



Review Article

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NUTRITIONAL AND THERAPEUTIC USES OF MUDGA [*VIGNA RADIATA* (L.) R. WILCZEK]: A POTENTIAL INTERVENTIONAL DIETARY COMPONENT

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ABSTRACT

Mudga or green gram is one of the most commonly used components of Indian cuisine. A majority of the Ayurvedic lexicons opine that it is the best among all pulses and advocate its use in everyday diet. Excerpts from Ayurveda and recent research based studies showcase it as a potential interventional diet in Cardio vascular and lifestyle disorders. This review throws light on some of the important aspects of Mung bean as an effective lifestyle intervention in a wide spectrum of disorders. References from various Samhitas and Nighantus of Ayurveda were collected systematically with respect to Mudga, its properties and actions. Evidence based research studies were also reviewed in this regard and are compiled in this article.

Keywords: Cardio vascular diseases, Lifestyle disorders, Green gram / Mung bean, Ayurveda, Vichitra pratyarabdha dravya.

INTRODUCTION

In recent years, there is a sharp rise in the incidence of a variety of lifestyle disorders. Certain conditions such as cardio vascular diseases, diabetes mellitus etc are threatening lives and have turned out to be major causes of death. Prevention of occurrence of such diseases has been a major global concern. Green gram, a principle pulse used as a daily food article, exhibits a potential to act against this. In this regard, Ayurveda recommends its use in daily diet and modern research also directs towards the same recommendation.

Mudga- An Ayurvedic Perspective

The word Mudga in Sanskrit means “that which brings joy, delight and gladness”.¹ All the pulses are known to produce flatulence with an exception of Mudga. This property makes Mudga complementary to health. There are evidences to show that Mudga was used as a measurement parameter in Ayurvedic practice. It has been used to explain the size of a mass of haemorrhoids². It has been also referred to, in determining the outlet lumen of an enema nozzle for children³ (used in basti or enema therapy) or a horn used in bloodletting therapy⁴. Further Mudga has been used as a reference to describe the shapes of lesions of certain skin diseases [for e.g., Ajagallika⁵ (Diaper dermatitis), Upadamsha⁶ (Chancroid) and Masurika⁷ (Measles)]. These evidences show the familiarity of Mudga to people at large. In Ayurveda, the pharmacokinetics and pharmacodynamics of a drug are explained in terms of certain attributes viz., Rasa (Taste of the drug), Guna (Properties and effect it has on the

body following consumption), Veerya (Potency of the drug, whether it has a catabolic or anabolic effect on the body), Vipaka (Post digestive effect on metabolism). Based on the above, the probable action of the drug can be understood in terms of its effect on the Doshas (Bio-forces governing the body whose balance and imbalance determines health and ill health). The pharmacodynamics of mung in Ayurveda has been explained to be that as Madhura⁸ (Sweet) and Kashaya⁸ (astringent) in taste, Laghu⁸ (light for digestion), ruksha (Dry), sheetaveerya⁸ (cold in potency), katu vipaka⁸ (post digestive transformation into pungency) and it exhibits Kaphapittahara Vatakaratva⁸ (pacifies kapha and pitta whereas aggravates Vata). It is known to be drushtiprasadaka⁹ (improves quality of vision). Different varieties of Mudga as Shyama (Black), Harita (Green), Peeta (Yellow), Shwetha (White) and Rakta (Red)⁹ based on the seed colour are mentioned by the nighantus wherein the green variety is considered to be the best one (Figure 1). Mudga has potential therapeutic (Table 1), dietary and promotive uses. Mudga has been prescribed as a pathya ahara (favourable interventional diet) in a broad spectrum of disorders like Agnimandya (Loss of appetite), Arochaka (Anorexia), Amlapitta (Hyperacidity), Atisara (Diarrhoea), Pravahika (dysentery), Grahani (Irritable bowel syndrome, Tropical sprue), Chardi (Emesis), Kamala (Jaundice), Sthoulya (Obesity and Dyslipidemia), Prameha (Urinary diseases and Diabetes), Pratishyaya (Rhinitis), Shvasa (Dyspnoea), Kasa (Cough), Rajayakshma (Pthisis), Kushta (Skin diseases), Sheetapitta (Urticaria), Shotha (Inflammatory conditions),

Vidradhi (Abscess), Arsha (Haemorrhoids), Bhagandara (Fistula-in-ano), Ashmari (Calculus), Bhagna (Fracture), Galaganda (Diseases of Thyroid), Arbuda (Malignancies), Hrudroga (Cardiac disorders), Pandu (Anaemia), Madatyaya (Alcohol related diseases), Udara (Ascites), Murcha (Altered consciousness), Apasmara (Convulsions) Unmada (psychiatric disorders), and Pradara (Menstrual disturbances). Mudga is told to be apathya (Unfavourable) in some conditions like Navajvara (Acute fever), shula (Gastric and duodenal ulceration), Vatavyadhis (A group of diseases caused due to aggravated Vata dosha or nervous disorders) viz., Pakshaghata (Hemiplegia), Ardita (Facial palsy), Manyasthambha (Cervical spondylitis), Katishula (Lumbar spondylitis, Intervertebral disc prolapse etc), Apabahuka (Frozen shoulder), Grudhrasi (Sciatica) and Sandhigatavata (Osteo arthritis).¹⁰⁻¹² A cursory glance through the above list provides an overview that Mudga could be a potential dietary intervention in a number of lifestyle and life threatening diseases such as Cardiovascular diseases, Diabetes mellitus, Obesity, Dyslipidemia and Malignancies etc.



Figure 1: Mung beans (*Vigna radiata*)

Botanical Illustration of Mung Bean

The mungbean (*Vigna radiata*) is a member of the legume family Fabaceae and commonly called as green gram (Figure 1). Mungbean originated in the plains of Peninsular India with its botanical origin, area of maximum genetic diversity and location of domestication being South India.¹³ Mung bean is an annual, deep rooted herb, 25-100 cm tall with trifoliate leaves and short fine brownish hairs on the stem branches. Planted in early June, the crop begins to flower in 50 to 60 days which continues for few weeks and is ready to be harvested in early to mid-September. The matured pods are glabrous and consist of 8-20 globose seeds per pod.¹⁴ Green gram is cultivated in several countries of Asia, Africa and the America. It grows best at an altitude of 0-1600 m above sea level and under warm climatic conditions (28-30°C). They are well adapted to red sandy loam soils and are drought tolerant giving reasonable yields with as little as 650 mm of yearly rainfall. Heavy rainfall results in increased vegetative growth with reduced pod setting and development.¹⁵ The most important part of mungbean is the seed used in several food products, both as whole seed and in processed form. Like most legumes they are relatively high in proteins, around 25 % of the seed weight. The principal domestic use of mungbean is the

production of bean sprouts which is seen commonly in Asian cooking and is used for dhals and soups.¹⁶

Nutritional Facts of Mung

Green gram is known for its high nutritional value. 100 g of it produces 334 Kcal of energy.¹⁷ It is rich in carbohydrates (56.7 g/100 g) and is a very good source for minerals like Potassium (843 mg/100 g), Magnesium (127 mg/100 g), Calcium (124 mg/100 g), Phosphorus (326 mg/100 g) and Iron (4.4 mg/100 g). Vitamins like Carotene, Thiamine, Niacin, Riboflavin, Ascorbic acid and Folic acid are also present in Mung. It is considered one of the best sources for proteins and constitutes a number of essential amino acids such as Arginine, Histidine, Lysine, Tryptophan, Phenylalanine, Leucine, Isoleucine, Tyrosine, Valine, Threonine, Cystine and Methionine. Mung, hence is considered to be a substantive source of dietary proteins and carbohydrates. Mungbean provides significant amounts of dietary iron to plant based diets in developing countries where Mungbean is consumed.¹⁸ Certain chemical components such as flavanoids (Flavones, isoflavones and isoflavonoids), phenolic acids (Gallic acid, Vanillic acid, Caffeic acid, Cinnamic acid, protocatechuic acid, Shikimic acid, *p*- hydroxybenzoic acid etc), and organic acids isolated from Mung in recent years, supports its health promoting action as mentioned in the classics.

Mode of Action of Mudga as per Ayurveda (Pharmacological Effects)

Mudga is known to possess a unique property in initiating physiological effects in the human body. It belongs to the category of substances possessing a distinctive property known as "Vichitra pratyarabdha". In Sanskrit this term means "a unity of paradoxes". A drug or a substance is known to act at various levels based on its attributes for example milk is a substance with sweet taste known as madhura rasa, possessing guru guna (taking a long time to digest), sheeta veerya (consuming energy while digestion), Madhura vipaka (Post digestive effect being anabolic) and brumhana (bulk promoting or nourishing). But Mudga being a Madhura rasa drug possesses Laghu guna (Takes lesser time for digestion) Katu vipaka (Catabolic post digestive effect) yet is bulk promoting. These paradoxes make Mudga a drug with multifaceted action. Mudga has been known to be an efficient tissue builder and nourisher. It has been described as the most compatible food substance and this property is an attribute of madhura rasa.¹⁹ The Kashaya rasa (astringent) is useful in wound healing and a very good absorbent (especially to dry up impaired doshas in diseased states).²⁰ The laghu guna (which gets digested easily in less time) of Mudga makes it a good dietary candidate. The vishada guna⁸ of Mudga makes it a good clearing agent (especially in clearing the obstruction to digestive and metabolic pathways). Further, the sheeta veerya (Cold potency) of Mudga makes it vivifying, nourishing, strength promoting and body growth promoting.⁸ Thus these properties elaborate the health promoting action of Mudga and also justify its usage as a supportive diet in various diseased conditions. Mudga is known to possess the Rasayana property (antioxidant, anti ageing and prolonging life).

This property makes it a highly beneficial candidate for daily diet in the present scenario wherein numerous lifestyle disorders are affecting people worldwide. Cardiovascular diseases and allied conditions (causal and risk factors) like Diabetes mellitus, Obesity, Dyslipidemia are leading threats to mankind globally. Dietary supplementation both preventive and supportive can help in combating these and usage of Green gram as staple will account for a valuable step. Mungbeans have been tested for several pharmacological activities worldwide. Cao *et.al.*, have studied the antioxidant effect of Mungbean extracts *in-vivo* wherein vitexin and isovitexin were found to be the major antioxidant components in mungbean.²¹ The Mungbean extracts were also found to have a potent scavenging activity against pro-oxidant species, including reactive oxygen species and reactive nitrogen species as well as an inhibitory effect on low-density lipoprotein oxidation.²² The administration of compound Vitexin isolated from Mungbean produced a significantly protective effect in peripheral blood cells and in lymphocyte blast-transformation function in Breast cancer patients undergoing radiotherapy with Co-60 thus establishing the radioprotective, antioxidant and detoxifying effects of Mungbean.²³ Regular consumption of Mungbeans can regulate flora of enterobacteria,

decrease absorption of toxic substances, reduce risk of hypercholestraemia and coronary heart disease, and prevent cancer.²⁴ Mungbean protein isolates improved the plasma lipid profile by normalizing insulin sensitivity and significantly reduced plasma triglyceride level.²⁵ Mungbean (*Vigna radiata*) has been traditionally used in China both as nutritional food and herbal medicine against a number of inflammatory conditions since the 1050s. This when experimentally tested showed that Mungbean extract is protective against lethal sepsis by stimulating autophagic HMGB1 degradation.²⁶ In the anti-glycation assays, vitexin and isovitexin showed significant inhibitory activities against the formation of Advanced Glycation end products induced by glucose or methylglyoxal with efficacies of over 85 %.²⁷ It was found that the Mung extracts lowered blood glucose, plasma C-peptide, glucagon, total cholesterol, triglyceride, and BUN levels and at the same time markedly improved glucose tolerance and increased insulin immunoreactive levels suggesting a potent antidiabetic effect.²⁸ The above mentioned researches establish the potential of Mungbean in preventing the occurrence of certain chronic and life threatening disease conditions on daily consumption and also as a therapy in several diseased conditions.

Table 1: Different Forms of Medicament Prepared from Mudga

S. No.	Form	Indication	Reference
1	Yusha (Soup) ²⁹	Jvara (Fever), Udara (Ascites), Kasa (Cough)	CS. Chi. 25/79
2	Hima (Cold infusion) ^{30,31}	Raktapitta (Bleeding disorder) Trushna (Polydipsia), Chardi (Emesis)	CS. Chi. 4/79 CS. Chi. 20/31
3	Mudgmalaka prayoga ³²	Prameha (Urinary disorders and Diabetes), Kushta (Skin diseases)	CS. Chi. 6/48
4	Kvatha (Decoction) ³³	Visarpa (Erysipelas)	CS. Chi. 21/60
5	Ghruta (Ghee preparation) ³⁴	Dantaroga (Diseases of teeth)	AH. Ut. 2/41
6	Lehya (Semisolid preparation) ³⁵	Chardi (Emesis)	SS. Ut. 49/33
7	Varti ³⁶	Apasmara (Convulsions)	CS. Chi. 6/49
8	Pishti(paste) as Anjana (Collyrium) ³⁷	Avrana shukla (Corneal opacity)	AH. Ut. 11/46
9	Payasa lepa (External application of the paste) ^{38,39}	Vrana (Ulcers) Vataja vatarakta (Gouty arthritis with predominance of Vata)	CS. Chi. 25/112 CS. Chi. 29/135
10	Upanaha (poultice) ²⁹	Daha shula yukta vrana (inflammatory swellings)	CS. Chi. 25/79
11	Pradeha (External application of the paste) ⁴⁰	Visarpa (Erysipelas)	CS. Chi. 21/79

CONCLUSION

Mudga or *V. radiata*, one of the most commonly used components of Indian cuisine, is mentioned as the best among Shimbidhanyas (legumes) in Ayurveda. It is mentioned in both treatment and dietary aspects of life threatening conditions like cardiovascular diseases. Some of the researches of recent years have provided evidence on the validity and authenticity of the classical view points about Mudga. Hence Mudga can be considered a potential interventional diet in lifestyle disorders. Further research is necessary for better understanding about Mudga so as to throw more light on its pharmacological efficacy.

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