



## Microscopical assessment of the selected herbal drugs mentioned in the classical texts of Unani

Kiran Negi<sup>1\*</sup>, Ghazala Javed<sup>2</sup>

<sup>1</sup> Assistant Research Officer, (Pharmacognosy), Drug Standardisation Research Unit, (Central Council for Research in Unani Medicine), Ministry of Ayush; Govt. of India, Janakpuri, New Delhi, India

<sup>2</sup> Research Officer (Unani), Drug Standardisation Research Unit, (Central Council for Research in Unani Medicine) Ministry of Ayush; Govt. of India, Janakpuri, New Delhi, India

### Abstract

Herbal drugs are the chief constituents in traditional medicine especially the Unani System of Medicine. The classical texts of Unani enumerates a number of formulations where the plant as whole or the various plant parts such as seeds, leaves, stem, root, bark, flowers has been powdered and admixed with other raw materials to cure various ailments such as hypertension, bronchitis, arthritis, cirrhosis etc. In today's medical practice the general acceptability of unani formulations have given rise to their increasing demand resulting the various forms of abuse and adulteration of the herbs leading to consumers and manufacturers disappointment. In this scenario the authentication of the herbal drugs and identification of adulteration from the genuine material herb are essential for both pharmaceutical companies as well as public health to ensure reproducible quality of herbal medicine. In view of this a research endeavor was planned for four potential herbal drugs with different morphological groups from diverse families like boraginaceae; colchicaceae; fabaceae and malvaceae. The diagnostic and distinctive characteristics of each morphological group present in different unani formulations have been reported along with their chemical constituents and therapeutic potencial. All these studies will serve as a reference standard in checking the adulteration in market samples of herbal medicines used in the preparation of various unani compound formulations and hence beneficial for the academicians, researchers, plant chemists, TM students, health professionals and plant based pharmaceutical industries.

**Keywords:** Classical texts of Unani, herbal drugs, identification

### Introduction

Unani system of medicine which is widely known as *Greeko Arab medicine* is a traditional system of medicine originated from Greece. It is mainly based on the principles given by *Jalinoos (Galen)*; a Greek physician <sup>[1]</sup>. Around 500 B C Unani medicine was practiced by *Buqrat (Hippocrates)* who is well known as the father of medicine <sup>[2]</sup>. It was introduced in India by Mughal emperors in tenth century. Presently, Unani system of medicine enjoys an official status as one of the alternative systems of medicine in India <sup>[1-3]</sup>. According to WHO, about 70-80% of the population in the developing countries is dependent upon the traditional system of medicines for their basic healthcare needs <sup>[4]</sup>. These medicines may be derived from plant, animal or mineral sources, of which plant origin drugs are most commonly used by the Unani physicians.

The plants; which have developed a sophisticated traditional healing structure in Unani system of medicine; are used either as a single herb, a combination of herbs (polyherbal formulations) or a combination of herbs, animal products and minerals (herbo-mineral formulations) <sup>[5, 6]</sup>. In classical periods Hakims (the unani practitioners) used to prepare the medicines for the patients by themselves but in today's era this practice got vanished since the production and sale of Unani drugs have become formalized into a booming industry on a commercial scale.

In India, around 9000 licensed units are involved in manufacturing of traditional formulations. At present, the

Indian systems of medicine use more than 1100 medicinal plants, most of which are harvested from the wild. More than 60 species are in high demand. The tribal belt of India is rich in these plants and the tribes mainly depend on this trade for their livelihood. There are wide possibilities for adulteration and contamination in the process. Therefore, the adequate availability of adulterant-free raw materials at reasonable prices has become a major problem for the industry and this demand is increasing every year <sup>[7]</sup>.

Adulteration and substitution are becoming more common malpractice in raw material trade of medicinal plants. Incorrect identification of many plants and deforestation leading to extinction of many species are some of the factors that have resulted in adulteration and substitution of raw drugs, which have somewhere resulted in decreased faith in herbal drugs. Adulteration in market samples creates hindrance in promotion of herbal products which thereby adversely affected the import and export of these preparations. In the current scenario, adulteration and substitution of herbal drugs are the burning problems faced by the herbal industry. Since most of the raw materials are derived from plant sources and due to adulteration in raw materials and lack of proper standardization techniques for manufacturing, the worldwide acceptance of Unani is becoming problematic <sup>[8, 9]</sup>.

The initial step towards ensuring quality of any herbal material is authentication. Most of the classical text dealing with the materia medica of Unani lacked sufficient

information for appropriately identifying the medicinal plants. Majority of them enumerates only the macromorphology/ organoleptic descriptions as a standard feature. According to WHO, microscopic description along with macroscopical details should be performed; before any tests are undertaken; for establishing the identity and the degree of purity of herbal materials.

Microscopic identification is the most commonly used method to authenticate any herbal drug. By means of using various microscopic techniques structural and cellular features of herbs are examined to determine their botanical origin. The method is useful to identify species with similar morphological characters. The observation of cellular-level morphology or anatomy is especially important for identification of out broken or powdered drugs, because in these cases most of the morphological diagnostic features are lost. The powdered crude drugs can be identified based on the form, the presence or absence of different cell types based on their cytomorphological characters, eg. parenchyma, collenchyma, fibres, stone cells, vessels, trichomes, secretory cells, epidermal cells etc. Cell inclusion characteristics are of considerable value in the identification of some unorganized crude drugs, eg. ergastic contents as aleurone grains, cluster crystals and prisms of calcium oxalate, silica and starch granules. In view of this a research endeavor was planned for four potential herbal drugs with different morphological groups from diverse families like boraginaceae; colchicaceae; fabaceae and malvaceae. The diagnostic and distinctive characteristics of each morphological group present in different unani formulations have been reported along with their chemical constituents and therapeutic potential. All these studies will serve as a reference standard in checking the adulteration in market samples of herbal medicines used in the preparation of various unani compound formulations and hence beneficial for the academicians, researchers, plant chemists, TM students, health professionals and plant based pharmaceutical industries.

### Materials and Methods

Authentic crude drug samples procured from the market; powdered and sieved through 60 mesh. The powdered drug first cleared in the solution of chloral hydrate and then mounted in the solution of chloral hydrate and glycerol to prevent the formation of chloral hydrate crystals during the examination of the slide. Lignification was established by the reaction with solution of phloroglucinol and hydrochloric acid. Several preparations with different mountants like iodine water, sudan III, ruthenium red, ferric chloride etc. were also made to emphasise the presence of particularly important cells or cell contents. Care should be taken to avoid the presence of any air bubble [10, 11]. Most diagnostic features and the dimensions of the cells and other particles were recorded. Photomicrography was performed by using digital microscope with computer attachment.

### Results and Discussion

#### 1. Name of the drug: Sapistan

#### Morphological group: Fruit

*Cordia dichotoma* Forst.f syn *C.obliqua* Willd, *C. myxa* Roxb. Non L. mentioned as Sapistan in classical text of Unani belongs to the family Boraginaceae is a medium

sized evergreen tree with short crooked stem and smooth greyish bark. It is a native in Asia temperate and widely distributed throughout the warmer parts of India. It is known as Lassora (Hindi & Urdu); Bahubara or Bohodai (Bengali); Gundomoto (Gujrati); Bhokar or Bargund (Marathi); Bahubaraka, Laghushelu, Madhubhutadruma, Sukshmaphala (Sanskrit); Dabak (Arabic) and Sebesten Plum (English). Different parts of Cordia tree reported to exhibit multitude pharmacological effects. The fruit extract of Sapistan revealed the presence of oil, glycosides, flavonoids sterols, saponins, terpenoids, alkaloids, phenolic acids, coumarins, tannins, resins, gums and mucilage [12-16], resulting antidiabetic, immuno modulator, diuretic, anthelmintic, wound healing, antiulcer, gastro-protective, anti-inflammatory, antileprotic, antidiabetic, and hepatoprotective and antioxidant activities [17]

#### Description reported in Unani Texts

Sapistan fruit, a drupe 1.3–2.5 cm long, when ripe yellowish brown, pink or nearly black, shining, but minutely rugose, endocarp rugose, very hard, in a sweetish viscid almost transparent pulp [18]. In Unani literature, the Sapistan fruits, being hot and dry (of second degree) [19] are considered as expectorant, astringent, laxative and anthelmintic. It is used frequently by the unani physicians to suppress the cough and for the management of many diseases related to respiratory tract like bronchial asthma, dry cough, common cold and dryness of throat etc. Its seeds are used for the management of various inflammatory disorders [17]. Sapistan fruit is used as a single drug and also as an ingredient in the preparation of different Unani compound formulations such as lauq sapistan, lauq sapistan khyar shambari, sharbat-e-ejaz, sharbat-e-sadar and sharbat-e-nazla [20].

#### Microscopical Assessment of the powdered drug

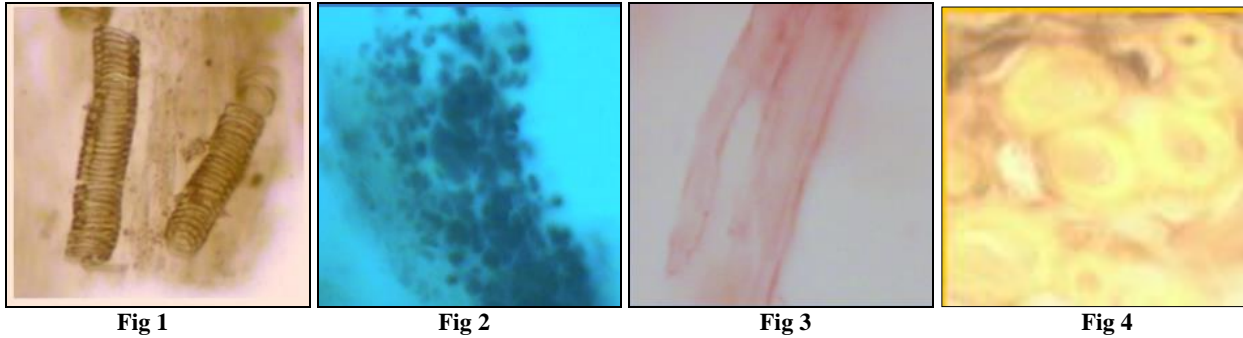
**Colour:** Brown

**Odour:** Specific

**Taste:** Sweetish & mucilaginous

Microscopical examination of the powder shows following characteristics; (Fig. 1-4)

- Abundant thick walled, lignified sclereids with broad lumen and numerous distinct pits. With various shape (from square- rectangular and from oval- polygonal) and size (approx. 49.5 $\mu$  - 94.5 $\mu$  in length and 36 $\mu$ -58.5 $\mu$  in width) they are present either single or in groups.
- Pieces of simple, lignified, unseptate, thick walled fibres with acute apex and narrow lumen having width approx. 9  $\mu$ - 13.5  $\mu$ .
- Abundant simple, spherical to oval starch grains measuring 4.5  $\mu$ -7  $\mu$  in diameter, found either scattered or as compact masses in the mesocarpic parenchyma cells.
- Vascular fragments with annular and spiral thickenings having width 4.5  $\mu$ - 9  $\mu$ .



**Sapistan fruit: Fig 1:** x40 Group of sclereids; **Fig 2:** x40 Pieces of fibers; **Fig 3:** x40 Starch grains in powder; **Fig 4:** x40 fragment of spiral vessels

## 2. Name of the drug: Suranjan Shirin

### Morphological group: Corm

*Colchicum autumnale* L. mentioned as Suranjan Shirin in the classical texts of Unani belongs to the family Colchicaceae is a perennial herb with an underground brown, scaly corm, which bears solitary, long violet and tubular crocus like flowers [21]. It is distributed in Europe, The Mediterranean region, Central Asia, Northern India (extending from Murree hills to Kashmir and Chamba.) It is known as Suranjan in Hindi, Kashmiri, Punjabi, Urdu and Persian; Hiranyaturtha in Sanskrit and Golden collyrium, Hermodactyls and Meadow Saffron in English [22, 23].

Dried corm contains abundance of starch and an alkaloid called colchicine [24]. Colchico-resin, a trace of veratrine, fat, gum, sugar, tannin and gallic acid also reported from it. [25] It is chiefly used to relieve the pain and inflammation and shorten the duration of acute gout and certain gouty infections [11] It is found effective in all the three important of arthritis i.e. rheumatoid arthritis, osteoarthritis and gouty arthritis [26].

### Description reported in Unani Texts

In Unani literature, being hot and dry in 2<sup>nd</sup> degree the dried corms possesses anti-inflammatory, analgesic, antiarthritic, carminative, laxative and aphrodisiac activity [5, 22, 26]. It is used as an important ingredient in a number of compound unani formulation such as habb-e-surjan, habb-e-falij mulaiyin, habb-e-mafasil, habb-e-irq-un-nisa, habb-e-semmul far musakkin, habb-e-baryuma, habb-e-aafiat, majoon-e-surjan, majoon-e-niqras, majoon-e-khadar, majoon-e-yahya bin kavid, rqughan-e-surjan, roghan-e-naf-e-warm-e-niqras, safoof-e-surjan [20].

### Microscopical Assessment of the powdered drug

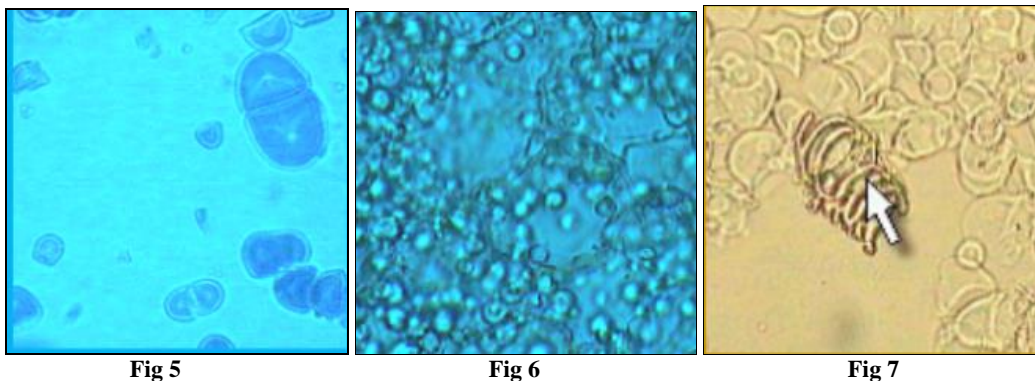
**Colour:** Pale grey or buff

**Odour:** Odourless

**Taste:** Sweet and starchy

On examination under the microscope it shows:- (Fig. 5-7)

- Abundant spherical or muller shaped, simple or compound (upto 4 components) starch grains having diameter  $4.5\mu - 23\mu$ .
- Fragment of parenchyma cells filled with starch grains.
- Pieces of lignified vessels with spiral thickenings having width  $18\mu - 23\mu$ , present either single or in groups.



**Suranjan Shirin: Fig 5:** x100 Starch grains (enlarged view); **Fig 6:** x40 Parenchyma cells filled with starch grains; **Fig 7:** x40 Piece of spiral vessel

## 3. Name of the drug: Ikleel-ul-Malik

### Morphological group: Fruit

*Astragalus hamosus* L. mentioned as Ikleel-ul-malik in the classical texts of Unani belongs to the family Papilionaceae, Fabaceae is an annual herb, 30-40 cm in high, appressed-pubescent, diffuse or erect found in the plains of Punjab. It is known as Katila or Purtuk in hindi, Giyaheqaisar in persian, Akhilulmalik in Punjabi and Nakhunah in urdu. The plant is aphrodisiac, galactagogue, maturant, pectoral, antiperiodic, stomachic, wound healer, demulcent, laxative

and emollient [18, 23, 27-29]. It also possesses astringent, antirheumatic and anti-inflammatory properties. The pods gives positive test for phenols, saponins, sterol/ terpenes and tannins. The principal fatty acid composition of the seed oil contains linoleic acid, linolenic acid, lauric acid, myristic acid, palmitoleic acid, palmitic acid, stearic acid, oleic acid and arachidic acid and fenozan acid [30]. The various amino acids present in the pods are ornithine, aarginine, histidine, alanine, methionine, norleucin and isoleucine [31].

### Description reported in Unani Texts

In Unani texts, pods which are known as Nakhuna or Iklilul Malik <sup>[32]</sup> are spreading, oblong – linear, terete, 2 cm long, 3mm thick, <sup>[18, 33]</sup> semilunar or moon shaped <sup>[18, 34]</sup> which are filled with fenugreek like small seeds <sup>[18, 33-35]</sup>. In Unani literature the pods are described as hot and dry in first degree <sup>[33-35]</sup>, and hence possess anti-inflammatory, anodyne, diuretics and emmenagogue properties. The decoction of the pods is given internally in nervous disorder; liver, kidney and spleen affections. The paste of the pods is massaged and applied externally on inflammatory areas and to relieve headache <sup>[23, 30]</sup>. The pods are used in the preparations of a number of unani formulations such as zimad-e-kibreet, zimad-e-sumbul-ut-teeb, zimad-e-waram-e-unsayain muzmin, zimad-e-waram-e-unsayain muzmin, qairooti-e-arad-e-baqla, qairooti-e-babuna wali, qaiqooti-e-mamool, habb-e-mohallil and roghan-e-naf-e-warm-e-niqras <sup>[20]</sup>.

### Microscopical Assessment of the powdered drug

**Colour:** Light brown

**Odour:** Odourless

**Taste:** Mucilaginous

On examination under the microscope it shows:- (Fig. 8 – 14)

- Abundant trichomes, found either scattered or attached to the fragment of the epicarp. Trichomes are simple, unbranched, unicellular, unseptate, thick walled with distinctly warty walls and acute apex. Their size vary from 126 $\mu$  - 360 $\mu$  x 18 $\mu$  - 36 $\mu$ . Few trichomes are very enlarged i.e. upto 702 $\mu$ .
- Fragment of epicarp in surface view, composed of moderately thick walled, polygonal cells. Numerous trichomes are attached to it.
- Parenchyma cells of the mesocarp.
- Numerous fibers that are simple, unbranched, unseptate, thick walled with narrow lumen, having width 11.25 $\mu$  - 18 $\mu$ , present mostly in groups.
- Pieces of vessels with annular and spiral thickenings having width 9 $\mu$  - 13.5 $\mu$
- Fragment of testa in surface view consisting of thick walled, polygonal cells.
- Group of parenchyma cells of the cotyledon filled with very minute starch grains

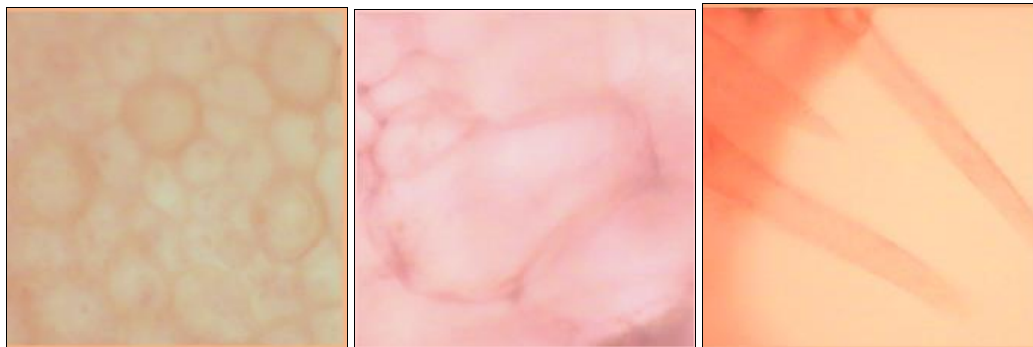


Fig 8

Fig 9

Fig 10



Fig 11

Fig 12

Fig 13

Fig 14

**Ikleel-ul-Malik:** Fig 8: x40 Simple, unicellular, unseptate trichomes; Fig 9: x40 Epicarp in surface view; Fig 10: x40 Parenchyma cells of the mesocarp; Fig 11: x40 Fibres in groups; Fig 12: x40 Vessel in powder; Fig 13: x40 Fragment of testa in surface view; Fig 14: x40 parenchyma cells of the cotyledon showing starch grains

### Name of the drug: Tukhm-e-Khatmi

#### Morphological group: Seed

*Althaea officinalis* L. mentioned as Tukhm-e-Khatmi in the classical texts of Unani belongs to the family Malvaceae is a perennial herb native to Western Asia, Europe and United States of America. In India the herb has been successfully cultivated in Manali at 2000 mt. altitude and in the gardens of Kulu valley of Himachal Pradesh, Delhi, Kashmir, Punjab, Uttar Pradesh, Madhya Pradesh and Rajasthan <sup>[36]</sup>. It is known as Khaira in Hindi, <sup>[36, 37]</sup> Marsh Mallow, Bull's

Eye, Bread and Cheese in English, Khatmi, Khubbaishajri in Urdu and Kaseeralmunfaah and Khatmi in Arabic <sup>[38]</sup>. The seeds contains polysaccharides,  $\beta$  sitosterol, stigmasterol, linolic, petro salinic acid <sup>[36, 39]</sup>, oleic acid, linoleic acid, palmitic, stearic acid and mucilage <sup>[36]</sup>. It is widely used in the treatment of the irritation or oral, pharyngeal mucosa and associated dry cough, mild gastritis, skin burns and insect bites. It is also used in catarrh of the mouth and throat, gastrointestinal tract, ulcers, abscesses, constipation and diarrhea <sup>[40]</sup>.

### Description reported in Unani Texts

In Unani literature the seed are moderate towards coldness and moistness [22, 38]. They are expectorant, resolvent, laxative cococtive [22, 38], diuretic and emmenagogue and are used in the treatment of pneumonia, pleurisy, coryza, catarrh, dry cough, polyarthritis and inflammation [34, 41]. They are the important ingredient of a number of unani formulations such as Lauq-e-Nazli, Laooq khashkhash, sharbat zoofa, qurs-e-zat-ul-janb, dawa-ul-misk motadil Jawahar wali, khameera abresham sada, khameera gaozaban sada, khameera marwareed, laooq sapistan khyar shabari, sharbat-e-aijaz, sharbat nazla, laooq khyar shambar, etc. [20]

### Microscopical Assessment of the powdered drug:

**Colour:** Brownish black

**Odour:** Odourless

**Taste:** Sweet and mucilaginous

On examination under the microscope it shows:

1. Unicellular, non glandular, unseptate trichomes with pointed tip of varying sizes. Small trichomes with length 108 $\mu$ - 234 $\mu$  and width 13.5 $\mu$ - 18 $\mu$  and large with length 360 $\mu$  - 900 $\mu$  and width 18 $\mu$ - 54 $\mu$
2. Stellate trichomes with 2 – 10 arms.
3. Group of malphigians cells present in a single row of cells having length 54 $\mu$ - 90 $\mu$  and width 18 $\mu$ - 27 $\mu$
4. Fragment of seed coat in surface view, thick walled cells filled with orange or brownish content.
5. Rosette crystals of calcium oxalate having diameter 18 $\mu$ - 36 $\mu$ .
6. Pieces of vessels with spiral and reticulate thickenings, pitted vessels having width varying from 18 $\mu$  - 27 $\mu$
7. Pieces of thick walled, unseptate fibers with narrow lumen having thickness 36 $\mu$ .



Fig 15



Fig 16



Fig 17

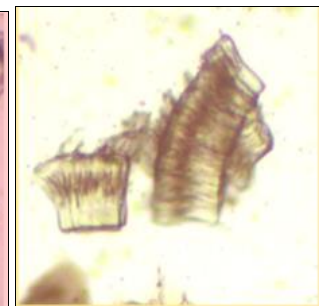


Fig 18

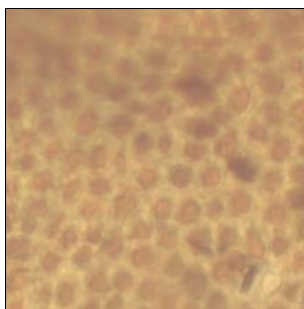


Fig 19

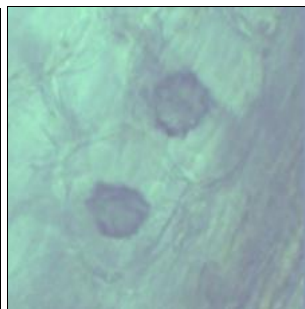


Fig 20

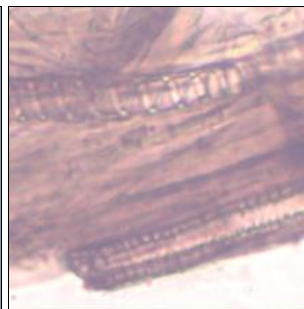


Fig 21



Fig 22

**Tukhm-e-Khatmi:** Fig 15: x 10 Unicellular, non glandular trichomes; Fig 16: x 10 two armed trichome; Fig 17: x10 stellate trichome; Fig 18: x10 malphigian cells; Fig 19: x10 fragment of seed coat in surface view; Fig 20: x40 Rosette crystals of calcium oxalate; Fig 21: x40 Vascular elements; Fig 22: x40 Piece of fibre

### Conclusion

All the classical texts of Unani enumerates the morphological details and organoleptic descriptions only, hence creating a lot of confusion regarding the correct identification and authentication of herbal drugs. As per WHO guidelines, microscopical examination should be performed as an initial step for establishing the identity and degree of purity of any herbal material. Hence the microscopical assessment of the selected herbal drugs mentioned in the present paper will provide a set of valuable information, regarding the different cells/ cell contents/ tissues along with their measurement, that can be helpful in identification of these herbal materials and their detection as a component in any Unani compound formulation.

### References

1. Ahmad S, Rehman S, Ahmad AM *et al*. Khamiras, a natural cardiac tonic: An overview Journal of Pharmacy and Bioallied Sciences,2010:2:93.
2. Rashid B, Younis PM, Itrat M *et al* Review of Majoon-e-Falasfa \_ A Unani formulation. The Pharma Innovation,2015:3:83.
3. Hongal S, Torwane NA, Pankaj G *et al*. Role of unani system of medicine in management of facial diseases: A review. Journal of clinical and diagnostic research. JCDR,2014:8:AE12.
4. Pal SK, Shukla Y. Herbal medicine: current status and the future. Asian pacific journal of cancer prevention,2003:4:281- 288
5. Hakeem MA. Bustan-ul-Mufradat new Delhi: Idara kitabul Shifa, 2002, 23-34.
6. Fazil Akram M. Factors contributing to irritability in diabetes mellitus type-2 patients. Altern Integr Med,2019:8:277.
7. Patwardhan B, Warude D, Pushpangadan P, Bhatt N. Ayurveda and traditional Chinese medicine: A comparative overview. Evid Based Complement. Altern Med,2005:2:465-73.

8. Neelam, Kumar N, Dwivedi KN, Ram B. Adulteration and substitution of medicinal plant: A burning problem in herbal industry. *Int. J Pharm Biol Arch*,2014;5:13-18.
9. Kurele R, Rohit KS, Pawar G, Abdulah, Singh J, Srinivasulu B. A comprehensive review on adulteration of raw materials used in ASU drug. *Int J Ayurveda Pharm Res*,2018;6:66-71.
10. Trease GE, Evans: *Pharmacognosy* 12<sup>th</sup> Ed.; London; Bailliere Tindal, 1983, 538-544.
11. Wallis TE. *Textbook of Pharmacognosy*; 5<sup>th</sup> Ed.; London; J & A Churchill Ltd, 1969, 578-582.
12. Rashed K, Luo MT, Zhang LT and Zheng YT. Evaluation of anti HIV -I activity of *Cordia myxa* L, and phytochemical profile; *Banat's Journal of Biotechnology*,2015;5(10):75- 82.
13. Pandey B, Deshpand B, Singh S, Chandrakar V. Estimation of elemental contents of *Cordia myxa* and its antimicrobial activity against various pathogenic microorganisms. *Indian J Sci Res*,2014;4(1):39- 44.
14. Abdullath IZA, Khattab HAH, Heeba GH. Gastroprotective effect of *Cordia myxa* fruit extract against indomethacin- induced gastric ulceration in rats; *Like Science Journal*,2011;8(3):433- 445.
15. Ali KA. Study of effect of alcoholic extract of fruit of *Cordia myxa* in total count and differential count of white blood cells in rats. *Al Qadisyia Journal of Vet Med Sci*,2008;7(2):21-24.
16. Aberoumand A. Preliminary evaluation of some phytochemical and nutrients constituents of Iranian *Cordia myxa* fruits; *International Journal of Agricultural and Food Science*;2011;1(2);30- 33.
17. Kuppast IJ, Nayak PV. Wound healing activity of *Cordia dichotoma* fruits; *Nat Prod Rad*,2006;5:103–107.
18. Kirtikar KR, Basu BD. *Indian Medicinal Plants* 2<sup>nd</sup> Ed. Vol. I-IV; Dehradun; International Book Publisher & Distributers, 2006.
19. Dr. Hafzul Kabir. *Introduction to Ilmul Advia*; 1<sup>st</sup> Edition; Shamsheer Publisher and Distributers; Aligarh; UP, 2002.
20. Anonymous. *National Formulary of Unani Medicine*, Govt. of India; Ministry of Health & Family Welfare (Dept of Ayush), ND; 2006- 2011, 1-6.
21. Singh MP. *Medicinal Herbs with their formulations*; Daya Publishing House; Delhi,2005;1:278-280.
22. Ghani N. *Khzain-ul-Advia*, CCRUM, New Delhi,2010;4:477-478
23. Khare CP. *Indian Medicinal Plant*, Vol. III. Springer, 2007, 676.
24. Ali M. *Textbook of Pharmacognosy*; Shri Balaji Printers, Delhi, 2012, 340-342.
25. Khory RN, Katrak NN. *Materia Medica of India and their Therapeutics*; Neeraj Publishing House, Delhi, 1993, 618- 619.
26. Viqar S, Amin KMY, Yunus MN. Comparative Ani Arthritic profile of some unani drugs, MDU Thesis, Dept. of Ilmul Advia, AMU, Aligarh, 2012.
27. Prajapati ND, Purohit SS, Sharma AK, Kumar T. *Handbook of Medicinal Plant*, Agrobios, India, 2003, 31
28. Chopra RN, Nayar SL, Chopra. *Glossary of Indian Medicinal Plants*, PID, CSIR, ND, 1956, 29.
29. Anonymous. *The Wealth of India- A Dictionary of Indian raw Materials and Industrial Products*, PID, CSIR, ND,1985:1:476.
30. Hamedi A, Zarshenas MM, Sohrabpour M. Phytochemical assessment of *Astragalus hamosus* pods (iklil-ul-malik). *Trend in pharmaceutical sciences*,2016;(2):77-84.
31. Afaq SH, Tajuddin. *Pharmacognosy of selected Unani Medicinal Plants*, AMU Press Aligarh, 2006, 102-108.
32. Ibn Baitar. *Al-Jame le Mufradat al-Advia wal Aghzia* (Urdu translation); CCRUM, ND, YNM, 1, 116-118
33. Usmani MI. *Tanqihul Mufradat*, Famous Offset Press, Delhi, 2008, 39-40.
34. Kabeeruddin. *Makhzan-ul-Mufradat*, Idara Kitab ul-Shifa, New Delhi, 2007.
35. Tariq D. *Tajul Mufradat*, Idara kitabus-shifa, ND, 2010, 720-721.
36. Anonymous. *The wealth of India*, Vol. I. New Delhi: CSIR, 2002, 207-208.
37. Dymock W, Warden CJH, Hooper D. *Pharmacographia Indica*. New Delhi: Srishti Book Distributors,2005;1:201-205.
38. Khan MA, Muheet-e-Azam. (Urdu translation). Part II. CCRUM. New Delhi, 2013, 491-93.
39. Rastogi RP. *Compendium of Indian Medicinal Plants*. Central Drug Research Institute, Lucknow and National Institute of Science Communication, New Delhi, 1999, 3.
40. Shah SA, Akhtar N, Akram M, Shah PA, Saeed T, Ahmed K, Asif HM. Pharmacological activity of *Althaea officinalis* L. *Journal of Medicinal Plants Research*,2011;5(24):5662-6.
41. Ali HSS, Unani Adviya Mufradah, Qaumi Council Baraye Farogh Urdu Zuban, 10th edition, 2004, 150.