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HULBA (*TRIGONELLA FOENUM GRAECUM*): THE COMMON INDIAN SPICE FULL OF MEDICINAL VALUES

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ABSTRACT

Fenugreek (*Trigonella foenum graecum*) is an annual plant in the family Leguminosae. It is well known spice frequently encountered in the cuisines of Indian subcontinent. In *Unani* (Greco-Arabic-Indian) system of medicine plant is known by the name of "*Hulba*" and the leaves of the plant are known as "*Barge Hulba*". It is cultivated in every part of India in winter season. The height of the plant is about one meter. The seeds are yellowish-red in colour and are known as "*Tukhme Hulba.*" The seeds are bitter in taste with pungent agreeable odour and mucilaginous. Seeds are also known as "*Methi Dana*". Leaves are bitter in taste and have pungent odour. Leaves are also used as vegetable and it is a common spice in Indian kitchen. In this manuscript we have summarized the action and medicinal uses of *Hulba* described in *Unani* as well as in different traditional and complementary & alternative system of medicine.

Key Words: *Methi*, *Unani* Medicine, *Barge Hulba*, Fenugreek, Traditional Herb.

INTRODUCTION

Hulba (*Trigonella foenum graecum)* is an aromatic annual plant, 30 to 60 cm tall found wild in Kashmir, Punjab and upper Gangetic plains and widely cultivated in many parts of India. The two fairly distinct types of plants are recognized; the dwarf type grown for culinary purpose and tall-growing type known as *Methi* in Punjab, grown for fodder. The drug *Barge Hulba* is the leaf of *Trigonella foenum graecum* and the name comes from "Foenum- grecum" meaning Greek Hay. The name of genus Trigonella is derived from the old Greek name denoting "three angled" from the form of its corolla. The *Trigonella foenum Graecum* belongs to the family Leguminosae the second largest family of flowering plants and contains 600 genera and about 12000 species [1-4].

Habit and Habitat

Hulba is native to South Europe and Asia. The plant is widely cultivated in many Parts of India. It grows in winter season, flowers and fruits appear during February and March. This annual herb is found wild and extensively cultivated in Kashmir, Punjab and some parts of the Bombay and Madras presidencies [1,4-9].

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Scientific classifications

Kingdom:	Plantae
Sub-kingdom:	Tracheobionta
Super-kingdom:	Spermatophyta
Division:	Magnoliophyta
Class:	Magnoliopsida
Sub-class:	Rosidae
Order:	Fabales
Family:	Leguminosae/Fabaceae
Genus:	Trigonella
Species:	*T. foenum* graecum[10,11]

Historical background

Trigonella foenum-graecum originated from the Mediterranean region and Asia. It is one of the oldest medicinal plants dating back to the ancient "Egypt and

Greece". Charred fenugreek seeds have been recovered from "Tall Halal" Iraq (Radio carbon dating to 4000 B C) and Bronze Age level of Lachish as well as desiccated seeds from the tomb of Tutankhamen. The fenugreek is indigenous to the countries bordering the Eastern shores of the Mediterranean, extending to the central Asia. In ancient Greece and Italy it was grown for the spring forage and for medicinal purpose. It has remained a prized ingredient of herbal tonic formulas in *Unani*, *Ayurvedic* and Chinese medicines. But along with Nigella seed this wonder seed was originally used in Greek medicine, and was then passed eastwards. The proof of this is in the seed's botanical name "*Trigonella foenum-graecum"* meaning "Greek hay". The Arabic name for the seed is "*Hulba*" from which the Chinese got their name, Hu Lu Ba. The East Indian name of the seed is *Methi*. In western herbal medicine an infusion is commonly made from it which is drunk hot to loosen and expel excess phlegm. But if taken as decoction or powder it becomes a valuable tonic. In Chinese medicine fenugreek is used mainly as restorative in chronic fatigue and sexual debility. In Islamic and *Unani* medicine the seed is such a treasured tonic that the "Prophet Mohammed (S.A.W) says "if you know the value of fenugreek you pay its weight in gold". *Ibn Sina* also used fenugreek and valued it highly. Hippocrates considered fenugreek to be a valuable soothing herb and used it for cough, lung Congestion and upper respiratory complaints. Dioscorides advocated fenugreek for all types of gynaecological disorders. Fenugreek has been used since Biblical times to increase the production of milk for nursing. "The Ebers papyrus of 1500 BC Egypt lists a preparation of fenugreek for the skin". Qasim Bin Abdul Rehman narrates that Prophet (S A W) stated that "get cure from *Methi*. Hidvegi *et al* (1984) report that references to the utilization of fenugreek are found as far back as 1578, detailed information on the plant is given in the famous Herbarium compiled by Melius (1578). Historically, fenugreek is one of the oldest known medicinal plants and even "Hippocrates" thought highly of it. Fenugreek was first introduced in Chinese medicine in the Sung dynasty, A D 1057 and Dioscorides a Greek physician of Anazarbus in Cilicia, father of pharmacology, in AD 65 in his De-Materia Medica write that fenugreek is an active component of ointments. In 17th century fenugreek seeds were recommended by Haward to help expel the placenta of women after giving birth. Fenugreek was introduced into central Europe at the start of 9th century. Hutchinson (1964) has given detailed description of *Trigonella-foenum graecum*.

Vernacular names

Aasami:	Mithiguti
Arabic:	*Hulba*
Bengali:	Meetu
Chinese:	Hu Lu Ba
Danish:	Bockkelhorns-fro
Dutch:	Fenegrick
English:	Bird foot, Greek hayseed
French:	Fenugreek
German:	Griechischten
Hindi:	*Methi*, Kasorimethi
Italian:	Fieno Greco
Kannada:	Menta
Malayalam:	Vethian
Marathi:	Methi
Punjabi:	Methiri
Persian:	Shambelile
Sanskrit:	Methika
Spanish:	Alnolva
Swedish:	Bockhornsklover
Tamil:	Vandayam
Telgu:	Methikura[1,3,6,12-18]

BOTANICAL DESCRIPTION

Macroscopic description

Trigonella foenum graecum leaves are yellowish-green, petiolate, usually 2-5cm long but sometimes up to 10cm, ovate, deeply divided into five or occasionally seven segments, each with a coarsely crenate margin and obtuse apex; both surfaces downy and the midrib prominent on the lower surface. Leaflets are 2.0 to 2.5cm long, Oblanceolate along obscurely dentate; flowers are white are yellowish white in colour. Seeds are rhomboidal in shape and with a deep yellow colour compressed, truncate at both ends, 3.0-7.0 mm in length, 2.8-4.0 mm in breadth and 2.2-2.5 mm in thickness. The testa is smooth and is bitter odour pungent and agreeable, difficult to break.

Microscopical description

Leaves contains upper and lower epidermal cells with wavy anticlinal walls, striated cuticle and anomocytic stomata, more frequent on the lower epidermis; trichomas, more abundant on lower epidermis of two types; covering trichomas, uniserate with up to six small isodiametric basal cells and an elongated, tapering apical cell, often at right angles to the axis of basal cells; glandular trichomas, slightly sunken, composed of a short, biseriate two or four-celled stalk and a biseriate head of four cells, around which the cuticle forms a bladder like covering. Transverse section of seed coat consists of an outer palisade layer. These cells are radially elongated and their tips are pointed and show thickening of outer wall. Parenchymatous layer is 1-2 cells thick followed by 2-3 layers of elongated cells of parenchyma. Epidermis of radicle consist thin walled parenchymatous cells. The aleuronic grains are oval to round in shape [2,8,9,16,19].

Uses

Leaves are used both internally and externally for their cooling properties. Due to refrigerant property they are internally used for vitiated conditions of pitta. A poultice of the leaves is said to be of use in external and

internal swellings, burning and to prevent the hair falling off. Leaves are highly beneficial for throat sore, throat pain, tonsillitis, relieves dyspnoea (breath lessness), and the severity of cough. Patients, suffering from uteritis, uteralgia, ulcers and adhesions of the uterus are relieved if given a sitz bath in its decoction. Decoction of leaves admixed with vinegar, is also useful in intestinal ulcers. Its aqueous decoction is also a good remedy for dysentery and diarrhoea. Fenugreek clears voice, nourishes the lungs, softens the chest and throat, soothes the cough and asthma, particularly when it is decocted with honey or dates or fog. It also relieves hyperacidity and stomach burning [20,21,22,23,24,25,26,27,28]. Leaves contains moisture, proteins, fats, fibre other carbohydrates, ash and minerals such as Ca, Mg, Na, K, Cu, S, and Cal; traces of Stronium and lead have been reported in some samples. Leaves are good source of carotene, thiamine, riboflavin, nicotinic acid and vitamin C. The presence of vitamin K has been reported. About 80% of Ascorbic acid contents are present in leaves. Leaves were also found to contain small amount of sesquiterpenes (cadinene, alfa-cadinol, and gama-eudesmol and alfa-bisabolol). The essential oil contents of the aerial parts were found to be [delta]-cadinine (27.6%), [alpha]-cadinol (12.1%), [gamma]-eudesmol, [alpha]-bisabolol. The leaves contain at least seven Saponins known as graecunis. These compounds are glycosides of diogenin composition of fenugreek are similar to cod liver oil, which is rich in phosphates, lecithin, nucleoalbumin and iron. The plant also contains trimethylamine; neurin and betain which tends to stimulate appetite by their action on the nervous system or can produce diuretic effect. It contains Saponins, coumarine, funegreekine, nicotinic acid, phytic acid, scopoletin and trigonelline all of these are known to lower blood sugar [25,28-30]

Fenugreek is much used in herbal medicine, especially in North Africa, the Middle East and India. It has a wide range of medicinal applications. Fenugreek is rich source of the polysaccharides galactomannan. They are also a source of Saponins such as diosgenin, yamogenin, gitoenin, tigoginin and neotigogens. Other bioactive constituents of fenugreek include mucilage, volatile oils and alkaloids such as Choline and Trigonelline. Fenugreek is frequently used in the production of flavouring for artificial syrups. The taste of toasted fenugreek is additionally based on substituted pyrazines, as is cumin. By itself, it has a somewhat bitter taste [31,32-35].

Fenugreek leaves are mainly used as digestive aid. Fenugreek is widely used as a Galactogogue (milk producing agent) by nursing mothers to increase inadequate breast milk supply within 24-72 hrs [36-38]. Fenugreek is a potent stimulator of breast milk production and its use was associated with increase in milk production of as much as 900 %. It can be found in capsule form in many health stores. Supplement of fenugreek were shown to lower serum cholesterol, triglyceride and low-density lipoprotein in human patients and experiment models of hypercholesterolemia and hypertriglyceridemia. Several human intervention trails demonstrated that the antidiabetic effects of fenugreek seeds ameliorate most metabolic symptoms associated with type-1 and type-2 diabetes in both human and relevant human models. Fenugreek is currently available commercially in encapsulated forms and is being prescribed as dietary supplements for the control of hypercholesterolemia and diabetes by practitioners of complementary and alternative medicine [25,26,39,40-43]. It contains an amino acid known as 4-hydroxyisoleucine, which has property to increase the body's insulin production when body's blood sugar levels are high and help to stabilize blood sugar and reduce body fat production. 15gms of fenugreek daily after meals significantly reduces glucose level. In recent research, fenugreek seeds were experimentally shown to protect against cancer of the breast and colon. The hepatoprotective properties of fenugreek seeds have to been also been reported in experimental models [44-52].

Pharmacological actions

Anticholesterolemic, Anti-inflammatory, Antiphlogistic, Antitumor, Cardio tonic, Carminative, Demulcent, Deobstruent, Diuretic, Emollients, Expectorant, Febrifuge, Galactogogue, Hypoglycaemic, Hypotensive, Laxative, Restorative [1,5,9,12,22,24].

CHEMICAL CONSTITUENTS

Organic components

Alkaloids, Flavonoids, Glycosides, Proteins, Amino acids, Reducing sugars, Saponins, Triterpens, Tannins, Fixed oil

Inorganic components

Sodium, Potassium, Phosphate, Chloride [1,5-8,10] E.Johns reports that he has found two alkaloids in the fenugreek i.e. Choline, a base found in animal secretions and another one which he names Trigonella. Saponins on hydrolysis yield diogenin and gitoenin in 9:1.Seeds contains alkaloid Trigonelline. Air-dried seeds contain 0.38% Trigonelline and3% nicotinic acid. The seeds are reported to contain small quantities of xylose and arabinose. The seeds contain 30% proteins. The globulin is characterized by high histidine contents; the prolamin contains a low percentage of cystine and tryptophan. The nutritive value of the protein in seed, as assessed by the WHO/FAO in 1965 scoring procedure (based on the pattern of essential amino acids in egg protein) is 65.

Chemical composition of leaf

Leaves contain at least seven Saponins known as graecunins and these compounds are glycosides of diosgenin. The leaves contain moisture 86.1, proteins 4.4, fat 0.9, fibre 1.1, other carbohydrates 6.0 and ash 1.5 in per 100g of edible matter. The mineral components are Ca

395,Mg 67, P 51 (phytin P,.0) Fe 16.5, Insoluble Fe 2.7), Na 76.1, K 31.0, Cu 0.26, S 167.0, Cl 165.0, Traces of strontium and lead have been reported. The vitamins present in leaves include (per 100 gm edible matter), Carotene 2340µg, thiamine 0.04mg, riboflavin 0.31mg, nicotinic acid 0.80mg, and vitamin C 52.0mg.They contains vitamin K, Xanthophyll and β-carotene and maximum value can be obtained when plant reaches the age between 18-28 days. They are also good source of Choline, Ascorbic acid and contain glutamate pyruvate transaminase. The leaves contains following proteins. Arginine 0.35, Histidine 0.11, Lysine 0.3, Tryptophan 0.08, phenylamine 0.30, Methionine 0.09, Threonin 0.20, Leucine 0.39, Isoleucine 0.30, and Valine 0.32. The coefficient of true digestibility of the protein is 77.6% and its biological value is 84%. The Saponins from the leaves yield diosgenin, tigoginin and gitogenin (the first one is major component). About two-fifths of the total nitrogen of the leaves occurs as non-protein nitrogen. The free amino acids present are: lysine, histidine, Arginine, Threonin, Valine, tryptophan, phenylalanine, Isoleucine, Leucine, cystine, and tyrosine. The non-protein nitrogen fraction is a good source of dietary lysine [4,10,13,17-19,53].

MEDICINAL DESCRIPTION OF *HULBA* IN UNANI SYSTEM OF MEDICINE

Mizaj (Temperament)

Hot and Dry up to 2^0C [19,54] others have mentioned it as Hot in 2^0C and dry in first degree[55].

Af'al (Actions)

Mohallile Waram (Anti-inflammatory), *Musakkin* (Analgesic), *Mudirre Baul* (Diuretic), *Mudirre Haiz* (Emmenagogue), *Mulaiyyin* (Mild Laxative), *Munaffise Balgham* (Expectorant), *Mujafif* (Siccative), *Mulatif* (Demulcent)[54-57].

Istemal (Uses)

Amaze Barida, *Isterkha*, *Sara*, *Niqras*, *Istisqa ziqqi*, *Sual Muzmin*, *Azame Tehal Kabid Waram Reham*, Bawaseer [54-58].

Muzir (Side effects)

Hulba is harmful for people of hot temperament. It is harmful if taken empty stomach in large quantity and regular use cause headache and nausea [54,59,60].

Miqdare Khurak (Doses)

It is given orally from 3 gm to 7 gm [54,60].

Scientific reports

Leaves of *Hulba* are useful in all kinds of inflammations both internally and externally. It is also useful in pain. The use of *Hulba* flour with *Maa-ul-Asal* (Extract of roots) is useful for the internal and external inflammation. It causes headache if taken in large quantity, and it cannot be used in every season. As an application to the head, it promotes the growth of hair and also prevents from falling off. Decoction of *Hulba* makes hair curvy. 17.5 gm of *Majith* with infusion of *Hulba* is useful in "*Haiz*" prevent the bad smell of the mouth reduces stool, sweat and urine smell. It is also useful in injury. If nails shrink due to heat or cold the application of *Hulba* is very beneficial. *Hulba* is useful in cough, pain and asthma. It increases sexual power and is useful in *Balghami* diseases. *Hulba* excretes *Balgham* (Phlegm) from lungs and excrete urine in large quantity. Due to hot in 2^{nd} degree *Hulba* excretes waste materials in large quantity. If it is used with medicines, which are used to prevent the skin diseases, it makes skin bright. The infusion of the *Hulba* is useful for eye redness and clears the voice if it is taken orally. It is also useful in *warme Rehem* (endometritis), *Wajaul Rehem* (uterine pain). The dryness of the *Rehem* (uterus) can be prevented by infusion of *Hulba*. Leaves of *Hulba* are useful in *Wajaul Kabid* (Pain in kidney), disease of kidney, Micturation and in uterine pain caused by cold. Fresh *Hulba* leaves increase haemoglobin level. *Hulba* when applied with vinegar is useful in external inflammation as well as internal inflammation. If *Hulba* is taken before meals then acts as *Mullayin* (laxative) however, if it is taken with meals then produce action i.e. it causes *qabz* (constipation) and decreases semen quantity. It is *Mufarihe qalab* (Cardio refrigent) and useful in worm infestation. Wash the seeds and dry them make a powder then mix with honey and take 7 gm at night. Powder of the seeds when applied on breasts it increases the milk flow. According to Qasim-bin-Abdul Rehman the "Prophet Mohammad (S.A.W) says that get cure by *Hulba* as it consists of 72 properties. 5 gm of *Methi* powder with water is useful in dysentery and spasms. *Joshanda* (Decoction) of 5gm of *Hulba* with sugar is useful in cough. 5gm of *Hulba* powder with salt is beneficial in weakness of stomach and *Zof-e-Hazam* (loss of appetite) [1,3,7,8,18,21,54-56].

METHODOLOGY

Authors have searched the ancient and recent *Unani* literature and thesis. Scientific databases like Google search, Google scholar and Web of Science were used and the keywords used for the literature search were *Hulba*, *Methi*, Fenugreek and *Trigonella foenum graecum.* Authors collected the data by above method and summarized the current scientific information about the medicinal activities and uses of *Hulba* / Fenugreek *(Trigonella foenum-graecum)* especially in *Unani* medicine [61].

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CONCLUSION

Plants are one of the most important sources of medicines. *Hulba* is a well-known combo of spice and medicine. As we saw in different doses form *Hulba* as a whole (Seeds leaves, shoots and/or all) or its components are full of medicinal values as well as rich food supplements. It is considered as best Emmenagogues, Analgesic, Anti-inflammatory and Galactagogue in *Unani* literature. Although its leaves and seeds both are equally important as medicine in *Unani* medicine but more refined and advanced studies are needed to maximize and generalized its medicinal use.

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