



**PHARMACOGNOSTICAL STANDARDIZATION OF SEED OF METHIKA
(TRIGONELLAFOENUMGRAECUM LINN.)**

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Abstract

The drug Methika(TrigonellafoenumgraecumLinn.) is used as a tastemaker in Indian cuisines. According to Ayurveda literature it is used for the treatment of many diseases. Even though various parts of drug owe numerous pharmacological actions, its classical officinal part is seed. A lot of studies have been published about the pharmacognosy of the drug, but the study related to pharmacognosy of seed of Trigonellafoenum-graecumLinn.is not available. The pharmacognostical evaluation was carried out in two phasesi.e, macroscopical and microscopical evaluation of seed and seed powder. The observations from the macroscopical and microscopical evaluation of seed of Methika were compared with that of the available descriptions from authentic books. Powder microscopical characters identified include endosperm cells, oil globules, aleurone grains, epidermal cells, cuticle, palisade cells of epidermisetc. this study resulted in providing an updated pharmacognostical standards for seeds of TrigonellafoenumgraecumLinn.

Keywords- Methika; Trigonellafoenumgraecum Linn.; Macroscopical evaluation; Microscopical evaluation.

I. INTRODUCTION

Trigonella foenum-graecum Linn. belonging to Fabaceae family is a smooth fairly stout, erect herb, and growing 30-60 cm high. The plant though not indigenous, is found under cultivation in many parts of India, especially Punjab, Kashmir, the upper Gangetic plain and some of the western provinces.¹ The references of this drug are available from Vedic period. So, the treatment with *Methika* (*Trigonella foenum-graecum* Linn.) became established from Vedic period itself.² Detailed description of the drug is available in *Nighantus*. It is stated as *vatasamana*, *sleshmaghna* and *jwaranasana* in *Bhavaprakasha nighantu*.³ It has been eaten in winter season to improve immunity and it protects heart, brain and other vital organs of body through its medicinal properties. In traditional Chinese Medicine it is being used for the treatment of kidney problems.

Standardization of *Methika* seeds is done for the establishment of quality and identity profile of the drug for the purpose of safety monitoring and overall quality assurance of the drug. Therefore, this study is an attempt to standardize *Trigonella foenum-graecum* Linn. by using macroscopical and microscopical characters and powder microscopy.

II. MATERIALS AND METHODS

A. Collection of plant material

The plant *Methika* (*Trigonella foenum-graecum* Linn.) was positively identified from fields Odhav village of Ahmedabad district in Gujarat, where the plant was locally cultivated. The seeds were collected during the months of September – October, when the seeds were fully matured. The seed of *Methika* (*Trigonella foenum-graecum* Linn.) collected was washed with water thoroughly to remove physical impurities and dried well in shade. The seeds required for Macroscopical evaluation and microscopical evaluation were separated. The remaining dried seeds of *Methika* (*Trigonella foenum-graecum* Linn.) were thoroughly powdered and sieved through mesh with size 120 for standardization purpose.

B. Pharmacognostical evaluation

Pharmacognostical evaluation consist of two phases, they are Macroscopic evaluation and Microscopic evaluation.

a. Macroscopic evaluation

It includes macroscopic evaluation of seed and also seed powder of *Trigonellafoenum-graecum*Linn.

Materials: Magnifying lens and dissecting microscope were used for the purpose.

Procedure: The seed and powder of the seed were subjected to macroscopic evaluation by observation with naked eyes, by tactile and other sensory inspection. A magnifying lens with a dissecting microscope was used for a better evaluation of surface characters.

b. Microscopic evaluation

Microscopic evaluation was carried out in two phases; Histological evaluation and Powder microscopy.

i. Histological evaluation

Materials: Sharp blades, Safranin stain, glass slides, water, cover slips, glycerin, petri dishes, watch glass, brushes, needles and digital microscope.

Procedure: For microscopical evaluation, thin section of seed was taken using a razor blade. As per standard procedure staining was done using the Safranin stain and the slides were prepared. The prepared slide was examined under a compound microscope and images were taken at 4x, 10x and 40x magnifications.

ii. Powder microscopy

Materials: Powdered drug, glass slides, cover slips, microscope, glycerine and safranin stain.

Procedure: For examining characters of the powder, sufficient amount of seed powder of *Methika* were mounted on a glass slide after mixing with glycerine. The prepared slide was examined under a compound microscope for examination of powder characters and images were taken at 4x, 10x and 40x magnification.

III. RESULTS

A. Macroscopic Evaluation

Seed of *Methika* (*Trigonellafoenum-graecum*Linn.)

Macroscopical characters of seed of *Methika* (*Trigonellafoenum-graecum*Linn.) have been done (Fig. 1). The seed was oblong to rhomboidal in shape with light to dark yellowish brown. The dimensions of the seed of *Methika* were 3mm to 5mm in length, 2mm to 2.5mm in width and 1.5mm to 2 mm in thickness. It was smooth in touch and hilum is situated in a small depression on one side of the seed. Two oblique grooves one on either side of the seed starting from the hilum and running towards the flattened base. It was bitter in taste with characteristic odour.



Fig.1 Seed of *Methika* (*Trigonellafoenum-graecum*Linn.)

Powder of *MethikaChoorna* (*Trigonellafoenum-graecum*Linn.)

Macroscopical characters of powder of *MethikaChoorna* (*Trigonellafoenum-graecum*Linn.) have been done (Fig. 2). *Choorna* of *Methika* had granular texture with yellowish colour. And it possesses bitter taste and characteristic odour. The observations were tabulated below:

Table No 1 Powder macroscopy of *Methika*(*Trigonellafoenum-graecum*Linn.)

Character	<i>Choorna of Methika</i>
Colour	Yellowish
Texture	Granular
Odour	Characteristic
Taste	Bitter



Fig.2 Choorna of Methika (Trigonella foenum-graecum Linn.)

B. Microscopical Evaluation

1. Seed of Methika (Trigonella foenum-graecum Linn.)

Transverse section of seed shows outer testa, middle endosperm and inner cotyledons.

Testa : Cuticle is thick outer covering, which is continuous but uneven layer. Outermost layer of the testa is composed of single row cylindrical cells arranged like the palisade tissue. Adjoining the palisade like cells at the inner side is a row of “column” cells. Inner to the “column cells” is a zone of parenchyma composed of 3 or 4 rows of narrow tangentially elongated thin walled cells without intercellular space. (Fig.3)

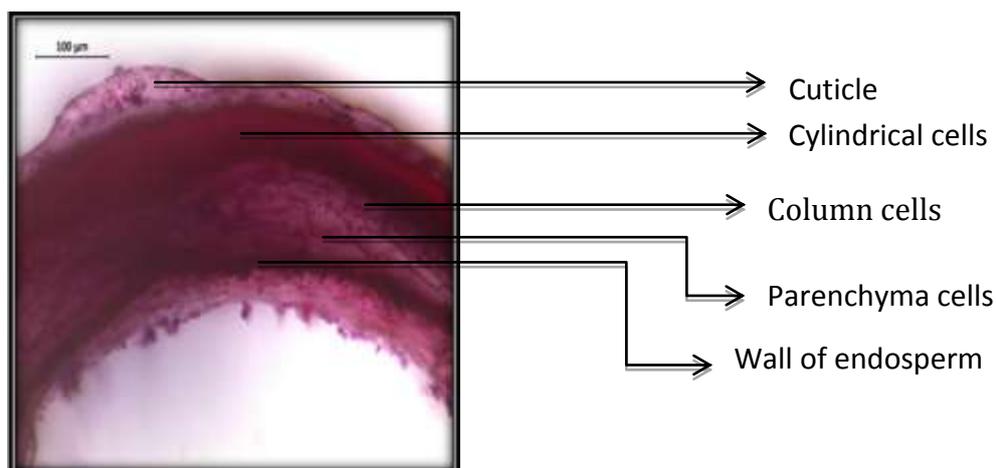


Fig.3 T.S of Methika (Trigonella foenum-graecum Linn.)- Testa

Endosperm : Outermost row of the endosperm is made up of rectangular to polygonal thick walled cells. The cells of inner rows of the endosperm are smaller. Inner most row

is composed of very narrow tangentially elongate cells. All these cells of the endosperm contain mucilage. (Fig.4)

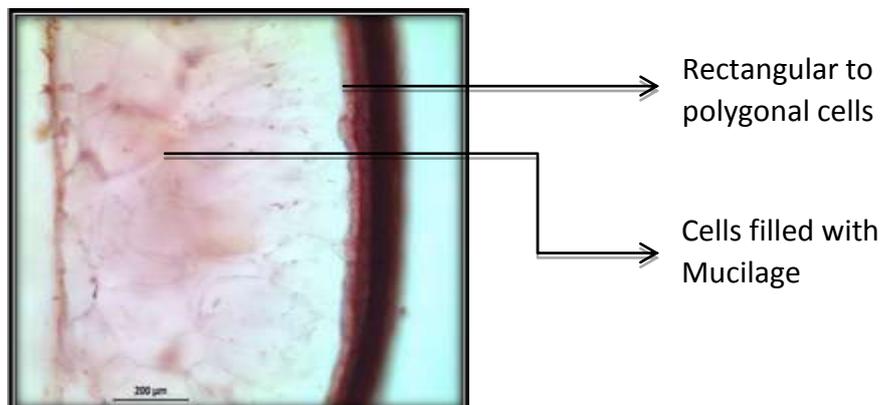


Fig. 4 T.S of Methika (Trigonella foenum-graecum Linn.)- Endosperm cells

Cotyledons : Epidermis that completely surrounds the tissues within and which may be differentiated by the position of the layers into an outer or dorsal and inner or ventral row. Mesophyll in between is differentiated into a palisade layer of 3 or 4 rows and a spongy region of 3 to 5 rows of cells. Beneath the epidermis of the ventral face of each cotyledon is a palisade layer made up of three or four rows of thin walled vertically elongate cylindrical cells. The spongy tissue made up of few rows of thin walled polygonal cells. (Fig.5)

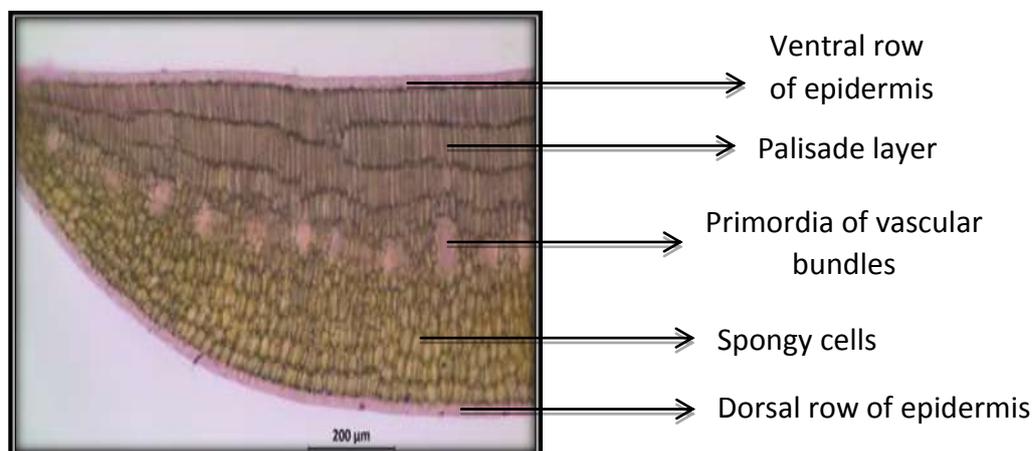


Fig.5 T.S of Methika (Trigonella foenum-graecum Linn.)- Cotyledon

Radicles : Epidermis is made up of rectangular parenchyma cells. Within the epidermis is a mass of rounded parenchyma cells are seen. In centre of radicle four radiating strips of small slightly thick walled polygonal cells are seen. (Fig.6)

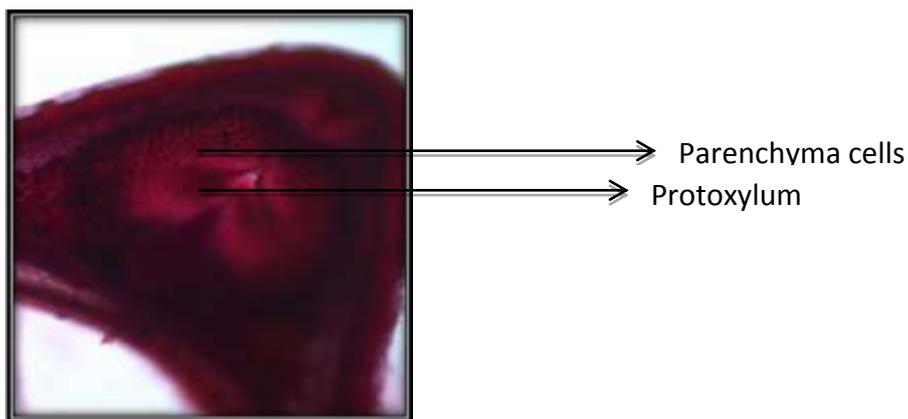


Fig.5 T.S of Methika (*Trigonella foenum-graecum* Linn.)- Radicle

2. Powder microscopy

Powder of *Trigonella foenum-graecum* Linn. was observed microscopically to identify the structures included in it. The structures identified were Endosperm cells, oil globules, aleurone grains, epidermal cells, cuticle, palisade cells of epidermis. (Fig 6 a-d)

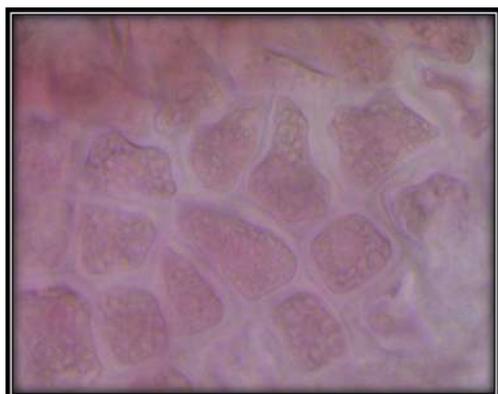


Fig.6a Endosperm cells

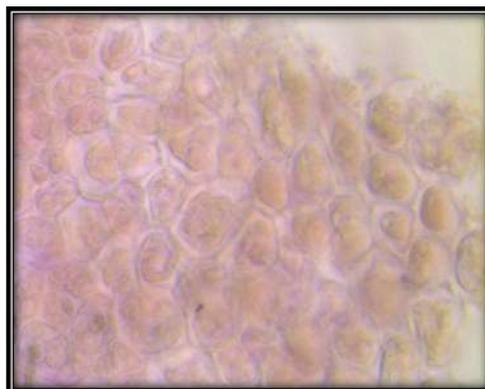


Fig.6b Oil globules and aleurone grains



Fig.6c Epidermal cells and cuticle

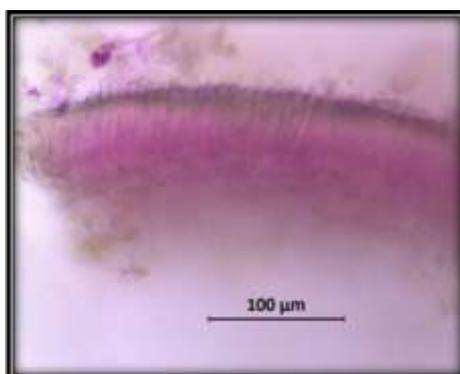


Fig.6d Palisade cells

IV. DISCUSSION

In order to standardize the raw drugs, pharmacognostical studies were carried out on the basis of analysis of macroscopical features, microscopical features including section microscopy and powder microscopy. The taxonomic features of the plant was compared with the description of the plant in Ayurvedic Pharmacopeia of India and other authentic botany text books like Indian Medicinal Plants written by Kirtikar and Basu, Flora of Madras Presidency, Flora of British India and the drug has been botanically identified as *Methika*. Seed of *Methika*(*Trigonellafoenum-graecum*Linn.) were collected from an authentic source. Collected drug was washed, cleaned and dried. The macroscopic features of the *Methika* including the size, shape, external characters, colour, odour and taste was similar with the description in the Ayurvedic Pharmacopeia of India.

The *Methika*(*Trigonellafoenum-graecum*Linn.) was oblong to rhomboidal in shape. Its dimensions are 3mm to 5mm in length, 2mm to 2.5mm in width and 1.5mm to 2 mm in thickness. These features were similar with the description given in the Ayurvedic Pharmacopoeia of India. On transverse section on seed of *Methika*(*Trigonellafoenum-graecum*Linn.), it showed four distinct parts; Testa, Endosperm, Cotyledon and Radicle. Testa composed of outer cuticle, single layer of palisade like cylindrical cells, row of column cells and zone of parenchyma cells. Outermost row of endosperm composed of rectangular to polygonal thick walled cells. Inner most row is composed of very narrow tangentially elongate cells. Cells of endosperm contain mucilage. Cotyledons are completely surrounded by epidermis. Within the epidermis mesophyll layer was found, which divides into palisade layer and spongy layer. Radicle is covered with epidermis, which is made up of rectangular thick walled parenchyma cells. In the centre of the radicle, radiating strips of small slightly thick walled polygonal cells that represent the initials of a tetrarch protoxylem are present. These features were found to be similar to those explained in the Ayurvedic Pharmacopoeia of India and Pharmacognosy of Ayurvedic Drugs.

Macroscopical and microscopical evaluation of the powder of the seed of *Trigonellafoenumgraecum*Linn, revealed that, the powder was yellowish in colour and granular in nature with a characteristic odour, and bitter taste. The powder microscopic characters of *Methika*(*Trigonellafoenum-graecum*Linn.) revealed the presence of

endosperm cells, endosperm cells loaded with oil globules and aleurone grains, palisade cells of epidermis and parenchyma layer of endosperm. These features were found similar to that given in the literature review.

The pharmacognostical features of seed of *Methika* (*Trigonella foenum-graecum* Linn.) was analysed and compared with that of description available in literature and found to be genuine.

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