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. Pulses and legumes have been gaining interest because they are an excellent source of bioactive compounds. The objective of this present review is to compile all relevant information regarding the medicinal uses of Vigna mungo. It is rich in flavonoids, isoflavonoids, phytosterogens, phenolic acids, enzymes, fibers, starches, tryptophan inhibitors, phytic acid, lectins, saponins, tocopherols, fatty acids, and proteins. 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. This review demonstrates that Vigna mungo is rich in bioactive components and able to cure and prevent diseases in addition to its basic nutritional value.

Keywords: Māsh, Vigna mungo, black gram, bioactive components, legumes

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

TAXONOMY

Kingdom: Plantae

Scientific Name: Vigna mungo (Linn.) Hepper

Synonyms: Phaseolus radiates Roxb. 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

Genus: Vigna

Species: V. mungo
Figure 1: Māsh (Vigna mungo): Plant and its seed

MATERIAL AND METHODS
Pubmed, Medline, and Google Scholar databases were searched for the published articles with māsh, Vigna mungo, black gram, Īrad, 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-Ṭibb (English Translation), Muḥīt-i Azam, Maḥkhan-ul-Mufradat, Khazain-ul-Advā, Al-Jami ul Mufradat al-adwiya wa al-aghāḥiyya, Kitab al-Mıḥāt fit-Ṭibb, Qarabadin-i-Sarkar, Kitab-ul-Umda fil-Jarahat, etc.

Table 1: Name of Vigna mungo in different languages

| S. No | Language | Name   | S. No | Language | Name   |
|-------|----------|--------|-------|----------|--------|
| 1     | Arabic   | Māsh   | 2     | Kannada  | Uddu   |
| 3     | English  | Black gram | 4     | Marathi  | Uḍīd, Maga |
| 5     | Hindi    | Īrad   | 6     | Tamil    | Ulundu, Ulunthu |
| 7     | Bengali  | Mash-kalai | 8     | Malayalam | Uzhunnu, Ulunnu |
| 9     | Gujarati | Adad, Ārad | 10    | Sanskrit | Masah   |
| 11    | Persian  | Bano Māsh | 12    | Urdu     | Urad    |
| 13    | Sanskrit | Masa   | 14    | Telgu    | Minumulu, karuminimulu, nallaminimulu, Uddulu |

PARTS USED
Roots, seeds, fruit

MIZĀJ (TEMPERAMENT):
Moderately moist and dry. Cold and dry in the first degree. Cold in the first degree. Cold in the second degree, moderately moist and dry. Hot and moist.

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. The ellipsoid, usually black seed is up to 5mm long with square ends and raised and concave hilum, usually black or mottled. Sometimes the plant adopts a twining habit. Flowers are bisexual, papilionaceous, small; bracteoles linear to lanceolate, exceeding the calyx. Flowers are yellow and in dense clusters.

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. The Guntur District ranks first in Andhra Pradesh for the production of black gram in India.

PROPAGATION
By seeds.
**AFĀL (ACTIONS)**

Roots are narcotic and are reported to be used by the Santals as a remedy for aching bones. Seeds are sweet, emollient, diuretic, nutritious, thermogenic, tonic, galactagogue, laxative, aphrodisiac, styptic, appetizer, and nerve tonic. When used externally it acts as Taḥlīl-i-Awrām (dissolvent), Jālī (corrosive), Musakkin-i- Alam (analgesic), and Maluyyin (laxative). The plant leaves may possess anti-inflammatory, analgesic, and ulcerogenic properties among others. In traditional medicine, the seed is used for its suppurative, cooling, and astringent properties.

**ISTI’MĀLĪT (THERAPEUTIC USES)**

Used in rheumatism, paralysis, aching bones, affections of the nervous system, and diseases of the liver. It is medicinally used both internally and externally, internally used in the form of decoction in dyspepsia, strangury, constipation, hepato-athyropathy, neuropathy, and agalactia, externally as a poultice, also in gastritis, dysentery, and rheumatism. Used as plaster in case of organic pain, also relied on muscular contusions and rupture. It is used as foment in painful conditions. It also removes viscous phlegm and abnormal bile and produces good humour and moderate heat in the body. Pure black gram cake known as idli is used as a night diet for diabetics. 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.

**MUḌIRRĀT (SIDE EFFECTS)**

Flatulence. People with cold temperament.

**MUSHILĀT (CORRECTIVES)**

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

**BADAL (SUBSTITUTE)**

Bread bean (Bakla) (Vicia faba L.).

**MIQḌĀR-I-KHŪRĀK (DOSEAGE)**

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

**COMPOUND DRUG**

Majoon Supari Paak.

**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. Allantoins, glutathione, plant growth regulators, and lignin precursors are present in seeds. Contains genistein, kievitone, dalbergiogin, isofefererin, eureno, glycinos, hydrate, arbutin. 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.

**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. 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.

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.

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. Ahmed et al., (2015) reported that methanolic extract of boiled Vigna mungo seeds is effective in alleviating pain. Ali et al., (2014) reported anti-inflammatory and antinociceptive activities of untreated, germinated, and fermented mung bean aqueous extract. Vigna mungo has been reported pharmacologically to possess anti-inflammatory activity. Anti-inflammatory activity is due to ethanol extracts mainly polyphenols. The seeds of nearly all species of Vigna have antioxidant properties and are used to treat different diseases like rheumatism, liver diseases, etc. The proteins, polypeptides, polysaccharides, and polyphenols from the seeds, sprouts, and hulls of mung beans all show potential antioxidant activity. Vigna mungo has been shown to possess antimicrobial activities.

**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 Māsh 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 taxonomic characters of various medicinal plants. Further experimental methods are required to investigate the possible mechanism of action by which these chemical constituents show their action. 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 prospects for the discovery of new molecules and 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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