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Therapeutic and Nutritional Properties of Fenugreek in Unani Medicine: A Short Review

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Abstract
Fenugreek is a wonderful herb with impressive therapeutic and nutritional benefits and has been in use for thousands of years in Ayurveda, Unani, and Chinese medicine both as medicine and spice. It is a rich source of iron, magnesium, alkaloids, saponins, flavonoids and steroids. Recent researches have highly explored its antidiabetic, anticarcinogenic, hypocholesteremic, anti-oxidant, and immunological actions. Seeing the volume and trend of research on the said herb, least work has been done with reference to this valuable plant in Unani medicine. It is a sincere effort of authors to accurately present the invaluable benefits mentioned in Unani classical literature.
Keywords: Hulba, Methi, Fenugreek, Unani, Diabetes

Introduction

Hulbā (*Trigonella foenum-graecum* L.) is an aromatic; 30-60 cm tall, annual herb [1,2]. An erect strong-smelling herb. Flowers pole-yellow. Pods straight, often falcate with a long beak [2, 3]. Smooth erect annual; Leve trifoliate; leaf-lets toothed, oblanceolate-oblong [4]; flowers whitish, solitary or in pairs in axils, petals deciduous; pod beaked, long and narrow with 10-20 square seeds [2,5]. An erect aromatic annual herb, 30-40 cm tall. Leaves pinnate, 3-foliolate; leaflets obscurely denate; oblanceolate-oblong, 2.0-2.5 cm long. Flowers axillary, 1 or 2 [4], white or yellowish-white. Pods beaked, turgid, 3-15 cm long. Seeds 10-20, oblong with a deep groove across one corner, greenish-brown, 2.5-5.0 mm x 2.0-3.5 mm [4]. Flowers during January and fruits in march [4]. Calyx-teeth linear. corolla much exserted. Pod 5-7.5 cm. long, with a long persistent beak, often falcate, 10-20. Seeded, without transverse reticulations [4].

An erect annual; leaves pinnate, 3-foliate, leaflet toothed; flowers pale yellow or white, 1 or 2, axillary; calyx lobes subulate; pods 5-8 cm. long, with a long persistent beak, 10-20 seeded; seeds greenish-brown, oblong with a deep groove across one corner, giving the seeds a hooked appearance [6]. Fenugreek seed are about 4 to 6 mm. long, 2 to 3 mm. wide and 2 mm. thick; they are hard, yellowish-brown, irregularly rhomboidal in outline and flattened (Fig. No. 1). Nearly in the canter of one of the long, narrow sides is a small depression in which both hilum and micropyle are situated, the former appearing as a whitish point [7].

Figure 1: Trigonella foenum-graecum L.

Unani botanical description

It is a famous plant. The colour of seed is reddish-yellow. The teste is bitter [8,9,10,11].

Habitat

The plant is widely cultivated in Asia including India, Europe, Morocco, Mediterranean region, Persia, and Africa [2,5,6,7,12,13,14]. It was well known to the ancients, who used the herb as cattle fodder and employed the seeds medicinally[7].

Taxonomic classification [15,16]

Kingdom	Plantae
Division	Magnoliophytae
Order	Fabales
Family	Fabaceae/Leguminosae
Genus	*Trigonella* L.
Species	*Trigonella foenum-graecum* L.

Vernacular names

Language	Vernacular name	Reference
Urdu	Methi, Hulbā, Methi	1,6,13,17
Arabic	Hulbā	1,2,5,12
Persian	Shammiyat	1
English	Fenugreek hulba (methi), Greek hayes	1,4,12,13,18,19
Hindi	Methi, Muthi	1,4, 6,12,13,18–20
Gujarati	Methi Bhaji	1,12,20
Kannada	Menthe, Mente, Mentya, Mentesoppu	2,18,19
Tamil	Mendium, Ventaiyam, ventayan	1,4,6,12,17,18,19
Malayalam	Uluva, mal ventayam, Venthiam	1,4,6,12,17,18,19
Marathi	Methi	1
Punjabi	Methi, Methri	1,4
Telugu	Mentulu Mentulu, Mentikura	1,4,12,17,18,19
Sanskrit	Methika methi, kalanusari Bahuparni, Bahupatrika	2,4,12,17,18,19,20

Chemical constituents

It is rich in mucilage (25–45%) and contains small amount of essential oil (0.01%) but various secondary metabolites in abundance such as, trigonelline (0.37%), choline (0.05%); saponins (0.6–1.7%) derived from diosgenin, yamogenin, and tigogenin; sterols such as β-sitosterol; and flavonoids including orientin, iso-orientin and iso-vitexin [21].

Protein; fats; fibre; mucilaginous material; mineral such as Ca^{++}, P, Fe^{++}; Beta-carotene, thiamine, riboflavin, niacin & tryptophane [5].

Fenugreek seeds

Fenugreek seeds (Fig.1) are aromatic, bitter, carminative, galactagogue, and antibacterial. Bitterness is mainly due to the oil, steroidal saponins and alkaloids. The composition of mature fenugreek seeds is given in Table 1. The fibre portion consists of both insoluble (30%) and soluble fraction (20%), which is mostly galactomannan (Fig. 2). The 7.5% lipid present in the seed consists of mainly neutral lipids, namely, 6.3% triglycerides and 450 mg/100 g phospholipids Cooking of fenugreek is understood to have no effect on the quality seed protein [22].

Table 1: Composition of mature fenugreek seeds 22

Component	Fenugreek seeds	Component	Fenugreek seeds
Moisture		Cu	33mg
Protein	30 g	S	16mg
Fat	7.5 g	Cl	165mg
Fibre	50 g	Choline	50mg
Sapogenins		Vit-C	43mg
Trigonelline		Carotene	96g
Ca	160mg	Thiamine	340g
Mg	160mg	Riboflavin	290g
P	370mg	Nicotinic acid	1.1mg
Fe	14mg	Folic acid	84g
Na	19mg	K	530mg

Protein has high level of lysine and tryptophane. Raw leaves have protein fat, carbohydrates. [5]. Alkaloids, flavonoids, glycosides, proteins, aminoides, reducing sugars, saponins, striterpenes, tannins and fixed oils. Sodium, potassium, magnesium, iron, phosphate, sulphate, chloride.[6]

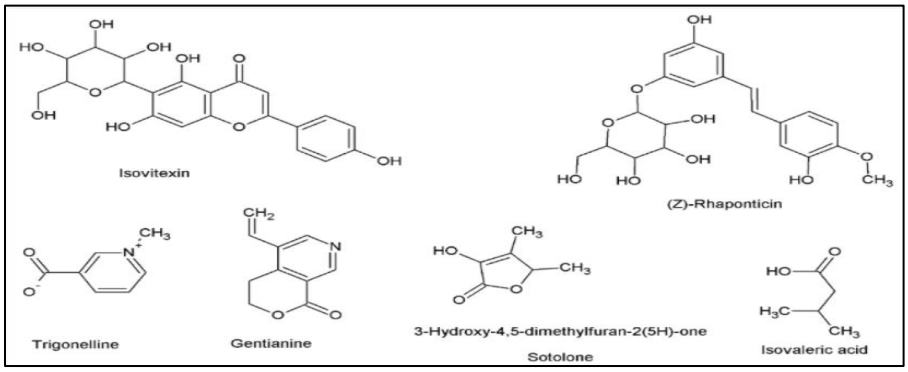

Figure 2: Structure of active constituents of fenugreek seeds

Part used: Seeds [2,4,5,6,7,14,17]
Temperament: Hār (Hot) 2˚ & Yābis (dry) ˚2 [5,6,8,9,10,11]; Hot 2˚ & Dry 1˚ [23]
Actions

Table 2: Actions of Hulbā in Unani medicine

S. No.	Actions	Reference
1	Muḥallil-i Waram (resolvent)	[1,5,6,8]
2	Mudir-i Laban (lactagogue)	[5]
3	Sāqit-i Ḥamal (abortifacient)	[5]
4	Mulaṭṭif (demulcent)	[6]
5	Mudir-i Bawl (diuretic)	[5,6,8,9]
6	Mudirr-i Ḥayḍ (emmenagogue)	[1,5,6,9,11]
7	Mulayyin (laxative)	[1,6]
8	Munaffith-i Balghām (expectorant)	[6,9,10,11]
9	Kāsīr-i Riyāh (carminative)	[5,9]
10	Muqawwai-i Shaʻr hair tonic)	[9]
11	Musammin-i Badan (fat forming)	[9,10,11]
12	Jālī (detergent)	[1,10,11]
13	Muqawwī-i Bāh (aphrodisiac)	[1,9,10,11]
14	Munaqqī-i Rahem (uterine cleanser)	[8,9,10,11]
16	Muqawwī-i Āʻsāb (neurotronic)	[9,10]

Table 3: Therapeutic uses of Hulba in Unani medicine

S. No.	Uses	Reference
1.	Ḍuʻaf-i Bāh (sexual debility)	[10,11]
2.	Dāfiʻ Suṭāl (cough)	[9,10,11]
3.	Waram-i Tayhāl (splenomegaly)	[8,9]
4.	Waja al-Ẓahar (lower back pain)	[8,9,10,11]
5.	Taqtīral-Baul (dribbling of urine)	[9]
6.	Wajaʻ al-Kabid (hepatitis)	[9]
7.	Wajaʻ al-Raham (metritis)	[8,9,10]
8.	Burudat-i Masāna (atony of bladder)	[8,9,10]
9.	Fālij (hemiplegia)	[8]
10.	Lakhwa (facial palsy)	[8]
11.	Rasha (tremor)	[8]
12.	Waja al-Mafasil (arthritis)	[8,10,11]
13.	Istisqā (ascites)	[9]
14.	Ẓauf-i Āsab (nervous debility)	[10,11]
15.	Dama (asthma)	[10,11]

Ethno-botanical uses

Colic, flatulence, dysentery, diarrhoea, dyspepsia with loss of appetite, dropsy, and enlargement of the spleen and liver [12].

Dose: 7-17.5 gm [5]; 4-6 gm [6,9]; 3 – 5 gram; [11],[10] 5 gram [8]

Muzir (contraindications): it is injurious for persons having hot temperament[8,9]; testicles[9], and

liver[10]. Owing to its stimulatory effects on the uterus, the seeds should not be used during pregnancy [24]. Allergic reactions to the seeds following ingestion or inhalation have been reported including rhinorrhoea, wheezing, fainting and facial angioedema [24].

Musleh (corrective): Ghee [8]; spinach [9],[10],[11]; Khurfā [9],[10],[11]; Sikanjbīn; Anisūn; Anār Maykhush and Kasni leaf [9]; raw mango [8].

Badal (**substitute**): linseed [8]; turnip [8], and liquorice seed [10]

Scientific reports

Most of the experimental and clinical trials conducted on fenugreek seeds have reported the pharmacological actions as depicted graphically (Fig. No. 2).

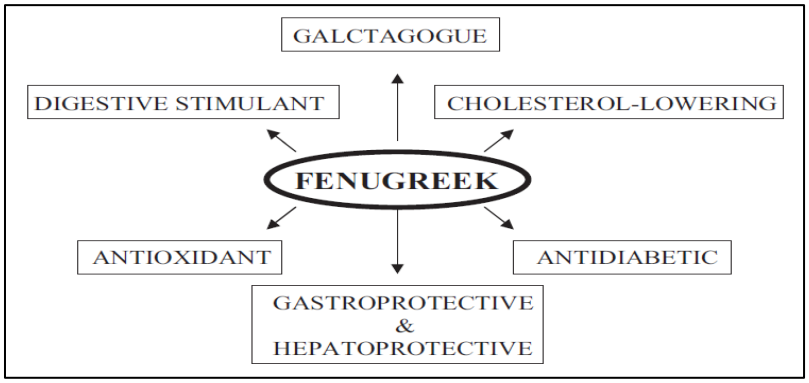

Figure 3: Summary of pharmacological effects of fenugreek seeds 22

Antidiabetic activity

Fenugreek seeds have been extensively studied for its anti-hyperglycaemic effect. The hypothetical mechanisms of action have been depicted graphically (Fig. No. 4).

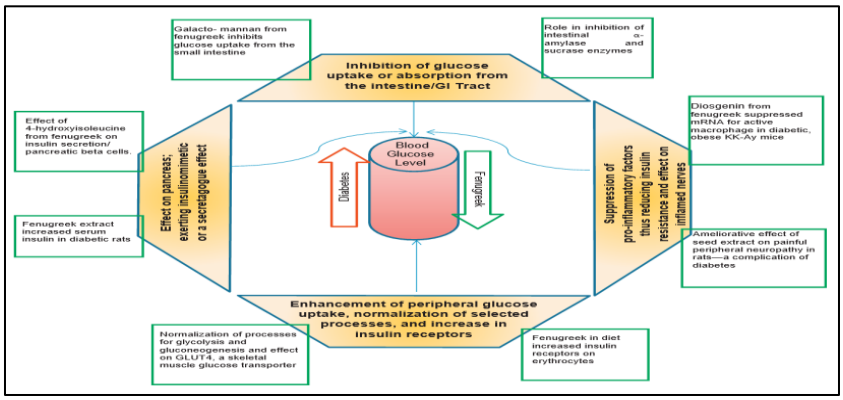

Figure 4: Potential mechanisms for hypoglycaemic effect of fenugreek seeds 25, 26

Antioxidant activity

Reactive oxygen radicals are reported to induce lipid peroxidation in cell membranes and generate lipid peroxides that cause extensive damage to membranes. Administration of 2 g/kg bw of the seeds in the diet of rats with alloxan-induced diabetes lowered lipid peroxidation, increased the glutathione and β-carotene concentrations and reduced the α-tocopherol content in the blood [24].

Antioxidants terminate chain reactions by removing free radical intermediates, and inhibit other oxidation reactions by being oxidized themselves or binding themselves with free radicals. Antioxidant neutralizes free radicals by donating an electron to free radicals or by breaking free radicals [27]. It also neutralizes free radicals by using antioxidant defence system against oxidative stress [28].

Gastric stimulant

Spices are well recognized to stimulate gastric function. They are believed to intensify salivary flow and gastric juice secretion, and hence, aid digestion. Salivary and gastric secretions are increased when the nerve centres are stimulated by the sense of smell and by the presence of pungent principles in the foodstuff. Dietary fenugreek increased bile flow rate by 44%. Similarly, oral administration of fenugreek as a single dose (0.5 g/kg) significantly increased biliary bile acid secretion by 35%. Fenugreek increased the bile flow rate by 35% when administered as a single oral dose [21], [22], [29].

Anti-inflammatory activity

The main chemical constituents responsible for the anti-inflammatory activity are alkaloids, saponins, and flavonoids. It was observed that chloroform fraction of seeds was effective against inflammatory cytokines, such as IL-1, IL-6, and TNF-α induced with phorbol myristate acetate [29].

Antimicrobial activity

Chandra *et al* reported that the aqueous extract of fenugreek seeds has antimicrobial effect against *E. coli* and *M. furfur* but no response against *P. putida* [29].

Hypocholesteremic activity

Singhal *et al* found that the inclusion of fenugreek seeds in diet of mice reduced cholesterol level by 42% and 58% both in control group and intervention groups respectively [29]. GII, a derivative from the seed extract of fenugreek was found to decrease the lipid, total cholesterol, and increase HDL cholesterol levels in alloxan-induced rabbits along with reduction in triacylglycerols, phospholipids, and free fatty acids [29]. In another study, intragastric administration of 30.0 g/kg body weight of ethanol extract of fenugreek seed daily for 4 weeks to hypercholesterolaemic rats reduced plasma cholesterol levels by 25% [21]. This effect may be attributed to the large amount of fibre, galactose, and mannose of fenugreek seeds [26].

Anticancer activity

Fenugreek seed extract significantly inhibited Benz(a)anthracene-induced mammary hyperplasia in rats due to its increased apoptotic action. Further, the alcohol extract of fenugreek seeds showed *in vitro* cytotoxicity against different human cancer cell lines including neuroblastoma cell line and human colorectal adenocarcinoma cell line [26].

Conclusion

Fenugreek is an important medicinal as well as spice of the household. The keen interest in the exploration of its health beneficial has shown various important pharmacological actions and uses such as antioxidant, anti-hyperglycaemic, anticancer, anti-inflammatory, and gastric stimulant. The evidence-based findings underline the medicinal importance of fenugreek in maintenance of health.

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