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A review of medicinal uses, phytochemistry and pharmacology of *Vigna mungo* (L.) Hepper

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Abstract
Vigna mungo (L.) Hepper belongs to the family Papilionaceae. It is an erect hairy annual plant with long twining branches. The flowers are small and yellow in color, while fruits are cylindrical. The pods are hairy containing 1-4 seeds per pod. Seeds are used as nervine tonic and in urinary reflex disorder. The phytochemical analysis revealed the presence of flavonoids, saponins, tannins, alkaloids, vitamin C and steroids. Seeds posses antidiabetic, antioxidant and hypolipidemic properties. The present review provides an updated information on its medicinal uses, phytochemistry and pharmacology.

Keywords: *Vigna mungo*, medicinal uses, phytochemistry, pharmacology

Introduction
Vigna mungo (L.) Hepper is a member of family Papilionaceae. It is an annual and important short duration pulse crop native to central Asia. It is staple crop in Central and South East Asia. However, it is extensively used only in India. It is summer pulse crop with short duration (90 –120) days and high nutritive value [1].

Vigna mungo seeds

Table 1: Name of *Vigna mungo* in different languages [2, 3]

Languages	Names
Arabic	Maash
Bengali	Mash kalai/ Mashkalair dal
English	Black gram, Urd bean, Urad bean, Black lentil, Black matpe bean, Mungo bean, Mash bean
French	Ambérique, Haricot urd
German	Urdbohne, Linsenbohne
Gujrati	Aalad
Hindi	Urd dal
Italian	Fagiolo indiano nero, Fagiolo mungo nero
Japanese	Ke tsuru azuki
Kannada	Uddina bele
Malayalam	Uzhunnu parippu
Marathi	Uddachi dal
Portuguese	Feijão-da-India, feijão-preto
Russian	Fasal mungo, Fasol' vidov
Spanish	Frijol mungo, Fréjol negro, Frijol negro, Lenteja negra, Urd
Tamil	Ulutham paruppu, Ulundo
Telugu	Minapa pappu
Thai	Thuaa dahm
Urdu	Urd daal

Table 2: Taxonomy [4, 5]

Kingdom	**Plantae**	**Sub tribe**	Phaseolinae
Family	Papilionaceae	Genus	*Vigna*
Subfamily	Faboideae	Species	*Mungo*
Tribe	Phaseolae	Synonyms	*Azukia mungo* (L.) Masam. *Phaseolus hernandezii* Savi *Phaseolus mungo* L. *Phaseolus roxburghii* Wight & Arn.
Plant	Erect, hairy annual herb up to 100 cm tall, sometimes twining, with a well-developed taproot.		
Leaves	Alternate, 3-foliolate.		
Inflorescence	Axillary false raceme.		
Flower	Peduncle up to 18 cm long, bisexual, papilionaceous, small.		
Fruit	A cylindrical pod 4–7 cm × 0.5 cm, erect or almost so, with long hairs and short hooked beak, 4–10-seeded.		
Seeds	Ellipsoid, up to 5 mm long, with square ends, and raised and concave hilum, usually black or mottled, sometimes green. Seedling with epigeal germination.		

Macroscopy of seed [6]

Hilum at (or almost at) the level of seed coat, Aril present, Funicle present, Aril massive, Narrow hilum with small tracheid bar, Macrosclereids 48.8 pirn in height.

Table 3: Nutritional value of seeds [3, 7]

Essential minerals	
Macro-minerals	
Calcium	1.0-4.3 g/kg
Magnesium	3.0 g/kg
Phosphorus	3.9-6.5 g/kg
Micro-minerals	
Copper	18 mg/kg
Iron	560 mg/kg
Zinc	99 mg/kg
Amino acid (g / 100 g)	
Arginine	6.7
Cysteine	0.6-1.5
Glycine	3.7
Histidine	2.1
Isoleucine	4.6
Leucine	7.2
Lysine	6.5-7.3
Methionine	1.1-1.4
Phenylalanine	5.9
Threonine	3.4
Tyrosine	1.7
Valine	5.1

Traditional medicinal uses

Vigna mungo seeds are traditionally used as food and leaves as vegetable. Seeds are used as nervine tonic for the treatment of male sterility problems and act as a good aphrodisiac agent. It is also used to treat urinary reflex disorder. Oil of seeds is used to treat neurological problems like hemiplegia, polio myelitis and rheumatological problems [8, 9].

Pharmacological activities

Different extracts of *Vigna mungo* have shown following pharmacological properties.

Part	**Extract**	**Pharmacological activity**
Seeds	Aqueous: methanol (80:20)	Antioxidant [10]
	Petroleum ether or alcohol	Immunostimulatory [11]
	Petroleum ether, ethanol/water	Immunomodulatory [12]
	Methanol, chloroform	Aphrodisiac [13]
	Petroleum ether or alcohol	Antihyperlipidemic [14]
	Petroleum ether, acetone	Antihyperlipidemic [15]
	Aqueous	Anticonvulsant [16]
	Hydroalcoholic	Anti-osteoarthritic [17]
	Methanol	Antidiabetic [18]
	Aqueous	Hepatoprotective and nephroprotective [19]
	Aqueous	Antifungal [20]
	-	Antiviral (HIV reverse transcriptase inhibition) [21]
Pulses	Tris-HCl	Enterokinase inhibition [22]
	Methanol	Antimicrobial [23]
	Cooked pulse	Antidiabetic [24]
Leaves	Petroleum ether	Hepatoprotective against CCl_4 toxicity [25]
	Methanol	Analgesic and anti-inflammatory, [26]
	Ethanol	Anti-oxidant and nootropic and [27]
	-	Diuretic [24]

Phytochemistry

Albumin, globulin, glutelin, prolamin, lectin [28, 29]
Alkaloid [13]
B-Sitosterol, stigmasterol, campesterol [10, 13]
Condensed tannins [10, 13]
Flavonoid [10, 13]
Glycoside [30]
Phenolic compounds [10, 13]
Saponin [13]

Conclusion

The traditional uses, phytochemistry and pharmacology of *V. mungo* presented in this review could be helpful for future studies and research. The plant has good future prospective for discovery of new molecules and pharmacological activities.

References

1. Singh G *et al*., Effect of Pb and Ni on root development and biomass production of black gram (*Vigna mungo* L.): overcoming through exogenous nitrogen application. International Journal of Agriculture and Crop Sciences. 2013; 5(13):1410-1417.
2. Porcher MH. Sorting Vigna names. In: Multilingual multiscript plant name database. http://www.plantnames.unimelb.edu.au/Sorting/Vigna.html#aconitifolia. 1995 [cited 2018 15th Jan].
3. Heuzé V, Tran G, Boval M. *Black gram* (*Vigna mungo*). Feedipedia, a programme by INRA, CIRAD, AFZ and FAO. https://www.feedipedia.org/node/236 last updated on March 30, 2016, 14:16.
4. U.S.D.A. Plant Database: *Vigna mungo* (L.) Hepper black gram. 2018 [cited 2018 January 29, 11:20EST]; Available from: https://plants.usda.gov/core/profile?symbol=VIMU7.
5. Jansen P, *Vigna mungo* (L.) Hepper, in PROTA 1: Cereals and pulses/Céréales et légumes secs. [CD-Rom]. M. Brink and G. Belay, Editors. 2006, PROTA: Wageningen, Netherlands.
6. Patel JD. Comparative seed coat anatomy of some Indian edible pulses. Phyton. 1976; 17:287-299.
7. Shaheen S *et al*., Comparative nutritional analysis between Vigna radiata and Vigna mungo of Pakistan. African Journal of Biotechnology. 2012; 11(25):6694-6702.
8. Varma R *et al*. Pharmacognostic evaluation and phytochemical analysis of seeds of *Vigna mungo* (L.) hepper. Open Res J Phytother Pharmacognosy. 2013; 1(1):01-09.
9. Rao TP *et al*. Review of herbs for Nervine tonic in traditional Siddha Medicine. Int. J Curr. Res. Chem. Pharm. Sci. 2017; 4(7):1-7.
10. Zia-Ul-Haq M *et al*., Compositional studies and biological activities of some mash bean (*Vigna mungo* (L.) Hepper) cultivars commonly consumed in Pakistan. Biological Research. 2014; 47(1):23p.
11. Solanki YB, Jain SM. Immunostimolatory activities of *Vigna mungo* L. extract in male Sprague–Dawley rats. Journal of Immunotoxicology. 2010; 7(3):213-218.
12. Dhumal J, Yele S, Ghodekar S. Evaluation of immunomodulatory activity of *Vigna mungo* (L) hepper. Journal of Pharmacy and Phytotherapeutics. 2013; 2:9-14.
13. Sajja R *et al*., Pharmocological evaluation of potential aphrodisiac activity of methanolic and chloroform extracts of *Vigna mungo* seeds in male *Albino rats*. International Journal of Pharmaceutical Sciences Review and Research. 2015; 33(1):8-12.
14. Solanki YB, Jain SM. Antihyperlipidemic activity of Clitoria ternatea and Vigna mungo in rats. Pharmaceutical Biology. 2010; 48(8):915-23.
15. Thomas M, Leelamma S, Kurup PA. Effect of blackgram fiber (*Phaseolus mungo*) on hepatic hydroxymethylglutaryl-CoA reductase activity, cholesterogenesis and cholesterol degradation in rats. Journal of Nutrition. 1983; 113(6):1104-1108.
16. Gohel MK, Sheth NR, Dudhrejiya AV. Anticonvulsant activity of extract from the seeds of *Vigna mungo* (L.) Hepper. Journal of Pharmacy Research. 2011; 4(6):1943-1945.
17. Patel DV, Sawant MG, Kaur G. Evaluation of anti-osteoarthritic activity of Vigna mungo in papain induced osteoarthritis model. Indian Journal of Pharmacology. 2015; 47(1):59-64.
18. Mou SJ *et al*., Antihyperglycemic studies with boiled and non-boiled Vigna mungo seeds. Journal of Applied Pharmaceutical Science. 2015; 5(12):135-137.
19. Nitin M, Ifthekar S, Mumtaz M. Evaluation of hepatoprotective and nephroprotective activity of aqueous extract of *Vigna mungo* (Linn.) Hepper on rifampicin-induced toxicity in albino rats. International Journal of Health & Allied Sciences. 2012; 1(2):85-91.
20. Ye X, Ng TB. A chitinase with antifungal activity from the mung bean. Protein Expression and Purification. 2005; 40(2):230-236.
21. Cheung AH, Wong JH, Ng TB. Trypsin-chymotrypsin inhibitors from Vigna mungo seeds. Protein and Peptide Letters. 2009; 16(3):277-284.
22. Bhat PG, Jacob RT, Pattabiraman T. Enzyme inhibitors from plants: Enterokinase inhibitors in tubers and seeds. Journal of Biosciences. 1981; 3(4):371-377.
23. Kingsley D *et al*. Extraction and screening of bioactive metabolites from *Vigna mungo* against various pathogens. International Journal of Pharmaceutical Sciences and Research. 2014; 5(2):428-431.
24. Soetan K Pharmacological and other beneficial effects of antinutritional factors in plants-A review. African Journal of Biotechnology. 2008; 7(25):4713-4721.
25. Anitha K *et al*., Protective effect of *Vigna mungo* (L.) against carbon tetrachloride induced hepatotoxicity. International Journal of Pharmacology Research. 2012; 2(1):29-34.
26. Usman M, Barhate S. Anti-inflammatory, analgesic and ulcerogenic activity of *Vigna mungo* Linn. leaves. International Journal of Phytopharmacy. 2011; 1(2):55-60.
27. Chinnala KM, Pinninti S, Elsani MM. Evaluation of nootropic activity of *Vigna mungo* Linn. On scopolamine induced cognitive dysfunction in mice. International Journal of Phytopharmacology. 2014; 5(3):190-197.
28. Soris P *et al.,* The biochemical composition and nutritional potential of three varieties of *Vigna mungo* (L.) Hepper. Advances in Bio Research. 2010; 1(2):6-16.
29. Suseelan K, Bhatia C, Mitra R. Purification and characterization of two major lectins from *Vigna mungo* (blackgram). Journal of Biosciences. 1997; 22:439p.
30. Varma R *et al*., Pharmacognostic evaluation and phytochemical analysis of seeds of *Vigna mungo* (L.) Hepper. Open Research Journal of Phytotherapy & Pharmacognosy. 2013; 1(1):01-09.