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A REVIEW OF ZUFAH-E-YABIS (*NEPETA BRACTEATES)* PHYTOCHEMICAL AND PHARMACOLOGICAL STUDIES

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INTRODUCTION

It is an aromatic perennial herbaceous plant of Lamiaceae family; it is a brightly colored shrub or sub-shrub that ranges from 30-100cm in height. Found in western temperate Himalayas from Garhwal to Kashmir at altitudes of 18, 00-2400 m. Leaves are ovate-obtuse (Handa*et al.,* 1957; Kirtikar&Basu, 2003). During summer the plant produces bunches of pink blue and more rarely white fragrant flowers.The herb is sometimes subshrub or shrub, annual or perennial and usually aromatic in nature. Stem is woody at base. Leaves are opposite, rarely whorled or alternate, simple to pinnately dissected or compound, without stipules. Inflorescences generally compound, sometimes flowers solitary and axillary; verticillasters two to many flowered, subtended by leaves or bracts. Flowers arebisexual, zygomorphic, rarely sub actinomorphic, bracteolate or not. Calyx is persistent, 5-toothed, 2-lipped; upper lip 3-toothed, lower lips are 2- or 4-toothed; tube sometimes hairy inside. Corolla limb usually 2-lipped; upper lip 2-lobed and lower 3-lobed, rarely upper lip entire and lower 4-lobed, also rarely limb (4- or) 5-lobed; tube is hairy annulated inside. Stamens areepipetalous, 4 or 2, free, rarely filaments connate, sometimes one staminodial; anther 1- or 2-celled, usually dehiscing longitudinally; disc persistent. Ovary is superior, 2-celled and each cell 2-ovuled and style sub terminal, or ovary 4-parted and each lobe 1-ovuled and style gynobasic with 2-cleft apex. Fruits are usually 4 dry nutlets. Seeds are with or without endosperm. About 250 species are found in temperate Asia, N Africa, and Europe, most abundant in the Mediterranean region and SW and C Asia; 42 species in China.[1,2,3,4,23,45,22]

Taxonomy

Domain:	Eukaryota
Kingdom:	Plantae
Subkingdom:	Viridaeplantae
Phylum:	Magnoliophyta
Subphylum:	Euphyllophytina
Infraphylum:	Radiatopses
Class:	Magnoliopsida
Subclass:	Lamiidae
Superorder:	Lamianae
Order:	Lamiales
Family:	Lamiaceae
Genus:	Nepeta
Species:	bracteata
Botanical name:	*Nepeta bracteata*

Vernacular names

Arabic:Zufa-e-Yabis	
Bulgarian:	Isop, Kalam
Chinese:	SàhnHēungChóu
Danish:	Isop
Dutch:	Hyssop, Ipse, Ysop
Farsi:	Zoufa
French:	Hyssope
German:	Ysop
Greek:	Issopos
Greek (Old):	Hyssopos
Hebrew:	Ezov
Latin:	Hysopum
Sanskrit:	Jufa
English:	Hyssop
Hindi:	Zupha
Urdu:	ZufaKhushk

Habitat and distribution

It occurs in Azad Kashmir (Pakistan), Baluchistan (Pakistan), East Europe, West Asia, West Himalayas. In West Himalaya, it is found from Kashmir to Kumaon. It has been known as a culinary and medicinal herb for hundreds of years. It grows wild in the coastal areas of France, Italy and Yugoslavia and cultivated in these countries and in Bulgaria, Hungary and Holland. It finds its greatest use in flavoring preparations for alcoholic beverages and meat products [4,5].

Unani Mahiyat

Dioscorides names this plant hyssopos, but does not describe it since it is 'a well-known herb. According to him, there are two main types of Zufayabis, the mountain and the garden. An under shrub, usually glabrous, stem branched blow ,branches woody 30-60 cm erect or diffuse, leaves are like the leaves of Marzanjosh*(Origanumvulgare* herb) giving very good smell and bitter taste, branches give yellow flowers without seeds, some leaves are like the leaves of Satyr (*Zatriamultiflora leaf*), and some are like the leaves of Mahanadi (*Lawsonia inermis*). Mountain (Pahadi) type is stronger than garden (bustani) one. And the type which is growing near the BaitulMuqaddas Mountains is good and is called as Zufah Misry.[47,48,53,55,59,45,42]

Botanical description

Macroscopic:

Flowers are pediculate, complete and hypogenous. Calyx are 15 nerved, 5 toothed, corolla, blipped. Stamens four,lower longer, anther cells linear spreading, style lobes sub equal, subulate.

Microscopic: transverse section of pedical shows a solid central stele. The epidermis is single layered having rectangular cuticularised cells. This is followed by a multilayered cortex. The central stele is enclosed in sclerenchymatouspericycle followed by continuous phloem. The xylem is formed of vessel tracheids, fibers and parenchyma. The crystals of calcium oxalate are present in the cortical cells. The uniserate and unicellular trichomes are also found on outer surface of pedicel.

Transverse section of sepal shows an upper and lower epidermis made up of rectangular cells. Epidermis is followed by 3-4 layered rounded parenchymatous cells loosely arranged with intercellular space, 4-5 vascular bundles are found in a sepal. Calcium oxalate crystals are also found in the parenchymatous cells of mesophyll.

Transverse section of petal is similar to that of sepal except the cells of mesophyll and epidermis are smaller in size than the cells of sepal. The number of vascular bundles is 3-4 only. Transverse section of anther shows four sporangia. The single layered epidermis having isodiametric cells filled with dense cytoplasm. The cells of endothelium show lignification on the radial and tangential wall.

Powder study: The powder is brownish green in color without any definite smell. Powder analysis of the crude drug reveals the presence of fragments of pedicel, calyx, corolla, and epidermal cells of anther along with endothelium and pollen grains. Tracheid's of different sizes, cells of xylem parenchyma and uniseriatetrichomesbrone on the pedicel are also observed.

Parts Used Leaves and Flowers[57,42,47,48, 6,7]

Maza (Taste) Mildly bitter[55,44,53,47]

Mizaj (Temperament)

Hot[3] and Dry[3] [45,46,47,48]

Hot[2] and Dry[2] [55,44,42,51];

MuzirAsrat (Adverse effects)

Adverse effects on Throat[59], Liver[42, 51, 59],Kidney [42]

Musleh (Corrective)

Following drugs have been recommended to be used along with Zufah yabis so as to avoid its adverse effects.

Babolka goond (*Gum of Acacia arabica)*[59,45], Anartursh (*Punica granatum*)[42,51],Katera (*Astragallus gummifera gum)*[59,52,42],Unnab (*Zizyfus sativa fruit*)[42,52]

Badal (Substitute)

Persiaoshan (*Adiantumcapillus herb*)[42, 51, 59]

Saterfarsi (*Zatariamultiflora*) [42, 44]

Marzanjosh (*Origanumvulgare herb*) [44]

Podina*(Menthapiperata)*[42]

Murakkabat (Formulations)

Sharbat-e-Zufah Murakab[10,53]

Habb-e-Shahiqa[51]

TaryakiMasha [52,45]

Majoon-e- Naankha [51,42]

MuffarahKabir[43]

Sharbat-e-Sadaf[56]

Majoon-e- Azaraqi[52]

MarhamKafoori[51]

Miqdar-e- Khurak (Therapeutic Dose)

1 - 10 g[42,45]

3 - 9 g[55,51]

5 - 7 g [52]

9g-1 tola[42,43]

Historical Uses

The name Hyssop is of Greek origin, it was named after azob meaning 'holy herb' because of its use for cleaning sacred places[8].

Hyssop was mentioned in the bible 'purge me with hyssop and I shall be clean, wash me and I shall be whiter than snow. It was often used to clean the houses of lepers [9]. In the Bible when the seven plagues were upon Egypt the Hebrews used brushes made of hyssop to paint the doorways with lambs blood to protect their children [10].

It was used in the middle ages; it was strewn on floors and shelves to repel insects, or added to pot pourri and laundry rinses If hung in the home it is said to prevent any negative energy from entering [11].

Pharmacological Actions and Therapeutic Uses

Table 8 Pharmacological Actions of *Nepeta bractaeta*

Action	Unani references
Muffateh-e-Sudad (Resolvent)	
Jali (Cleanser)	47,56,58
Munafisbalgham (Expectorant)	55,52,51,44,
Dafa-e-sualbalghami	55,44,51

Table 9: Therapeutic Uses *Nepeta bractaeta*

Uses	Unani references
Suaal (Cough)	24,56,44,51,28
Bahaq (Pityriasis)	44,67,45,38,34
Muharrik (Stimulant)	56,44,43,54
Basoor and Reem (Boils & Abscesses)	44,45,34,59
Warm-e-Mashana(Cystitis)	38,56,34
Dard-e-Auzn (Earache)	55,45,58
Gastritis	45,44
Fever Rheumatism	47,56
Insect bites	43,44,45
Irq-un-Nisa (Sciatica)	43
Is-haal (Diarrhoea)	34,59
Istisqa-e-Ziqqi (Ascites)	34,55
Dard-e-kamar (Lumbago)	51,42
Muscular pain	45,34
Nafakh (Flatulence)	34,45
Warm-e-Lozatan	54,53,44

Muhallil (Anti-inflammatory)	58,59
Mullattif (Demulcent)	45,27,45
Mullayyin (Laxative)	45,57,43

(Tonsillitis)	
Nazla- wa- Zukam (Common cold)	42,45
Niqras (Gout)	58,53,57
Zaheer (Dysentry)	44,47
Qoolanj (Intestinal colic)	44
Qurooh-e-Maida waAmaa (Peptic ulceration)	45,47,53,52
Raasha (Tremors)	30,47,58
Dipthera (Khunaq)	56,44,31
A gargle for sore throats and quinsy	44,48
Sozish-e-Baul (Burning micturition)	45,59,57
Usr-ul-Bala (Dysphagia)	56,47
Usr-ul-Baul (Dysuria)	57
Waja-ul- Mafasil (Arthritis)	56,44,48
Waja-ul-Asnaan (Toothache)	34,59,53,44
Warm-e-Amaa (Enteritis)	45,26
Falij (Paralysis)	44,47,58,54
Muarriq (Diaphoretic)	56,44,56
Qatil-e-Deedan (Anthelmintic)	59,57
Jarab (Scabies)	32
Aatash (Thirst)	44,55,51

Kasireriyah (Carminative)	45,34,67		
		Shoeb-e- Muzmin (Chronic bronchitis)	55,53
		Zeequnnafas (Asthma)	58,53,55
		MudireHaiz (Emmenagogue)	55,50
		Ikhtanaqur-Raham (Hysteria)	55,53,58,47,44,57
QatilKirmShikam (Anthelmintic)	58,32,45	Tashahnuj (Coli, Spasm)	42,44
		Amraz-e-Ain (Catarrhal ophthalmia)	50,55
		Dafa-e-zaiqunafas (Asthma)	45,42,51,53,57
		As a nervine for anxiety and petit mal seizures	43,53
Dafa-e-Humma (Fever)	56,43,44,34	As a tonic to build up stamina after illness or injury	55,46
		Antiviral against herpes simplex virus	58,44
		Healing bruise ,injuries and promotes wound healing	42,53
		Treatment of head lice with the essential oil	42,44,56

Chemical constituents

Several chemical constituents of hyssop have been identified, including pinocamphone, pinene, borneol, geraniol, thujone, camphene, limonene and phellandrene. Terpenoids with known pharmacological actions that are found in hyssop include marrubiin, ursolic acid and oleanolic acid. Other characteristic compounds identified in hyssop are hyssopin (a glucoside), caffeic

acid, tannins and resin. The volatile oil of hyssop is composed of camphor, pinacaphone, thujone, isopinocamphone, alpha- and beta-pinene, alpha terpinene, linalool, and bornylacetate [14,34,25,35]

Pharmacological studies

1.Anti-hyperlipidemia effects: From extensive *in vitro* and *in vivo* studies, both oleanolic acid and ursolic acid have recognized anti-hyperlipidemia properties [12].

2. Anti-inflammatory effects: From extensive *in vitro* and *in vivo* studies, both oleanolic acid and ursolic acid have recognized anti-inflammatory properties [12].

3. Anti-proliferative effects: Ursolic acid, a constituent of hyssop, was found to induce apoptosis in human leukemia cells. This effect may have been a result of enhanced intracellular Ca^{2+} levels, since lowering the intracellular Ca^{2+} level by different agents inhibits the apoptotic action of ursolic acid The antiproliferative action of ursolic acid was also indicated in a mouse melanoma cell line[13].

4. Antiviral effects: Crude extracts of dried leaves of *Hyssop* have shown strong anti-HIV activity *Hyssop* contain caffeic acid, unidentified tannins, and possibly a third class of unidentified higher molecular weight compounds that exhibit strong anti-HIV activity, and may be useful in the treatment of patients with AIDS [14].

5. Cardiovascular effects: According to a clinical trial, flavonoids found in hyssop, including diosmin and hesperidin, may slightly improve chronic venous insufficiency (CVI) [15].

6. Diabetes mellitus type 1 effects: Daflon® 500 (a mixture of diosmin [90%] and hesperidin [10%]) proved to be effective in decreasing glycation in type I diabetic patients [16].

7. Expectorant effects: Marrubiin, a bitter diterpenoid found in hyssop, irritates the lining of the throat, causing an expectorant action [17].

8.Gall bladder effects: Marrubiin, found in hyssop, is a bitter diterpenoid that increases the production of bile in laboratory animals [17].

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