Medicinal Properties of Māsh (Vigna mungo (Linn.) Hepper) : A Comprehensive Review

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INTRODUCTION

Māsh bean (Vigna mungo (L.) Hepper) belongs to the family Papilionaceae. It is one of the important legume crops extensively cultivated in India and other parts of the world from ancient times 1. The name of the Vigna genus is derived from an Italian botanist of the 17th century Dominico vinga. It comprises around 150 species 2. Its name in most languages of India derives from Proto-Dravidian uṣṭungu, borrowed into Sanskrit as udīda 3. India is the largest producer and consumer of pulses. Apart from proteins, pulses are good sources of micronutrients and dietary fiber. Black gram is a high-value pulse that contains 25:38 g protein per 100 g. It is used in several Indian cuisines in its whole, fermented, and powdered form 4. Black gram is grown on soils inclined to be clayey and on black cotton soil, it is harvested before the pods are fully ripe, processed in the form of splits or dal 5. Its shelf life is 3 years 6. Black lentil is usually the whole urad bean, whereas the split bean (the interior being white) is called white lentil. Black gram is very nutritious. Three taxa are distinguished within Vigna mungo: var. mungo, var. viridis, and var. silvestris 7. The seeds are well-known due to their therapeutic and nutritional potential 8, 9. Besides, it also plays an important role in sustaining soil fertility by fixing atmospheric nitrogen 9.

Black gram stands fourth in production and acreage in Indian Agriculture 10. It is grown throughout India as a pulse crop 11 and cultivated as a component of various cropping systems that cover over four million hectares, principally in India, Myanmar, Pakistan, Bangladesh and Thailand 12. Most Black gram cultivars produce black-coloured seeds which are rich in proteins in addition to lysine and phosphoric acid 13.

TAXONOMY

Kingdom: Plantae
Scientific Name: Vigna mungo (Linn.) Hepper
Synonyms: Phaseolus radiates Roth. Phaseolus mungo Linn. Azukia mungo (L.) Masam. Phaseolus hernandezii Savi Phaseolus mungo L. Phaseolus roxburghii Wight & Arn. In different languages, it is known by different names presented in Table No. 1
Family: Fabaceae 3, 8, 19 (Leguminosae) 16, 20 Papilionaceae (Leguminosae - Papilionoideae, Fabaceae) 7, 8, 14
Genus: Vigna
Species: V. mungo

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MATERIAL AND METHODS

Pubmed, Medline, and Google Scholar databases were searched for the published articles with mash, Vigna mungo, black gram, Ulad, flavonoids, isoflavonoids, etc. Relevant clinical trials and review articles published in peer-reviewed journals were included in this review article. Unāni literature was extracted from the classical Unāni textbooks like Al-Qanoon Fit-Tibb (English Translation), Muhit-i-Azam, Makhzan-ul-Mufradat, Khazain-Ul-Advia, Al-Jami ul mufradat al-adwiyah wa al-aghadhiya, Kitab al-Miah fit-Tibb, Qarabadin-i-Sarkari, Kitab-ul-Umda fil-Jarahat, etc.

Table 1: Name of Vigna mungo in different languages

<table>
<thead>
<tr>
<th>S. No</th>
<th>Language</th>
<th>Name</th>
<th>S. No</th>
<th>Language</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Arabic</td>
<td>Mash</td>
<td>2.</td>
<td>Kannada</td>
<td>Uddu</td>
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<tr>
<td>5.</td>
<td>Hindi</td>
<td>Urad</td>
<td>6.</td>
<td>Tamil</td>
<td>Ulundu, Ulunthu</td>
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<tr>
<td>9.</td>
<td>Gujarati</td>
<td>Adad, Arad</td>
<td>10.</td>
<td>Sanskrit</td>
<td>Masah</td>
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<tr>
<td>11.</td>
<td>Persian</td>
<td>Bano Mash</td>
<td>12.</td>
<td>Urdu</td>
<td>Urad</td>
</tr>
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</table>

PARTS USED

Roots, seeds, fruit 18,24,26

MIZĀJ (TEMPERAMENT):

Moderately moist and dry 27.
Cold and dry in the first degree 6,22,23,28,29.
Cold in the first degree 30.
Cold in the second degree, moderately moist and dry 31.
Hot and moist 21.

BOTANICAL DESCRIPTION

An erect, hairy annual plant, height varying from 30-90 cm with long twinning branches, leaves trifoliate, leaflets ovate 5-10 cm long, small flowers with elongating peduncles, cylindrical fruit pods, hairy with a short-hooked beak, seeds usually 4 but maybe 1 in a pod, generally black with white hilum protruding from the seeds. It has a taproot that branches to form branched roots. It is sweet to taste and hot in potency 5,18. The ellipsoid, usually black seed is up to 5mm long with square ends and raised and concave hilum, usually black or mottled 7. Sometimes the plant adopts a twining habit 17,25. Flowers are bisexual, papilionaceous, small; bracteoles linear to lanceolate, exceeding the calyx. Flowers are yellow and in dense clusters 14,17.

GEOGRAPHICAL DISTRIBUTION (HABITAT)

Black gram is grown mainly in Central and Southeast Asia. It is widely distributed in tropical West Africa and extensively cultivated all over India 5,7,14,16,18,25. The Guntur District ranks first in Andhra Pradesh for the production of black gram in India 3.

PROPAGATION

By seeds 7,17,25
AFĀL (APPLICATIONS)

Roots are narcotic and are reported to be used by the Santals as a remedy for aching bones 5. Seeds are sweet, emollient, diuretic, nutritious, thermogenic, tonic, galactagogue, laxative, aphrodisiac, styptic, appetite, and nerve tonic 1,8,14,18,19,20. When used externally it acts as Ṭahḥīl-i-Awram (dissolvent), ḽāli (corrosive), Musakkin-i-ʻAlam (analogic) 21 and Mulayyan (laxative) 30. The plant leaves may possess anti-inflammatory, analgesic, and ulcerogenic properties among others 16. In traditional medicine, the seed is used for its suppurative, cooling and astringent properties 25.

isti’mālāt (THE THERAPEUTIC USES)

Used in rheumatism, paralysis, aching bones, affections of the nervous system, and diseases of the liver 1,2,5,11,14,16,32. It is medicinally used both internally and externally, internally used in the form of decoction in dyspepsia, strangury, constipation, hepatothropy, neuropathy, and agalactia, 21,16,19 externally as a poultice, also in gastritis, dysentery, and rheumatism 1. Used as plaster in case of organic pain, also applied on muscular contusions and rupture 27,33. It is used as foment in painful conditions 21,22. It also removes viscous phlegm and abnormal bile and produces good humour and moderate heat in the body 6,23. Pure black gram cake known as idli is used as a night diet for diabetics 1. In traditional medicine, it is ground into a powder, moistened, and applied as a poultice on abscesses. The seed flour is rich in saponins and can be used as a soap substitute. The plant can fix atmospheric nitrogen hence it is grown in some areas as green manure 7,17,25.

MUḌIRRĀT (SIDE EFFECTS)


MUSHILĀT (CORRECTIVES)

Black pepper (Piper nigrum), sugar 21, Cumin (Cuminum cyminum), cloves (Syzygium aromaticum), cinnamon and ginger (Zingiber officinale) 6,22.

BADAL (SUBSTITUTE)

Bread bean (Bakla) (Vicia faba L.) 6,22.

MIQDĀR-I-KHŪRĀK (DOSE)

10 g 23. Used in the form of decoction, powder, paste, etc 19, 3 g for a massage with some oil 22.

COMPOUND DRUG

Majoon Supari Paak 24

CHEMICAL CONSTITUENTS

Various bioactive components reported in Vigna mungo were found and it includes flavonoids, isoflavonoids, phytoestrogens, phenolic acids, enzymes, fibers, starches, trypsin inhibitors, phytic acid, lectins, saponins, tocopherols. Black gram seeds contain about 25% protein and 65% carbohydrates 15,20. Allantoin, glutathione, plant growth regulators, and lignin precursors are present in seeds 1. Contains genistein, kievitone, dalbergiogen, isoferreirin, eureno, glycinol, hydrate, arbutin 11,19,19,34. Glycosides, tannins, alkaloids, terpenoids, quinone, sterols. All plant parts (seeds, leaves, stems, and roots) possess trypsin inhibitors. Black gram flour contains mucilage that can sustain the release of the freely soluble drug 2,14,16.

DISCUSSION

Several clinical facts suggest that plant-derived foods hold various potential health benefits, well known as nutraceuticals. These are the products that are used as food or as a part of food, able to cure and prevent diseases in addition to their basic nutritional value. Worldwide, about 70% of plant-based preparations are used as traditional medicines. For underdeveloped and developing countries, it is a need to provide safe, efficient, and cheap medications. In various parts of India, medicinal plants are widely distributed and always have increasing demand due to their medicinal properties 2. Black gram (Vigna mungo) is rich in bioactive components. Most of the reported components are from the seed part of the black gram. Various processes like cooking, soaking, and germination affect bioactive components. Studies have shown the presence of bioactive compounds in other parts of the plant like leaves, pods, roots, stems etc. which are normally considered as a waste product. Hence there is a need to isolate and characterize novel bioactive components from other parts of the black gram plant 1.

Patel et al., (2015) reported that Vigna mungo hydroalcoholic extract (VMHA) improved arthritic condition significantly by reducing pain and inflammation. Improvement in pain behavior could result from the inhibition of prostaglandins by flavonoids present in VMHA and/or maybe through central pathways of analgesia 32. Usman and Barhate, (2011) suggested that leaves of Vigna mungo L possess anti-inflammatory, analgesic, and ulcerogenic activities mediated through sequential inhibition of the enzymes responsible for prostaglandin synthesis from arachidonic acid 16. Ahmed et al., (2015) reported that methanolic extract of boiled Vigna mungo seeds is effective in alleviating pain 35. Ali et al., (2014) reported anti-inflammatory and antinociceptive activities of untreated, germinated, and fermented mung bean aqueous extract 36. Vigna mungo has been reported pharmacologically to possess anti-inflammatory activity 32. Anti-inflammatory activity is due to ethanol extracts mainly polyphenols 16. The seeds of nearly all species of Vigna have antioxidant properties and are used to treat different diseases like rheumatism, liver diseases, etc. 2. The proteins, polypeptides, polysaccharides, and polyphenols from the seeds, sprouts, and hulls of mung beans all show potential antioxidant activity 8,14,35. Vigna mungo has been shown to possess antimicrobial activities 14.

CONCLUSION

Nowadays several traditional medicines are in the international market but the genus Vigna with around 150 species, has received little attention. Therefore, it is required to find out the medicinal importance of individual parts of the plant, to manage, prevent and cure diseases. In this review, it is concluded that Mash is a rich source of nutrients and extract of seeds possess anti-inflammatory, analgesic, and antioxidant activity and able to manage and cure different diseases. To fulfill the demand for efficient, safe, and cheap medications, there is a need to understand the pharmacological activities. These results suggest that mash...
bean seed may be used in the food industry as functional food and nutraceutical as well as in the cosmetic and pharmaceutical industries.

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**CONFLICT OF INTEREST**

The authors report no conflict of interest.

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**REFERENCES**


