among tocopherols, α-tocopherol having the highest vitamin activity is the main vitamer in human tissues. However the non-polar nature of this compounds limits its incorporation into water based food and beverages. In order to develop stable oil-in-water microemulsions that encapsulate and deliver α-tocopherol, surfactants having different hydrophilic-lipophilic balance (HLB) values were investigated. In this study, Tween series surfactants (Tween-20, 40, 60 and 80) were used. Final tocopherol concentration in microemulsion was set as 1000 mg/kg and dispersion were performed by a sonicator. The effect of Tween type, concentration, and emulsification time on incorporation of α-tocopherol was determined after accelerated physical stability tests. It has been observed that, Tween-80 and 20 were better in emulsification of α-tocopherol compared to Tween-40 and 60. Increasing surfactant concentration caused decrease in particle size and for all Tween types, 4 g/L surfactant ratio caused formation a real microemulsion. With increasing sonication time, particle size were decreased until 4 minutes and further sonication led to degradation of tocopherol with no more particle size reduction. Tween-80 and 20 had the best turbidity results while Tween-20 gave higher alfa tocopherol retention in the emulsion.

Keywords: Alfa-tocopherol, Microemulsion-based delivery systems, Surfactant.

Supporting Agencies: İnönü University Scientific Projects Coordination Unit with Project ID: 2016/113

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Theme: Food Science and Technology

Curcumin as a Natural Food Coloring

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Abstract

The first property that is noticed before the food stuff is consumed is its physical appearance and especially the color. Food coloring agents are used to strengthen the weak color, to give the preferred color of the food, to cover the defects that occur during processing and the most important is to increase attractiveness of product to the consumer. Natural food colorants are obtained from microbial, vegetal, animal and mineral sources. Today, the importance of healthy food consumption has increased and consumers therefore prefer food products produced using natural colorants instead of synthetic colorants. Due to the increasing demand for natural food colorants, the production and use of curcumin, a natural polyphenolic bioactive color component, has gained importance. Curcumin is the most important bioactive component of the rhizomes of the Curcuma longa plant. The rhizomes of the Curcuma longa plant contain abundant bright yellow colored curcumin pigment. It is a great advantage to use curcumin pigment as a natural food coloring. Curcumin is an important component for health because of its anti-inflammatory, antioxidant and anti-tumor properties. It is known that synthetic food colorants used to obtain the bright yellow color of the curcumin pigment have many hazards such as cancer. As a natural food colorant, it is thought that the curcumin pigment can come from above these hazards and light up new researches.

Keywords: Curcuma longa, Curcumin, Food coloring, Polyphenolic bioactive.

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Theme: Food Science and Technology

Effect of Some Packaging Materials During Storage on Quality and Shelf-life of Olive Oil

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Abstract

Oils, effecting on nutritional value of foods and giving to aroma and taste of foods, are a significant part of human diet. Olive oil is an edible oil extracted from healthy olive fruits obtained from olive trees (*Olea europaea* L.). Olive oil that mainly consumed throughout ages in the Mediterranean diet is one of the most-known vegetable oils. Olive oil, that generates the main source of dietary fat, exhibits desirable sensory characteristics, health and nutritional benefits. The shelf-life and quality of olive oil is mainly impacted by the types of packaging material, storage time and conditions. The most important factors affecting quality and acceptability of olive oil during storage are storage temperature, exposure to light, contact with metals, storage humidity and the level of oxidation. In order to satisfy the expectations of consumers, protection of oil against oxidation which affects negatively on the quality of olive oil should be provided. Packaging that is a significant step during oil process preserves oil products from production to usage by consumer. Selection of packaging material is important for shelf-life and quality. Improper packaging causes negative changes in the chemical structure which lead to deterioration of olive oil and proper packaging ensure adequate product shelf life by supplying suitable conditions such as protection of oil product from light and oxygen for distribution and marketing. This study is mainly concerned with storage conditions, some factors affecting storage and effects of some packaging materials on the quality and shelf life of olive oil.

Keywords: Olive Oil, Packaging materials, Storage conditions, Shelf-life

Theme: Food Science and Technology

UV-LED Inactivation of *Bacillus Subtilis* in Dried Food Ingredients

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Abstract

The objective of this study was to investigate the efficacy of a novel UV light emitting diode based technique for the inactivation of *Bacillus subtilis* in dried ingredients. Additionally, the effect of this non-thermal technology on selected food quality parameters was assessed. The multiwavelength LED based system was used to treat inoculated black pepper and tapioca starch samples (1 g) using different combinations of UV light (285, 365, 405, 285/365, 285/405, 365/405, 285/365/405 nm). The plate count method was used to measure colony-forming units (CFU) for all treatments and two treatment times (5 & 10 min). The Folin–Ciocalteu assay and Rapid Visco Analyser (RVA) were used to assess quality parameters in treated black pepper and tapioca starch, respectively. Log inactivations of 1.5 $\log_{10}$ CFU/g were achieved with combinations of all wavelengths (285, 365, 405 nm) for black pepper and tapioca starch samples after 10 min treatment time. Results also showed increasing inactivation for greater treatment times. Total phenolic content determined using the Folin-Ciocalteau method showed minor changes in levels for all treatments. RVA analysis showed no significant changes in final viscosity for all treatments. The study demonstrates that UV-LED technology has potential application as food safety intervention step in the food industry.

Keywords: *Bacillus subtilis*, Inactivation, Light emitting diode

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Theme: Food Science and Technology

A sustainable source of Omega-3 fatty acids: Algal oil

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Abstract

The omega-3 fatty acids DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid) have a wide range of scientifically established health benefits attributed to their consumption. They have many positive effects on human beings, such as anti-inflammatory and anti-blood clotting actions, lowering triglyceride (TAG) level, reducing blood pressure, and reducing the risks of diabetes, some cancers, etc. Although the major sources of omega-3 fatty acids are fish oil and oil obtained from some fish products, some complications such as significant taste, odor, stability problems, the presence of contaminants from ocean pollution and objections by vegetarians limit the use of fish oil. To eliminate all these complications, recent researches has been focusing on the new sustainable source (Algal oil) of the omega-3 fatty acids. Algal oils that are produced by fermentation technologies have many benefits in functional foods due to their high omega-3 fatty acid content and their lack of environmental toxins. The production of algal oil includes growth (fermentation process) and harvesting of algae or algae-like microorganisms, extraction and refining of oil. A typical omega-3 fatty acid content of commercially available algal oil is 3% eicosapentaenoic acid (EPA) and 46% docosahexaenoic acid (DHA). In this review, we will present 1) briefly the characteristics of algal oil as an alternative source of omega-3 fatty acids 2) difference between algae and fish based omega-3 fatty acids 3) production of algal oil including fermentation, extraction and refining process 4) novel methods for delivering omega-3 rich algal oil to food products.

Keywords: Omega-3 fatty acids, algal oil, algae

Theme: Nutrition

Increasing Trend on Low-Calorie Sweeteners: Natural Sweeteners as Alternatives to Artificial Sweeteners

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Abstract

Currently consumers are demanding healthier food products and hence the development and consumption of novel food formulations with dietetic properties has increased greatly. No- and low-calorie-foods are referred to as artificially-sweetened foods, and are the foods sweetened with artificial sweeteners, like aspartame, sucralose, stevia, or acesulfame potassium. These artificial sweeteners are also referred to as low-calorie, non-nutritive, high-intensity or non-caloric sweeteners. They are alternatives to caloric sugars, such as sucrose (table sugar) and high fructose corn syrup table sugar, and used to provide sweet taste with fewer or no calories while maintaining palatability. They are commonly used in soft drinks/beverages, sweetener packets, grains, cereal-snack foods, dairy products, hygiene products, and medications. Hence, no- and low-calorie-sweetened foods play an important role in a food plan, especially for patients with Diabetes mellitus and having problems with weight control.

The main health benefits of artificial sweeteners are that they don't raise blood glucose levels, can be used to control weight and to treat hypoglycaemia. However, if consumed in excessive amounts, they can increase weight, promote obesity, and impairment of normal metabolic responses. Therefore it was suggested to include various natural sweeteners instead of artificial sweeteners in food formulations. These include honey, coconut nectar and sugar, maple syrup, molasses, sugar alcohols, stevia, dates, agave nectar, apple sauce and others. Many of these natural sweeteners have added benefits of being rich in minerals and vitamins. In addition some of the natural sweeteners also contain prebiotics which aid in improving the health of the digestive system by promoting the growth of probiotics.

The aim of this article was to review trends in the consumption of low-calorie sweeteners such as artificial sweeteners and natural sweeteners their role on diet, the health impacts and risks.

Keywords: Diet, artificial sweeteners, natural sweeteners, health, probiotics

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Theme: Food Science and Technology

Recovery of high added-value food ingredients from Tunisian citrus limon by-product: Identification and valorization

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Abstract

Citrus is one of the most abundant crops in the world, mainly in tropical and subtropical areas. Tunisian citrus production occupies the 9th position in the Mediterranean area with an annual production of approximately 230 million tons, representing about 1.2% of Mediterranean production and in which the lemon covers 16% of the total citrus. Citrus by-products are an important source of bioactive constituents, such as organic acids and phenolic compounds, with health promoting and nutritive properties. Therefore, the aim of this study was the determination of some important bioactive compounds (i.e. dietary fiber, organic acids, phenolic compounds and carotenoids) in Citrus limon by-product dried powder (CBP) proceeding from a Tunisian company. Physicochemical properties and major bioactive compounds have been studied. CBP showed high amounts of dietary fiber, total phenolics and flavonoids, and carotenoids. Forty polar metabolites (6 phenolic acid derivatives, 32 flavonoids and 2 organic acids) have been identified by HPLC-DAD-TOF-MS. To our knowledge, six of these compounds, have been identified for the first time in lemon by-products. The antioxidant activity was tested using DPPH, ABTS and FRAP assays. These results suggested that the extract obtained from CBP had an interesting antioxidant activity comparable with synthetic antioxidants. Finally, the results obtained in this work confirmed that the CBP is a good source of bioactive compounds and the isolation of antioxidant nutraceuticals can present an advantageous way to revalorize these by-product for potential use as dietary additives in the functional foods and pharmaceutical industry.

Keywords: Antioxidant capacity, Citrus limon by-product (CBP), Dietary fiber; HPLC-DAD-ESI-TOF-MS, Phenolic compounds.

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Component composition and biological activity of essential oils and plant extracts from *Chartolepis intermedia* Boiss.

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Abstract

Chartolepis intermedia Boiss., also called *Centaurea chartolepis* Greuter, is a perennial plant of the Asteraceae family, numbering more than 400 species. Chartolepis intermedia Boiss. widely distributed in the vast meadows of Kazakstan, on the territory of the European part of the CIS, in Central Asia, and in Western Siberia.

Chartolepis intermedia Boiss. well-studied plant and from the above-ground part of the herb plant were identified sesquiterpene lactones grosshemin and cinaropicrin. They are in interest because of their a wide range of pharmacological and biological properties, such as antibacterial, antioxidant, antitumor, antimicrobial, cytotoxic and strong antiallergic effect, and grosshemin can fight obesity and lower blood cholesterol levels.

The aboveground part of the raw material is Ch. intermedia (leaves, flowers and stems) were collected during the flowering phase in mid-August 2017, at the Korgalzhyn highway, Astana, Kazakstan.

The essential oil was obtained from the dried plant mass by the water distillation method on the Clevenger apparatus for 2 hours. The chemical composition of Ch. intermedia essential oil was established by GS MS method and the main components are ent-Germacra-4(15),5,10(14)-trien-1β-ol – 4.3%, n-Hexadecanoic acid – 3.9%, Spathulenol – 3.2%, Heptacosane – 2.7% and Phytol - 2.6% as well as Unknown components with 5.0, 4.6 and 3.3%.

The cytotoxic activity of essential oil and the plant extract (chloroform) of Ch. intermedia was determined by method of squeezing out sea crustaceans Artemia salina. Based on the experiment, the essential oil shows cytotoxicity, the mortality of larvae is 96%, and the chloroform extract is not cytotoxic.

Antiradical activity was determined by the reactions of the inhibition of 2,2-difinyl-1-picrylhydrazyl radical. The results showed that the antiradical activity of chloroform extract of Ch. intermedia at 0.5 and 0.75 mg/ml concentrations is average, and at 1 mg/ml the extract has a higher antiradical activity than butylhydroxyanisole.

Keywords: *Chartolepis intermedia* Boiss., essential oil, component composition, extract, cytotoxic, antiradical activity.

Agencies: TICO

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Component composition and biological activity of essential oils and plant extracts from *Cousinia alata* Schrenk and *Achillea salicifolia* Besser.

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Abstract

Cousinia alata Schrenk (family Asteraceae) is a perennial (less often biennial) plant. Among the representatives of this genus, polysaccharides, sesquiterpene lactones and cytotoxic lactones have been previously isolated. Cytotoxic, antioxidant, antitumor and fungicidal activities of the extracts of representatives were studied. According to our information in the literature, there is no data on the study of the composition of the essential oils of plants of the genus Cousinia.

The raw materials of *C. alata* (the aerial part) were collected during the flowering phase on August 17, 2017, near to village Zhaltyr of Akmola region of the Republic of Kazakhstan.

Achillea salicifolia Besser (family Asteraceae) is a perennial herbaceous plant. The raw materials of A. salicifolia (the aerial part) were collected on August 19, 2017, on the highway Korgalzhyn, Akmola region of the Republic of Kazakstan.

Essential oils of the two plants were obtained from the dried plant mass by the water distillation method on the Clevenger apparatus for 2 hours. The chemical compositions of the essential oils were established by GS MS method and the main components for *C. alata* are α-pinene - 31,8%, limonene - 11,6%, β-pinene - 4,8%, bornyl isovalerate and germacrene B - by 4.1%, bornyl acetate - 3.3%, as well as borneol with a content of 2.5%; and for *A. salicifolia* are sabinene – 3.1%, 1.8-cineol – 11.0%, α-thujone – 43.0%, camphor – 5.3% and terpinen-4-ol - 5.3%.

The cytotoxic activity of essential oils of *C. alata* and *A. salicifolia* show cytotoxicity, the mortality of larvae is 96%. The ethyl acetate, acetone and methanol extracts of *C. alata* at concentrations of 10 and 5 mg/ml exhibit cytotoxicity, petroleum ether and ethanol extracts at 10 mg/ml.

All the studied extracts of the *A. salicifolia* do not exhibit cytotoxicity at all tested concentrations.

Antiradical activity was determined and it was found that the essential oils of *C. alata* and *A. salicifolia* have a low antiradical activity.

Plant extracts of *C. alata* and *A. salicifolia*, in different solvents, show low, average and comparatively high antiradical activities according to the concentrations of the extracts.

Keywords: Cousina alata, Achillea salicifolia, essential oil, component composition, cytotoxic, antiradical activity.

Agencies: TICO

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Current status and options for introducing biotechnological practices in wine production, in Albania

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Abstract

Wine production in Albania previously, organized through state administration of vineyards and vineries, the vineyards covered more than 20000 ha. This situation dramatically changed during the 90s. Application of biotechnology to food processing consists on enhancing and improving food properties such as: its' shelf-life, aroma, taste, texture and nutritional value of foods. The biotechnological processes belonging to "traditional biotechnology" consist on improving microbial cultures through traditional methods of genetic improvement such as classical mutagenesis, conjugation and hybridization.

Actually in Albania, implementation of biotechnological processes can be classified to the traditional biotechnology. Current status of application of new biotechnological practices in wine production is focused on microbial inoculation, intervention on enzymatic activity through the GM micro-organisms for flavors and other chemical compounds modifications, increase of food safety through detection of pathogens.

Regarding to the food safety biotechnological practices the actual situation is in the first steps, and consist in rising the awareness of the produces for the control of food contaminants of biological origin, such as secondary metabolites, mycotoxins in wine and grape juices.

Application of the biotechnology is going to be more evident with the changing of consumer demand trends, which consist in increase demand for top quality wines. This will need improvement of the wine production through biotechnological alternative processes.

Proactive industrial strategies need to implement for increase of the competitiveness to the local producers with open market, especially for our region, known as important producer, and their need to increase wine production through the exports.

In that aspect role of the Government bodies is very important by addressing issues of protection of consumer health and interest, to ensure fare practices. Also is necessary to encourage and enable the proper environment for the introducing the biotechnological practices in wine production of Albania.

Keywords: Biotechnology, wine, small winery, Albania.

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Implementation and alignment with EU Legislation of Food Safety in Albania

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Abstract

"Food safety" ensures that food does not cause harmful effects on people's health, if prepared and consumed, under the proper conditions of use. The European Union has developed Food, Animal Health and Welfare, and Plant Health Standards in order to lay the foundations for ensuring a high level of human health protection and consumer interests to restore people's confidence in safety of food from the Farm to the Table.

In Albania, the public legal entity responsible for ensuring the safety of food is the National Food Authority (NFA/AKU) under the Ministry of Agriculture and Food (MAF). NFA/AKU is with main headquarter to Tirana and regional directories in the districts. It carries out inspection, technical and scientific activities in accordance with food law and other specific laws, the safety and quality of feed and foodstuffs, animal health and welfare, and plant protection.

The funds for establishing and starting the work of NFA/AKU are guaranteed by the state budget, internal resources or donations. The NFA/AKU, with the authorization of MAFCP, delegates to other legal entities public the activity in accordance with the objectivity of this authority. The organization and functioning of the AKU is determined by the decision of the Council of Ministers, upon the proposal of MAFCP.

Risk Analysis and Consumer Protection Interests consists on: Risk Assessment which is based on the validity of scientific data and decisions taken independently, objectively and transparently. Risk communication which provides fast, timely, objective and understandable information about nutrition, pests and risks; and Risk management by providing preventive and control measures taken to prevent, reduce or eliminate the risks to human health related to food consumption is based on the risk assessment results.

The official food controls are carried out by the Food and Feed Control Inspectorate and the authorized Food Safety and Veterinary Laboratories, under the AKU, which includes: inspection; sampling and analyze; control of the label and official documentation; reviewing the documentation for traceability; reviewing the self-control system.

NFA/AKU prepares standards, information materials on good manufacturing practices, cooperates with international food institutions and organizations. Trains and certifies food and feed control inspectors.

Keywords: Food Safety, EU legislation, Implementation, alignment, Albania

Theme: Food Science and Technology

Identification and Quantification of Phenolic Compounds of Quinoa by HPLC-DAD-ESI -MS^n and Screening for Their Antioxidant Activity

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Abstract

Quinoa (Chenopodium quinoa) is a native food plant traditionally cultivated in the Andean region of South America. Although a lesser-known plant, there has been growing interest due to its nutritional value but also due to the strong tolerance to stressing abiotic conditions. The present study identified the composition of phenolic compounds of quinoa cultivars in white and red, and how they promote to antioxidant potential. A total of 18 phenolic compounds were identified and characterized in a single analysis including phenolic acids, mainly vanillic acid, ferulic acid and their derivatives as well as main flavonoids quercetin, kaempferol and their glycosides. Black quinoa seeds had higher phenolic concentration and antioxidant activity. Findings of these phenolics, along with betacyanins in this study add new knowledge to the functional components of quinoa seeds of different cultivar background. Antioxidant activities of quinoa were also measured using the ABTS and DPPH assays and the data obtained were in agreement with total phenol content.

Keywords: Quinoa, Chenopodium quinoa, phenolic compounds, antioxidant capacity, DPPH, ABTS.

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Nutritional changes during extrusion

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Abstract

Extrusion cooking is a multifunctional, multistep, thermal and mechanical process has led a great number of food applications. Impacts of extrusion cooking on nutritional quality are uncertain. Advantageous impacts involving destruction of gelatinization of starch, denaturation of undesirable enzymes, inactivates some anti-nutritional factors, sterilizes the finished product, and retains natural colors and flavors of foods. However, maillard reactions between sugars and protein decrease the nutritional value of the protein, related with raw material types, their composition and process conditions. High moisture content, low temperature and low residence time (mild extrusion conditions) develop the nutritional value such as higher retention of amino acids, high protein and starch digestibility, increase soluble dietary fiber, decreased lipid oxidation, higher retention of vitamins and higher absorption of minerals, whereas high extrusion temperature, low moisture contents and improper formulation can affect nutritional value negatively. It is essential that control of process parameters should be kept down in order to obtain nutritionally balanced extruded productions. There are lots of fields that require further studies related with extrusion and nutrition. However, a few paper was published on the impacts of extrusion on phytochemical and some healthful food constituents. Future study may be focus on the interaction between compositional changes on production quality both sensory and nutritional aspects, in addition to the impacts of relation between complex extruder conditions on nutrient retention. This study reviews the nutritional changes during extrusion process. The impact on carbohydrates, protein, lipid, vitamins, dietary fiber, mineral content and non-nutrient healthful constituent of food are discussed.

Keywords: Cooking, Extrusion, nutrition, nutritional changes

Theme: Food Science and Technology

Development of Fortified Extruded Foods

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Abstract

Extrusion technique is a process in food processing technology which combines several unit operations including mixing, cooking, kneading, shearing, shaping and forming. It is designed to form and/or puff- dry ingredients. By extrusion, a variety of shapes, textures, colours can be produced, which is not easily feasible using other production methods. Extruders operate with low moisture while cooking food products, so therefore, less re-drying is required. Extrusion process also requires less space per unit of operation than traditional cooking systems. In addition to all these facilities of the process, it can be indicated that it minimizes degradation of food nutrients while it improves the digestibility of proteins, starches and destroys anti nutritional compounds. Preferences in consuming functional foods increase day by day depending on increasing education level and changing lifestyles of people. On account of being easy and low coasted process, various types of enriched extruded food products can be manufactured. For example, food products rich in protein quality and quantity, total dietary fiber, vitamin and mineral content can be produced by the extrusion of cereal-legume mixture. On the other hand, fruits, vegetables and food industry fruit and vegetables wastes are used in extrusion process and so enriched extruded food products are produced by adding vitamin, mineral, dietary fiber, and phenolic compounds. Pseudo cereals such as amaranth, quinoa, and buckwheat may also be used to improve enriched extruded food products because of their high level of amino acid, dietary fiber, vitamin, mineral, phenolic content. Due to adding vitamin (heat stable) and mineral cyclamen to raw material mixtures that will be extruded, enrichment of vitamin and mineral can be made. As a result, application of food extrusion process may develop in conjunction with the operational advantages of the process, increasing awareness of people and requirement for enriched foods in the future.

Keywords: Food extrusion, Food fortification, Food development

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Changes in polyphenols and antioxidant activity in shalgam at different heat pasteurization conditions

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Abstract

Shalgam which is mainly produced in Cukurova region is widely consumed in Turkey as a fermented beverage. During production, lactic acid forms and protects the beverage from bacterial spoilage but cannot block yeast growth. Degradation of lactic acid by yeasts and consequently decreasing acidity and increasing pH is one of the most important factors in shalgam spoilage. Therefore, heat pasteurization process is the one of critical step for safety and shelf life of shalgam. However, heat treatment has certain adverse effects on physical, chemical and biochemical properties of shalgam such as loss of polyphenols which has role in taste and nutritional value of final product. Changes in anthocyanins, total polyphenol (TP) content and antioxidant activity (AOA) of shalgam were monitored in pasteurization process at 80, 85, 90 and 95°C during 20, 26 and 30 sec. The analysis of anthocyanins shalgams were carried out by a LC-DAD-ESI/MS^n. Cyanidin and cyanidin derivatives accounted for the highest amount of the total anthocyanins. Among them, cyanidin-3-xylosylgalactoside and cyanidin-3-xylosyl-glucosyl-galactoside were the major anthocyanins. TP content was measured spectrophotometric Folin-Ciocalteu method. AOA was determined by DPPH method. The AOA values of shalgam juices were between 28.3-23.8 mM Trolox/100 mL and as expected the highest AOA values belonged to control sample which were not exposed to heat treatment. Especially after 26 second at 90°C the decreasing in AOA values were significantly different from control sample ($p<0.05$). Similar trend was also observed in TP content of shalgam juices after pasteurization. The TP content of shalgam was diminished up to 14% at 95°C during 30 sec and the difference from control was important for samples taken 85°C during 26 and 30 sec., 90 and 95°C during 20, 26 and 30 sec. These results showed that pasteurization condition parameters have affected the nutritional value of shalgam significantly. Therefore, in order to prevent reduction of TP and AOA values of final product, pasteurization conditions should be performed below 85°C. In future studies application of non-thermal pasteurization methodologies can be investigated in terms of nutritional and microbiological quality of shalgam.

Keywords: Shalgam, total polyphenol, anthocyanins, antioxidant activity, pasteurization condition.

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Theme: Food Science and Technology

Comparison of Phenolic Compounds and Other Important Quality Parameters of Clarified and Unclarified Pomegranate Juices

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Abstract

The purpose of this study was the comparative assessment of the alterations in phenolic compounds and some other quality parameters (antioxidant capacity, sugar and colour parameter) of pomegranate juices throughout different conventional processing techniques. Two different widespread methods were used to process pomegranates into juice. In the first method, an unclarified pomegranate juice was produced. In the second method, a clear juice was obtained by addition of fining agents. The analysis of anthocyanins pomegranate juices were carried out by a LC-DAD-ESI/MS^n. Five major anthocyanins, including cyanidin 3-glucoside, cyanidin 3,5-diglucoside, delphinidin 3-glucoside, pelargonidin 3-glucoside and pelargonidin 3,5-diglucoside were identified and quantified. In addition to this, the organic acid, sugar contents and antioxidant (by using DPPH and ABTS methods) potentials of juices was explored. High correlations were also found between anthocyanins and DPPH and ABTS antioxidant capacities. The results showed that commercial pomegranate juices had markedly high total phenolic contents and antioxidant capacity. Fructose and glucose were found as the major sugars. The major acids were citric and malic acids. The results showed that clarification condition have affected the phenolic composition of pomegranate juice significantly. Unclarified juices have higher phenolic content, anthocyanins and also antioxidant potential.

Keywords: Pomegranate juice, total polyphenol, anthocyanins, antioxidant activity.

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Food Fortification

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Abstract

Considering the public health, it is important to be sure that populations gain a balanced diet with good nutritional quality. Due to the risk of nutrient deficiency in a population, production of fortified foods is increasing. Food fortification is the addition of essential nutrients such as Iron, Iodine, Zinc, Vitamins A and D to a food so as to improve the nutrients quantity in food and to provide a public health benefit with minimal risk to health. The amount of nutrient added may be higher than levels present before processing. In the case, fortification standardizes variable concentrations of nutrients. Various benefits of the process encompasses the safe consumption of the fortified food among people, any requirement for changes in eating patterns or food habits/lifestyles of people, being socio-culturally acceptable way to deliver nutrients and cost-effective intervention, any chance in characteristics of the food like the taste, aroma or the texture of the food, the minimal side effects by using natural resources. For these purposes, food can be fortified in different forms. It is possible to add one or more micronutrients to foods commonly consumed by the general public (mass fortification), to fortify foods designed for specific subgroups by the way increasing the intake of that particular group rather than that of the population as a whole (target fortification) and/or to fortify foods available in the market place (market-driven fortification). Household and community fortification and bio fortification of staple foods are also the other types of food fortification. It is important to emphasize that there are several advantages of a food fortification. So the attention on the required levels of fortification, the identification of a suitable carrier, the fortification process technologies can increase in the future. This review is aimed to define food fortification and to discuss the types of the process.

Keywords: Bio fortification, food fortification, mass fortification, target fortification

Theme: Food Science and Technology

Nutritional Properties of Pseudocereals

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Abstract

Starch-rich grains take an important part in human nutrition and there are three master cereal species, maize, rice, and wheat are consumed by the world's population. In International AACC list of recognized grains, pseudocereals were mentioned. These grains are known since ancient times and cultivated in Asia, Africa and some parts of America, but it has been reemerged in the last forty years when after known its valuable properties. The morphological structure of cereals and pseudo-cereals is considerably dissimilar. The embryo of cereals is located inside a starchy endosperm, while the embryo of pseudo-cereals encircles the starchy tissue in the form of a ring. Other crucial differences between cereals and pseudo-cereals associate with their chemical and nutritional structure. Pseudocereals are being utilized widely in order to make better functional foods. Among the pseudocereals, important ones are amaranth, quinoa, and buckwheat. Amaranth (Amaranthus spp.) has been consumed by many ancient civilizations as Inca, Maya, and Aztec. Amaranth contains high-quality oil and high levels of favorable proteins, and it is an appropriate food for patients with the Celiac disease. Amaranth could be considered as 'natural pharmaceutic' grain because of the content of possible health-raising compounds such as nicotiflorin and rutin. Origin of Quinoa (Chenopodium quinoa willd.) is Andean regions of South America and it is taking great affection due to the nutritional value of amino acids like lysine and methionine that are unsufficient in cereals. Buckwheat (Fagopyrum esculentum Moench) includes high levels of polyunsaturated essential fatty acids, minerals, and vitamins, dietary fiber, antioxidant compounds. Cereals are inadequate in lysine but it can be enriched by adding buckwheat so amino acid profile can be balanced. Current trends head towards to pseudocereals because its nutritional contents are founded worthwhile especially for producing gluten-free products.

Keywords: Amaranth, Buckwheat, Gluten-free, Quinoa

Theme: Food Science and Technology

Recent applications in modified atmosphere packaging of fruit and vegetables

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Abstract

Modified atmosphere packaging (MAP) with low O_2 and high CO_2 for increasing shelf life of fruits and vegetables have been extensively reported in the literature. The use of high levels of O_2 with inert gases have also been reported as effective way for prevention of microbiological spoilage and inhibition of enzymatic reactions in various fresh cut fruit and vegetable. In some applications, researchers have noted that using of high level O_2 which is combined with high level CO_2 is more effective than using only one type gas to restriction of bacterial growth. The high level O_2 usage is an effective way to prevent potential risks of decay, because the accumulation of fermentative metabolites cause to off-flavor that may be occurred when excessively low level O_2 concentration are used. However, some studies reported that high level O_2 can lead to vitamin C loss in product. Noble gasses such as Helium, Argon, and Xenon have also studied to replace N_2 in MAP packaging due to their solubility and diffusivity characteristics. Those properties of the noble gasses help remove oxygen from cellular tissue easily when compared with N_2 and O_2.

Another approaches in MAP is to combine with other preservation techniques, such as applied with disinfection treatments (UV-C, gamma irradiation), combine with edible coatings, using new packaging materials (nanocomposites films, antimicrobial films), gas scavengers, and ethylene absorbents. There is growing studies on produce of new packaging materials using different materials that can be incorporated into the packaging material, or coated on the surface of the packaging film, or added in a sachet into the package. Studies showed MAP has a good effect on preservation of fruit and vegetables; however there are some limitations for commercial usage of MAP. Those limitations are requirement of different gas formulations for each product type, specialized and expensive equipment, legal uncertainties about new materials etc.

Keywords:MAP, fruit and vegetable, preservation

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