



ALBUM- POST HARVEST DISEASES OF FRUIT



Dr. Sumia Fatima

Associate Prof. & Head, Botany
Dr. Rafiq Zakaria College for Women,
Aurangabad-431001 (MS)



Dr. Syed Zafar Javeed
(Environmental Science)
Safety Manager
ENOC, Fujairah, UAE

ABSTRACT

In India actual availability of fruits and vegetables in the market goes down by 35% to 40% due to post harvest losses (Sumia Fatima et. al, 2006). Different types of fungal forms are found to be associated and responsible for post-harvest diseases of fruits during storage. Droby, (2006) reported that about 20-25% of the harvested fruits are lost via the activities of pathogens during post harvest chain. The infected fruits were collected from fruit market of Marathwada region and brought to the laboratory for further study. Post harvest fungi isolated and purified the culture by the method given by Aneja (1986), The post harvest disease of each fruit shown in album was confirmed by Koch postulate as mentioned above.

KEYWORDS

Images, Post harvest diseases, Fruits.

RESEARCH PAPER

INTRODUCTION

The branch of market pathology initiated due to improper, handling of harvested fruits or dormant storage organs, unfavourable environment of storehouse or go downs and mechanical injuries caused during harvest and transportation. In India actual availability of fruits and vegetables in the market goes down by 35% to 40% due to post harvest losses (Sumia Fatima et. al, 2006). These losses are not only due to lack of awareness about stages from its production to consumption but owing to high moisture content they are highly susceptible to attack by varieties of fungal pathogens.

In India, 2.95 million hectare area occupied by the fruit crop (Neeta Sharma and Mashkoor Alam, 1998). Different types of fungal forms are found to be associated and responsible for post-harvest diseases of fruits during storage. Droby, (2006) reported that about 20-25% of the harvested fruits are lost via the activities of pathogens during post harvest chain. The total estimated loss comes to corers of rupees annually. According to National Horticulture Mission (NHM) (2005-2006), the post harvest losses of fruits were up to 30-40%. The aim of preparation of ALBUM of post harvest diseases of fruits is to show the morphological symptoms of infected fruits caused by different types of post harvest fungi during storage periods. The photographs of fruits are captured at proper stage of development of infection.

Material and methods

Collection of fruits: The infected fruits were collected from fruit market of Marathwada region and brought to the laboratory in a separate sterile polyethylene bag .Total 500 infected fruits of each type was observed and fungi were isolated for each type of post harvest fungus from respected fruit. The final results were presented in the form of digital album after confirmation of the disease.







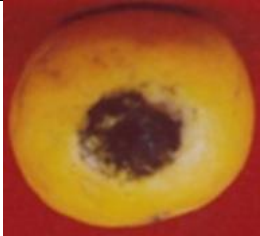


Isolation of fungus: The infected region of each type of fruit were removed with the help of sterile forceps in sterile condition and inoculated on PDA amended three petriplates. The petriplates were incubated at room temperature $26 \pm 1^{\circ} \text{C}^0$. The same procedure was used for each type of fruit and each type of disease.


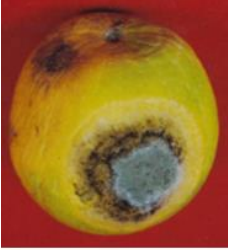










Purification of culture: The externally grown mycoflora of strawberry isolated and purified by using single spore inoculation technique and single hyphal thread inoculation technique, proposed by Mukadam and Chavan, (1998) on freshly prepared PDA medium. The fungus was identified on the basis of external morphology of spores, mycelium.


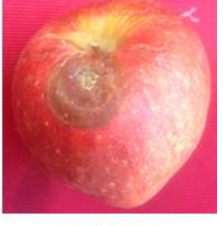










Pathogenicity test: The pathogenicity of isolated fungi from fruits of was tested according to Koch s postulates. The set of 3 healthy respective fruits were initially surface satirized with 0.1% HgCl₂ and superficially injured with the help of sterile needle and inoculated A four mm disc of 4-5 days old growing colony of respective fungus was removed with sterile borer in sterile condition and inoculated at artificially injured region of respective fruit set of 3. The inoculated fruits were incubated at room temperature 25+⁻¹ C⁰. The post harvest disease of each fruit shown in album was confirmed by Koch postulate as mentioned above.












It is difficult to understand the type of symptoms of post harvest diseases of different fruits in preserved condition; hence the album is useful to see the morphological features of the symptoms caused by various post harvest fungi on fruits during storage period. All the photos of the album are collected after confirmation of diseases by Kochs postulates.




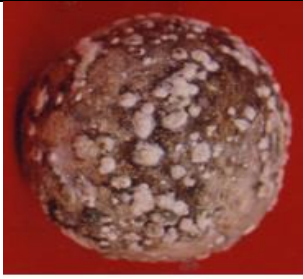



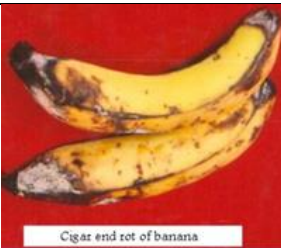



Post-harvest diseases of different fruits.

POST HARVEST DISEASE OF MANGO (<i>Mangifera indica</i>)	POST HARVEST DISEASE OF MANGO (<i>Mangifera indica</i>)	POST HARVEST DISEASE OF MANGO (<i>Mangifera indica</i>)
 <p>FRUIT ROT (<i>Sclerotium sp.</i>)</p>	 <p>ANTHRACNOSE (<i>Colletotrichum Acutatum</i>)</p>	 <p>FRUIT ROT (<i>Actinodochium sp.</i>)</p>
 <p>ANTHRACNOSE (<i>Colletotrichum gloeosporioides</i>)</p>	 <p>RHIZOPUS ROT OF MANGO (<i>Rhizopus nigricans</i>)</p>	 <p>BLACK MOULD (<i>Aspergillus niger</i>)</p>
POST HARVEST DISEASE OF ORANGE	POST HARVEST DISEASE OF ORANGE	POST HARVEST DISEASE OF ORANGE
 <p>BLACK MOULD (<i>Aspergillus niger</i>)</p>	 <p>GREENISH MOULD (<i>Penicillium crustosum</i>)</p>	 <p>FRUIT ROT (<i>Phomopsis sp.</i>)</p>

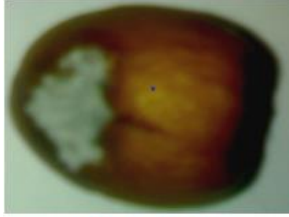











 <p>FRUIT ROT (<i>Diplodia natalensis</i>)</p>	 <p>FRUIT ROT (<i>Aspergillus niger</i> & <i>Penicillium sp.</i>)</p>	 <p>MOULD DISEASE (<i>Penicillium italicum</i>)</p>
 <p>FRUIT ROT (<i>Aspergillus flavus</i>)</p>	 <p>FRUIT ROT (<i>Penicillium expansum</i>)</p>	 <p>FRUIT ROT (<i>Guignardia citricarpa</i>)</p>
POST HARVEST DISEASE OF STRAWBERRY	POST HARVEST DISEASE OF STRAWBERRY	POST HARVEST DISEASE OF STRAWBERRY
 <p>FRUIT ROT (<i>Pestalotia longisetula</i>)</p>	 <p>FRUIT ROT (<i>Fusarium oxysporum f. sp. fragariae</i>)</p>	 <p>FRUIT ROT (<i>Rhizopus stolonifer</i>)</p>
POST HARVEST DISEASE OF PAPAYA	POST HARVEST DISEASE OF PAPAYA	POST HARVEST DISEASE OF PAPAYA
 <p>PAPAYA ROT (<i>Rhizopus stolonifer</i>)</p>	 <p>PAPAYA ROT (<i>Thielaviopsis sp.</i>)</p>	 <p>PAPAYA ROT (<i>Colletotrichum acutatum</i>)</p>
POST HARVEST DISEASE OF APPLE	POST HARVEST DISEASE OF APPLE	POST HARVEST DISEASE OF APPLE

 <p>APPLE ROT (<i>Botryosphaera sp.</i>)</p>	 <p>APPLE ROT (<i>Phoma mali</i>)</p>	 <p>APPLE ROT (<i>Phytophthora cactorum</i>)</p>
 <p>APPLE ROT (<i>Neofabraea alba</i>)</p>	 <p>APPLE ROT (<i>Phomopsis mali</i>)</p>	 <p>FRUIT ROT DISEASE (<i>Penicillium sp.</i>)</p>
POST HARVEST DISEASE OF APPLE	POST HARVEST DISEASE OF APPLE	POST HARVEST DISEASE OF LEMON
 <p>APPLE SPLITTING (Physiological disorder)</p>	 <p>BITTER ROT (<i>Colletotrichum gloeosporioides</i>)</p>	 <p>Botrytis rot of lemon</p>
POST HARVEST DISEASE OF AMLA	POST HARVEST DISEASE OF AMLA	POST HARVEST DISEASE OF AMLA
 <p>FRUIT ROT (<i>Aspergillus niger</i>)</p>	 <p>GOOSBERRY ROT (<i>Colletotrichum Cladosporioides</i>)</p>	 <p>FRUIT ROT (<i>Penicillium expansum</i>)</p>
POST HARVEST DISEASE OF PLUM	POST HARVEST DISEASE OF PLUM	POST HARVEST DISEASE OF PLUM

 <p>FRUIT ROT (<i>Fusarium sp.</i>)</p>	 <p>BLACK MOULD (<i>Aspergillus niger</i>)</p>	 <p>BLUE MOULD (<i>Penicillium expansum</i>)</p>
<p>POST HARVEST DISEASE OF GRAPES</p>	<p>POST HARVEST DISEASE OF GRAPES</p>	<p>POST HARVEST DISEASE OF GRAPES</p>
 <p>ANTHRACNOSE (<i>Sphaceloma ampelina</i>)</p>	 <p>STEM END ROT (<i>Aspergillus niger</i>)</p>	 <p>FRUIT ROT (<i>Sphaceloma ampelina</i>)</p>
 <p>BUNCH ROT (<i>Aspergillus aculiatus</i>)</p>	 <p>FRUIT ROT (<i>Aspergillus flavus</i>)</p>	 <p>NOBLE ROT DISEASE (<i>Botrytis cinerea</i>)</p>
 <p>STORAGE ROT (<i>Pestalotia sp.</i>)</p>	 <p>FRUIT ROT DISEASE (<i>Penicillium citrinum</i>)</p>	 <p>FRUIT ROT (<i>Drechslera hawaiiensis</i>)</p>

 <p>FRUIT ROT DISEASE (<i>Cladosporium cladosporoides</i>)</p>	 <p>BACTERIAL ROT OF GRAPES</p>	 <p>POWDERY MILDEW (<i>Erysiphe necator</i>)</p>
POST HARVEST DISEASE OF AEGLE	POST HARVEST DISEASE OF PEAR	POST HARVEST DISEASE OF JACKFRUIT
 <p>FRUIT ROT (<i>Fusarium solani</i>)</p>	 <p>FRUIT ROT <i>Aspergillus japonicus</i></p>	 <p>FRUIT ROT (<i>Fusarium sp.</i>)</p>
POST HARVEST DISEASE OF BANANA	POST HARVEST DISEASE OF BANANA	POST HARVEST DISEASE OF BANANA
 <p>FRUIT SPOT (<i>Popularas phaeospora</i>)</p>	 <p>Cigar end rot of banana CIGAR END ROT (<i>Verticillium theobromae</i>)</p>	 <p>FRUIT ROT (<i>Dieghtoniella torulosa</i>)</p>
 <p>ANTHRACNOSE (<i>Colletotrichum musae</i>)</p>	 <p>FRUIT CRACKS (Physiological disorder)</p>	<ul style="list-style-type: none"> • Droby, (2006) reported that about 20-25% • Sumia Fatima reported 27% loss of fruits in market of Marathwada
POST HARVEST DISEASE OF POMMEGRANATE	POST HARVEST DISEASE OF POMMEGRANATE	POST HARVEST DISEASE OF POMMEGRANATE

		
FRUIT ROT (<i>Penicillium</i> sp)	BLACK ROT (<i>Aspergillus niger</i>)	ANTHRACNOSE (<i>Colletotrichum gloeosporioides</i>)
POST HARVEST DISEASE OF POMMEGRANATE	POST HARVEST DISEASE OF POMMEGRANATE	POST HARVEST DISEASE OF JUJUBE
		
STEM END ROT (<i>Aspergillus niger</i>)	<i>Cercospora</i> rot of Pomegranate	<i>Penicillium</i> rot of jujube
POST HARVEST DISEASE OF FIGS	POST HARVEST DISEASE OF FIGS	POST HARVEST DISEASE OF FIGS
		
FRUIT ROT (<i>Phytophthora arecae</i>)	FIG ROT (<i>Curvularia lunata</i>)	FRUIT ROT (<i>Cephalosporium fici</i>)
POST HARVEST DISEASE OF GUAVA	POST HARVEST DISEASE OF GUAVA	POST HARVEST DISEASE OF JAMUN (ROSE APPLE)
		
GUAVA ROT (<i>Phytophthora nicotianae</i> var. <i>parasitica</i>)	FRUIT ROT <i>Gloeosporium psidii</i>	<i>Aspergillus</i> rot of Jamun (Rose apple)
POST HARVEST DISEASE OF JUJUBE	POST HARVEST DISEASE OF DATES	POST HARVEST DISEASE OF PEAR

 <p>FRUIT ROT (<i>Penicillium decumbens</i>)</p>	 <p>ROT OF DATES (<i>Fusarium sp</i>)</p>	 <p>FRUIT ROT (<i>Colletotrichum gloesporioides</i>)</p>
POST HARVEST DISEASE OF CUSTARD APPLE	POST HARVEST DISEASE OF CUSTARD APPLE	DISEASE OF LEMON
 <p>FRUIT ROT (<i>Phytophthora parasitica</i>)</p>	 <p>FRUIT SPOT (<i>Fusarium sp.</i>)</p>	 <p>CITRUS CANKER (<i>Xanthomonas citri</i>)</p>
POST HARVEST DISEASE OF PINEAPPLE	POST HARVEST DISEASE OF SAPOTA	POST HARVEST DISEASE OF WATERMELON
 <p>BALCK ROT (<i>Ceratocystis paradoxa</i>)</p>	 <p>FRUIT ROT (<i>Fusarium sp.</i>)</p>	 <p>MUSKMELON FRUIT ROT (<i>Fusarium sp.</i>)</p>
POST HARVEST DISEASE OF FIGS	POST HARVEST DISEASE OF CHERRY	POST HARVEST DISEASE OF CHERRY
 <p>FRUIT SPOT (<i>Pseudocercospora sp.</i>)</p>	 <p>CHERRY ROT (<i>Botrytis cinerea</i>)</p>	 <p>BLACK MOULD (<i>Aspergillus niger</i>)</p>

Result: The album of post harvest diseases of fruits created to cheat awareness among the researchers regarding morphological features of infected fruits by pathogenic fungi and to

promote research regarding management of post harvest diseases of fruits which is responsible for losses of millions of rupees every year. Second purpose of creating album of fruit diseases is that the preserved museum specimen of infected fruits does not show the natural symptoms of the disease. The post harvest diseases of most of the fruits available in market were collected isolated the respective pathogen and confirmed by using key proposed by Kochs postulates.

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