

Pharmacognostical and Physicochemical Evaluation of *Mudga* (*Phaseolus radiates* Linn.)

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Abstract

Phaseolus radiates is commonly known as Green gram (*Mudga*) belonging to family Fabaceae. *Mudga* (*Phaseolus radiates linn*) is described in Ayurveda under the classification of *Shami Dhanya* (Pulses). *Mudga* is considered best in the form of soup among all pulses. It is *Kashaya* (astringent) and *Madhura* (sweet) in taste, *Katu* (pungent) in *Vipaka*, *Ruksha* (ununctuous), *Sheeta* (cold), *Laghu* (light) and *Vishada* in properties. It alleviates the vitiated *Khapha* and *Pitta*. *Mudga* is one of the most cherished foods in the ancient holistic medicine practice. It is indicated for many diseases such as *Agnimandya*, *Jwara* (Fever), *Prameha* (Diabetes Mellitus), *Sthaulya* (obesity), *Gulma*, *Kasa* (Coughing), *Atisara* (Diarrhea) and *Chhardi* (Vomiting) etc. Hence, *Mudga* in the form of *Yusha* (soup) is selected for the management of *Agnimandya*. The present study was aimed at setting up a standard profile of *Mudga* through the Pharmacognostical and pharmaceutical analysis as per standard protocol. The observations were systematically recorded. Organoleptic features of coarse powder were harmonized with API. The pH value was 4, water soluble extract 13.9% w/w, methanol soluble extract 5.96%, ash value 3.7% and loss on drying 6.35%. HPTLC was carried out after organizing appropriate solvent system in which maximum 6 spots were distinguished at 254 nm and 1 spots at 366 nm.

Keywords

Agnimandya, HPTLC, *Mudga*, Pharmacognosy, Physico-chemical analysis



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INTRODUCTION

Food has been a basic part of our life. Through the centuries we have attained wealth of information about the use of food to ensure growth of children and youth, to maintain good health through life and to use it to recover from disease. Certain foods are very important for maintain good health, while others are harmful.

One of the beneficial food is Green Gram, also known as *Mung* (*Phaseolus radiates*) and is native to the Indian subcontinent. Apart from India it is also cultivated in China, Thailand, Indonesia, Burma, Bangladesh, Laos, Cambodia and also in hot and dry regions of Southern Europe and the Southern United States¹.

Suitable climate for cultivation of Green Gram should be warm humid and within temperature range of 25°C to 35°C, with moderate rains of 80-100cm, well distributed during growing period of 100days. In North India, it is cultivated during warm and wet season and in South India in mild winter season. It is cultivated on a variety of soils, from red laterite soils in South India to black cotton soils in North India and sandy soils in Rajasthan. To cultivate Green Gram a well-drained loamy to sandy loam soil is the best, while saline

and alkaline soil or water logged soils are not at all suitable for cultivation¹.

In the present study *Mudga* (*Phaseolus radiates linn.*) was purchased from Market and the sample was analyzed pharmacognostically and physico-chemically. Whole cooked *Mung* beans are generally prepared from dried beans by boiling until they are soft. *Mung* beans are light yellow in colour when their skins are removed². *Mung* bean paste can be made by dehulling, cooking, and pulverizing the beans to a dry paste. Although whole *Mung* beans are also occasionally used in Indian cuisine, beans without skins are more commonly used; but in Kerala, whole *Mung* beans are commonly boiled to make a dry preparation often served with rice gruel. Dehulled *Mung* beans can also be used in a similar fashion as whole beans for the purpose of making sweet soups. *Mung* beans in some regional cuisines of India are stripped of their outer coats to make *Mung dal*³.

Agnimandya is a condition in which activity of the *Pachakagni* (low digestive power) hampers, resulting in delayed or partial digestion or indigestion of food taken even in small quantity at proper intervals.

MATERIALS AND METHODS

The grains of *Phaseolus radiates* Linn. were collected from grain market, Jamnagar in the month of June and were authenticated in Pharmacognosy department, IPGT & RA, Gujarat Ayurved University Jamnagar. The grains were air-dried and were pulverized in a mechanical grinder to fine powder.

Parts used: Dried grain

Pharmacognostical evaluation:

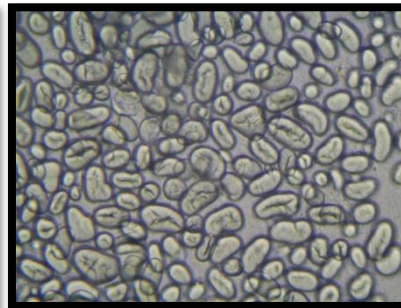
Raw drug i.e., *Mudga* (*Phaseolus radiates* Linn.) was identified and authenticated by

Plate 1 Microphotographs-Mudga powder

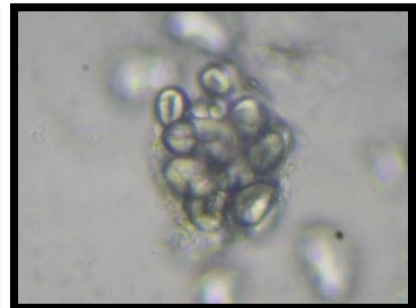
the Pharmacognosy department, I.P.G.T. & R.A., Gujarat Ayurved University, Jamnagar. The study was done by Powder Microscopy of *Mudga*. The identification was carried out based on morphological features, organoleptic characters and powder microscopy of the drugs as mentioned in API⁴. Microphotographs were taken by using Carl-Zeiss Trinocular microscope (Plate-1)⁵.



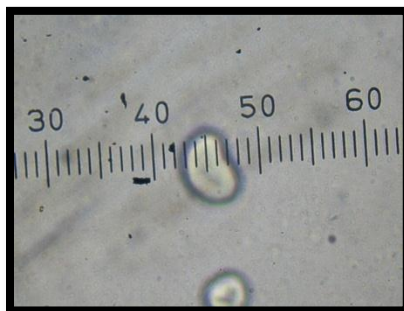
Simple-Compound Starch grain



Simple Starch grain



Starch grains in group



Simple Starch grain-Measures about 0.4mm



Simple Starch grain-Measures about 0.6mm



Compound starch grain Measures about 0.8mm



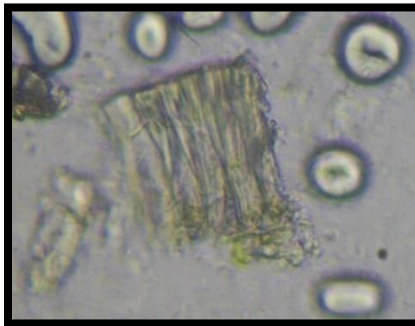
Compound starch grain
Measures about 0.7mm



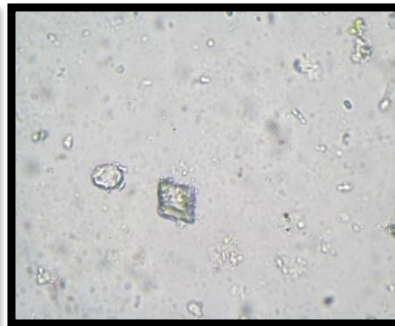
Parenchyma cells with starch
grain



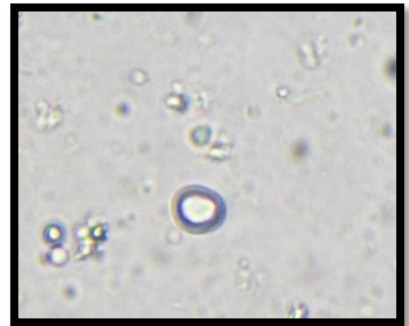
Epicarp cells



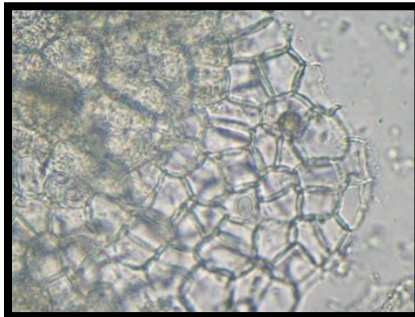
Spool cells



Prismatic crystals



Oil globules



Epidermal cells with oil
globules



Simple fibres



Annular vessels



Trichome



Lignified Fibre

Pharmaceutical analysis:

Following parameters were analyzed for different physico-chemical parameters by today's routine methods at the pharmaceutical chemistry lab, IPGT& RA, Jamnagar. Parameters were selected on the basis of common parameters mentioned for powder in Ayurvedic Pharmacopoeia of India and CCRAS guidelines⁶.

Physico-chemical Parameters⁷:

1. Loss on Drying
2. Ash Value
3. Water Soluble extract
4. Methanol Soluble extract
5. pH

High performance Thin Layer Chromatography study (HPTLC)⁸:

Methanol extract of *Mudga* was spotted on pre coated silica gel GF 254 aluminium plate as 5mm bands, 5 mm apart and 1 cm from the edge of the plates, by means of a Camag Linomate V sample applicator fitted with a 100 µL Hamilton syringe. Ethyl acetate: water: Acetic acid (8:1:1) were used as the mobile phase. After development, Densitometric scanning was performed with a Camag TLC scanner III in reflectance absorbance mode at 254nm and 366 nm under control of win CATS software. The slit dimensions were 6 mm×0.45 mm and the scanning speed was 20 mm per second.

All HPTLC plates were scanned with filter fraction Savitsy-goloy 7, minimum slope 5, minimum height 10 AU, minimum area 50 AU, and maximum height 990 AU with absorption unit.

RESULTS AND DISCUSSION

The initial purpose of the study was to confirm the authenticity of the raw drug used in the preparation of *Mudga Yusha*.

Organoleptic characteristics:

Organoleptic findings of *Mudga* powder is given in Table 1.

Pharmacognostical study:

Macroscopic:

Seed small, globular, about 0.4 cm long roughly rounded to square, smooth with white lateral hilum; usually green but sometimes yellowish-green; odour, not distinct; taste, slightly sweet⁹.

Microscopy:

Microscopic findings are shown in Table 2. Microphotographs are shown in Plate 1. Results matched with the API and thus confirmed the genuineness of the raw drug¹⁰.

Table 1 Organolaptic findings of *Mudga* powder

Morphological Characters	<i>Phaseolus radiatus</i>
Color	Greenish cream
Odour	Slightly aromatic
Taste	<i>Madhura, Kashaya</i>
Touch	Fine powder

Table 2 Characters found in *Mudga* seed

Simple and Compound-Starch grain	Oil globules
Starch grains in group	Spool cells
Simple Starch grain-Measures about 0.4mm x 0.6mm	Simple fibres
Compound starch grain Measures about 0.8mm x 0.7mm	Annular vessels
Parenchyma cells with starch grain	Trichome
Epidermal cells with oil globules	Lignified Fibre
Prismatic crystals	Epicarp cells

Pharmaceutical Evaluation:

Physico-Chemical parameters of *Mudga* powder like Loss on Drying, Ash value, Water soluble extract, Methanol soluble extract, pH value all were found to be within the normal range. Details are given in Table 3. Results of HPTLC study is shown in Table 4. Densitogram of *Mudga* is shown in Plate 2.

In the present study a pharmaceutical preparation of *Mudga* powder was tried. Its pharmaceutical properties had to be studied; hence the material was subjected to minimum Pharmacognostical and Pharmaceutical analysis. Pharmacognostical evaluation of *Mudga* powder showed the specific characteristic features found in

microscopy confirm the same and showed that the genuinity of the drug¹¹.

Wrong dietary habits like *Adhyashana*, *Vishamashana* and wrong behavioural pattern like *Vegadharana* which lead to vitiation of *Tridoshas* independently or together which result in manifestation of disease *Agnimandya*. In *Ayurveda*, it is believed that *Agnimandya* is root cause for all diseases¹² like *Prameha*, *Sthaulya* etc. *Mudga* soup is consider to be alleviating *Kapha* and is increasing digestive fire (appetizing) and pleasant. It forms the most wholesome diet to persons whose systems have been cleansed with the aid purgative and emetic remedies, as well as to those suffering from ulcers¹³.

CONCLUSION

Pharmacognostical findings confirm the ingredients present in market sample. Raw drugs were cross verified with API and no major change was observed. When the raw drug was analyzed under the microscope, it is inferred that the formulation meets the minimum qualitative standards as reported in the API at a preliminary level. The results of this study may be used as the reference standard in advance research undertakings of its kind.

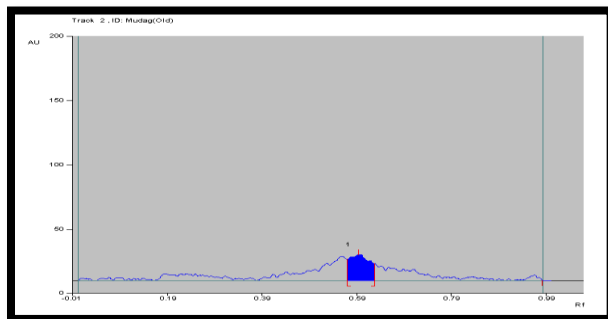
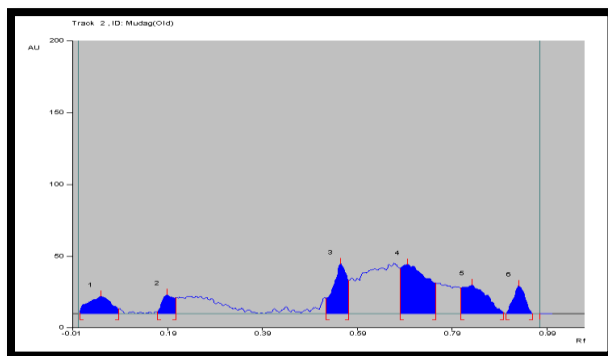
Table 3 Physico-Chemical parameters of *Mudga* powder

Sr.No.	Test	<i>Mudga</i> Powder
1.	Loss on Drying at 110 ⁰ C	6.35 % w/w
2.	Ash Value	3.7 % w/w
3.	Water soluble extract	13.9 % w/w
4.	Methanol soluble extract	5.96 % w/w
5.	pH Value (5% v/w aqua solution)	4

Table 4 Consolidated data of HPTLC profile of *Mudga* Powder

Solvent System: Ethyl acetate : water : Acetic acid (8 : 1: 1)

Condition	No. of spots	Max. Rf	Area
Short UV (254 nm)	6	0.05, 0.19, 0.55, 0.69, 0.83, 0.93	493.9, 292.7, 841.0, 1645.5, 872.4, 399.4
Long UV (366 nm)	1	0.59	747.8

Plate 2 Densitogram of *Mudga* (254nm and 366nm)

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