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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 possess 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	Urbohne, 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, Fasal' vidov
Spanish	Frijol mungo, Fréjol negro, Frijol negro, Lenteja negra, Urd
Tamil	Ulutham paruppu, Ulundo
Telugu	Minapa pappu
Thai	Thuua dahm
Urdu	Urd daal

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Table 2: Taxonomy [4, 5]

Kingdom	Plantae	Sub tribe	Phaseolinae
Family	Papilionaceae	Genus	<i>Vigna</i>
Subfamily	Faboideae	Species	<i>Mungo</i>
Tribe	Phaseolae	Synonyms	<i>Azuki mungo</i> (L.) Masam. <i>Phaseolus hernandezii</i> Savi <i>Phaseolus mungo</i> L. <i>Phaseolus roxburghii</i> 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 μ m 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 nerve 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]
Pulses	Aqueous	Antifungal [20]
	-	Antiviral (HIV reverse transcriptase inhibition) [21]
	Tris-HCl	Enterokinase inhibition [22]
	Methanol	Antimicrobial [23]
Leaves	Cooked pulse	Antidiabetic [24]
	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.

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