

Review on medicinal and traditional importance of horse gram

Sanjay Rao * and Anshu Sharma

Department of Pharmacy, Bhupal Noble's University Udaipur, Rajasthan 313001, India.

World Journal of Biology Pharmacy and Health Sciences, 2022, 12(03), 009–013

Publication history: Received on 19 October 2022; revised on 27 November 2022; accepted on 30 November 2022

Article DOI: <https://doi.org/10.30574/wjbphs.2022.12.3.0214>

Abstract

Horse gram has a long history of usage as an antihypertensive and treatment for diseases and infections. Along with lipids and other types of proteins, many steroidal, alkaloid, and glycoside chemicals were present in horse gram as significant bioactive components. Rich source of milk protein, vitamins A and C, and other nutrients. It belongs to the Lamiaceae family and has 15 different genetic species that are primarily grown in Asia and Africa. Horse gram plant pieces can be eaten by both people and animals. Nevertheless, as dal, in making so-called rasam, and as a concentrated feed for animals. It can be utilised as green manure as well. It offered a variety of possible effects, including anti-inflammatory, hepatoprotective, anti-cancer, anti-fertility, anti-cancer, antibacterial, and antioxidant etc.

These plants have a variety of medical qualities that can be found across the entire plant. This review's goal is to analyse and draw conclusions on the body of knowledge around the phytochemical make-up, therapeutic applications, and pharmacological effects of horse gramme and its constituent parts.

Keywords: Pharmacological activity; Phytochemical activity; Phytochemical constituents; Nutraceutical and nutritional composition

1 Introduction

In reference to the knobby statures on the pods, the term *Macrotyma* is derived from the Greek words *makros*, which means enormous, *tylos*, which means knob, and *loma*, which means margin. Due to its poor cooking quality, dry horse gram seeds are only occasionally used. Horse gramme also contains high levels of phosphate, iron, and vitamins C, thiamine, riboflavin, and carotene. It is well known to have a wide range of therapeutic and medical uses. It can be an ayurvedic drug used to treat kidney stones, piles, edoema, and other conditions.

Additionally, it contains polyphenols, which have strong antioxidant effects, molybdenum, which controls calcium intake, and iron, which aids in the delivery of oxygen to cells and makes up a portion of the blood's haemoglobin. Horse gramme contains a lot of haemagglutinin, a chemical that causes red blood cells to agglutinate. A significant crop in south India is horse gramme. Also possible is green manure.

The Indian states of Karnataka, Andhra Pradesh, Orissa, Tamil Nadu, M.P., Chhattisgarh, Bihar, W.B., Jharkhand, and the foothills of Uttaranchal and H.P. are where horse gram is primarily grown. Other nations, primarily Sri Lanka, Malaysia, the West Indies, etc., also cultivate it.

The crop horse gram is incredibly drought-resistant. Climates that are dry and moderately warm are ideal for its best growth. Late August through November is the primary planting season for horse gram.

*Corresponding author: Sanjay Rao

Department of Pharmacy, Bhupal Nobel University Udaipur, Rajasthan 313001, India.

Typically spread seeded at a seed rate of 40 kg/ha for dual use, i.e. grain and fodder.

In order to lower the risk of fungal diseases found in the soil infecting the seed, seed treatment fungicide must be applied. Application of irrigation should occur prior to flowering and pod production.



Figure 1 Horse Gram Pod



Figure 2 Horse Gram Plant and Seed

Table 1 Geographical Distribution of horse gram (*Macrotyloma Species*)

Spices Name	Area of Distribution
<i>Macrotyloma africanum (wilczek)</i>	Africa
<i>Macrotyloma axillare (E.Mey.) Verdc.</i>	Africa and Australia
<i>Macrotyloma bieense (Torre) Verdc.</i>	Africa
<i>Macrotyloma biflorum (Schum.&Thonn.) Hepper Africa</i>	
<i>Macrotyloma brevicaulis (Baker) Verdc.</i>	Africa
<i>Macrotyloma ciliatum (Willd.) Verdc.</i>	Asia & Africa
<i>Macrotyloma coddi Verdc.</i>	Africa
<i>Macrotyloma daltonii (Webb) Verdc.</i>	Africa
<i>Macrotyloma decipiens Verdc.</i>	Africa
<i>Macrotyloma densiflorum (Baker) Verdc.</i>	Africa
<i>Macrotyloma hockii (De Wild) Verdc.</i>	Africa
<i>Macrotyloma prostratum Verdc.</i>	Africa
<i>Macrotyloma rupestre (Baker) Verdc.</i>	Africa
<i>Macrotyloma stipulosum (Baker) Verdc.</i>	Africa
<i>Macrotyloma uniflorum (Lam.) Verdc.</i>	Asia, Africa and Australia

Table 2 Conservation at Different Gene books of the world

S.N.	Country	Name of Organization	Accessions
1.	India	National Bureau of plant Genetic Resources, New Delhi	1627
2.	The United States	Germplasm Resources Information Network of US, Department of Agriculture	35
38	Australia	Tropical Crops and Forages Genetic Resources Centre, Biloela, Queensland	
4.	Kenya	National Gene bank of Kenya, Crop Plant Genetic Resources Centre, KARI, kikuyu	21

Table 3 Evaluation of Germplasm by Different Institutes for agro- Morphological Traits

S. n.	Name of Institute	Number of Germplasm Accessions Evaluated	Year of Evaluation	References
1.	Common and Science collage Jalna, India	22	2011	Kulkarni(2010)
2.	NBPGR, New Delhi, India	22	2005,2006	Latha,(2006)
3.	Himachal Pradesh Agricultural University, Palampur, India	63	2005	Chahota et al. (2005)
4.	National Bureau of Plant	1426	1984-1990	Patel et al. (1995)

Table 4 Improved Varieties Released by Different States in India for cultivation

S. n.	Variety	Place of Release
1.	VLG1	Uttarakhand
2.	S27,S8,S39and S1264	Orissa
3.	K82 and Birsa Kulthi	Jharkhand
4.	PDM1AND VZM1	Andhra Pradesh
5.	HPK-4 and VLG1	Himachal Pradesh
6.	Maru kulthi,KS2,AK21 AND AK42	Rajasthan
7.	Hebbal Hurali2, PHG9 and KBH1	Karnataka

Table 5 Nutritional composition of Horse gram (*Macrotyloma Uniflorum* (Lam.)Verdic

S. No	Nutritional composition		References
1.	Carbohydrate	58.3% ,67.6+-2.1	Gopalan et al.,1999 Sreenrama et al.,2012 Bravo et al.,1999 Sreerama et al.,2012 Sreerama et al.,2012
		1.Starch 35.1.17g/100gm	
		2.TSS 6.45%	
		3.Dietary fibre 16%,Soluble	
2.	Protein	22%, 24%, 0.5-2.5%	Gopalan et al.,1999 Venkatesha RT, 1999 Sreerama et al.,2012
3.	Fat	0.25%, 0.5-2.5%	Gopalan et al .,1999 Sreerama et al.,2010 Mishra H and Pathan S, 2011 Mishra H and Pathan S, 2011
		Saturated Fatty acids 28% (Palmitic-22%),(Myristic-0.35%)	
		Unsaturated Fatty acid Olieic-17% and Lanolenic acid-43%	
4.	Moisture	12%, 12%(Whole)	Gopalan et al.,1997 Sudha et al.,1995
5.	Vitamin	Thiamine (0.4mg/100g)	Bolbhat and Dhupal,2012
		Riboflavin(0.2mg/100gm)	
		Niacin(1.5mg/100g)	

2 Conclusion

Horse gram is a staple food and feed crop that has historically been farmed in dry areas of underdeveloped countries. Its potential as an appropriate substitute in the current era of climate change. It is a treasure trove of many medicinal, bioactive chemicals in addition to having good nutritional value.

Horse gram is a healthy food that needs to be included in your diet on a regular basis. Additionally, there are still many opportunities to learn more about this legume's chemo profile, pharmacology, biological assessment, toxicological effects, inherent health-promoting qualities, several unexplored phytochemicals, as well as the need to support and encourage it.

Horse gram is a significant pulse crop grown on the Indian subcontinent; as a result, only in India is the germplasm collected and systematically evaluated. Its local research facility. The NBPG Regional Station in Thrissur, Kerala, has been chosen as the primary location for collecting and analysing the horse gram germplasm that has been amassed in Indian gene banks.

Compliance with ethical standards

Acknowledgments

I acknowledge my sincere thanks to my guide Dr. Anshu Sharma for his great support and Bhupal Nobel University Udaipur, Rajasthan for providing me facility.

Disclosure of conflict of interest

The author of this review article does not have any conflict of interest.

References

- [1] Aiyer, Y.N.(1990). Horse gram, In: field crops of India, Bangalore Press , Bangalore.114-118pp.
- [2] Anderson, J.W. Smith, and N.J. Gustafson (1994). Health benefits and practical aspects of high fiber diets. *Am.J clin.Nutri.* 59:1244-1248.
- [3] Arora, K. and P.S. Chandel (1972). Botanical source areas of wild herbage Legumes in India. *Tropical Grasslands* 6: 214-222.
- [4] Begum, M.J., S. Pridarshini, and S.R. Hirmath (1977). Varietal difference in protein of horse gram (*Dolichos uniflorus* Linn) *Mysore J.Agric.Sci.* 11:521-525.
- [5] Blumenthal, M.J. and I.B. Staples (1993). Origin, evaluation and use of *Macrotyloma* as forage- A review. *Tropical Grasslands* 28:17-30.
- [6] Bravo, L., P. Siddhurafu, and F.C. Calixto (1990). Composition of underexploited Indian pulses: composition with common legumes. *food chemistry* 65:187-196.
- [7] Durga , K.K (2012). Variability and divergence in horse gram (*Dolichos uniflorus*). *J. Arid Land* 4 (1) : 72-77.
- [8] Ghani,A. (1998). Medicinal plant of Bangladesh: Chemical Constituents and uses. Asiatic Society of Bangladesh, Dhaka 460p.
- [9] Gupta , S.K., P.K.Sharma, and S.H. Ansri (2005). Antimicrobial activity of *Dolichos biflorus* seeds *Indian J.Nat.Prod.*22:21-22.
- [10] Hornick,S.B.(1992). Factors affecting the nutritional quality of crops. *American J. Alternative Agri.* 7(1-2):63-68.
- [11] Katiyar R.P.(1984).kulthi a promising crop for Himachal Hills. *Indian Farming*34(9):32-35.
- [12] Khader, V.and S.Venkat Rao (1986).Limiting amino acids in Horse Gram (*Dolichos biflorum*).*Indian J.Nutrition and Dietetics* 23 (6): 159-165.
- [13] Khaton, N.and J. Prakash (2004) . Nutritional quality of microwave –cooked and pressure cooked legumes. *Int. J Food Sci. Nut.*55(6) : 442-448.

- [14] Khogare .D.T.(2012). Effect of dietary fiber on blood lipid profile of selected respondent Int.Food Res. J. 19(1) : 297-299
- [15] Kumar , D.(2006). Horsegram research : An introduction. In: Kumar D(Ed.), Horsegram In India. 1- 10pp.
- [16] Kumar, N.S.and D.R. Gopal rao (1986).The nature of lectins from Dolichos lablab. J.Biosci.10(1): 95-109
- [17] Lackey, J.A. (1981). Phaseoleae In : Polhill, R.M. and Raven, P.H. (Eds) Advances in legume systematics (Part 1).301-327pp.
- [18] Liener,I.E.(1994). Implications of anti-nutritional components in soybean foods. Crit. Rev. Food Science. Nutritional 34:31-67.
- [19] Mishra , H. and S. Pathan (2011).Fatty acid composition of raw and roasted Kulthi seeds. Advance J.Food Science and Technology 39(6): 410-412.
- [20] Nene, Y.L.(2006). Indian pulses through the millennia. Asian Agri History 10(3) 179-202.
- [21] Philip, A., P.V. Athul, A. Charan, and T.P. Afeefa (2009). Anthelmintic activity of seeds *Macrotyloma uniflorum*. Hygeia1(1) : 26-27.
- [22] Prasad, S.K. and M.K. Singh (2014). Horsegram – An underutilized nutraceutical pulse crop: a review. J.of food Science and Technology.1-11.
- [23] Reddy, N.R., M.D. Pierson, S.K. Sathe, and D.K. Salunkhe (1985). Dry beans tannins; a review nutritional implications. J. American oil chemists Society 62:542-554.
- [24] Shah, N.C. (2014) Ethnobiological Lores from the kumaon culture of India. The Scitech J. 1(3):28- 36.
- [25] Singh, D.P. (1991), Horse gram. Genetics and breeding of pulse crops. 369-371pp.
- [26] Srilakshmi, B. (2003). Pulses: Food Science. New Age International Publisher.67-84pp.
- [27] Tuteja , U (2008). Indian’s pulses production : Stagnation and redressal.29p.
- [28] Verdcourt, B(1982). Arevision of *Macrotyloma* (Leguminosae). Hooker’s Icones Plantamm 38:1- 138.
- [29] Allen, O.N.& Allen, E.K. (1981). The Leguminosae. A source book of characteristics, uses and nodulation. Madison, WI: The university of Wisconsin Press.
- [30] Blumenthal.M.J. & Staples. I.B. (1993). Origin, Evaluation and uses of *Macrotyloma* as forage- a review. Tropical Grassland,27,16-29.