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Review Article

Phytochemical, Ethnomedicinal, and Therapeutic Potential of Darmana Turki (*Artemisia maritima* L.) - A Critical Study

Anwar Jamal[1], Aisha Siddiqui[2], Afshan Khan[3], Mohammad Fazil[4], Asim Ali Khan[5]

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Abstract

Medicinal plants are nature's gift to human beings to make disease-free healthy life and play a vital role to preserve our health. They are believed to be much safer and proven elixir in the treatment of various ailments. In Unani System of Medicine, Darmana Turki (*Artemisia maritima* L.) a member of Asteraceae (Compositae) family is well known as Afsantin al-Bahr, Shih and Darmana. This plant grows abundantly in the high altitudes of the Himalayas from Kumaon to North-West Kashmir, covers the vast areas of plateau lands, mountain slopes, and in Gurez and Kistwar valleys. It is fairly common in Kulu valley and in Lahul and Spiti in Kangra district of Himachal Pradesh. It is a deciduous perennial shrub with much branched woody rootstock. Plant bark is rough, fibrous, twigs striated, hoary or somewhat white woody. It is documented as *Muḥallil-i-Riyāḥ* (Gas Resolvent), *Muqattiḥ* (diluting), *Mufattiḥ* (Deobstruent), *Muḥallil-i-Waram* (anti-inflammatory), *Munbit Sha'r* (hair growing), *Mukhrij-i-Dīdān* (Vermifuge), *Qātil-e-Dīdān* (Anthelmintic), *Tiryāq-e-Samūm* (Antidote) and recommended to be used in *Dīdān-i-Am'a* (Intestinal Worms/Helminthiasis), *Dā' al-Tha'lab* (Alopecia), *Ḥuzāz* (lichen/Seborrhoea Dandruff), *Lasa't ul-'Aqrab* (Scorpion sting poisoning) and *Rutaila* (Tarantula), etc., It has also been investigated for anthelmintic, antimalarial, hepatoprotective, antimicrobial, antibacterial, anti-diabetic, anti-fertility, juvenoid, cytotoxic, and anti-tumors activities, etc., Many chemical constituents have also been isolated from *A. maritima* L. as Santonin ($C_{15}H_{18}O_3$, M P 170-72°), two crystalline compounds, *viz.* β-santonin, a stereoisomer at C11 position (m p 216°–18°) and pseudosantonin (m p 190°), artemisin. Beside this essential oil revealed the presence of α and β pinenes, camphene, cineol (34.5%), thujone, dicyclic aldehyde camphor, bornyl acetate, citral, α-terpineol, and a sequiterpene (possibly β-caryophyllene), etc., The present review is a critique of the literature on traditional ethnopharmacology, pharmacognosy, phytochemistry, pharmacology as well as therapeutic medicinal potentialof *Darmana Turkī* (*A. maritima* L.).

Keywords: *Artemisia maritima L, Darmana Turkī, ethno-medicine, pharmacology, phytochemistry, Unani medicine*

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Introduction

The genus *Artemisia* of family *Asteraceae* is one of the largest and most complex and difficult taxa to understand. The Generic name "Artemisia" is derived from "Artemis," which refers to Diana, a Greek Goddess. In India, *Artemisia* species are mainly used in the traditional system of medicine namely Unani, Ayurveda, and ethobotanically used as incense due to their sweet aromatic odour or as an offering to local deities. There are about 500 species of *Artemisia* reported in the world and out of which about 45 species, are found in India.[1] It is interesting to know that a survey by the World Health Organization reported that about 80% of the world's populations rely on nonconventional medicines, especially herbal sources in their primary healthcare.[2] Medicinal herbs are the local heritage with global importance and the world is gifted with a rich wealth of medicinal herbs. Owing to the global trend toward improved "quality of life," there is considerable evidence of an increase in demand for medicinal plants.[3] The use of plants for treating various ailments of both humans and animal is a practice as old as human life itself. India is richly endowed with a wide variety of plants having medicinal value. These plants are widely used by all the sections of society whether directly as folk remedies or indirectly as pharmaceutical preparations of modern medicine.[4]

In India, it is traditionally used for various medicinal purposes. Flowering tops and buds are anthelmintic, useful in ascites

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Table 1: Botanical classification of *Artemisia maritima* L.[6]

Kingdom	Plantae
Subkingdom	Tracheobionta (vascular plants)
Superdivision	Spermatophyta (seed plants)
Division	Magnoliophyta (flowering plants)
Class	Magnoliopsida (dicotyledons)
Subclass	Asteridae
Order	Asterales
Family	Asteraceae (compositae)
Genus	Artemesia
Species	maritima L

and in hiccough. Its paste with water applied externally on inflammation and swelling.[5]

A decoction or infusion of the fresh plant is used in cases of intermittent and remittent fever. The flower tops are used in indigenous medicine as an anthelmintic. A poultice of the flowering tops is locally applied to relieve pain.[6,7]

The botanical classification of A. maritima L. is given in Table 1.

Synonyms: Wormseed, Shih, Sarifun, Afsantin al-Bahr.[7] (Dymock, 1976) [Figures 1 and 2]

Vernacular Names:

Arabic -Afsantin al-Bahr, Sarifun

Persian -Shih, Sariqun

English -Wormseed

French -Semencine, Barbotine

French -Absinthe maritime, Armoise maritime

Hindi -Kirmala

Hindi -Ajavayana, Chhuari

Gujrat -Kirmani-ajamo

Gujrati -Kirmanidinechi, Chhuvariajamoda

Marathi -Kirmani-ova

Sanskirit-Gadadhari

Bombay -Kiramoniowa

Gharwal -Purcha

Kashmir -Moorni

Urdu -Darmanah

Jammu and Kumaun-Seski[7-9]

Habitat

It grows abundantly in the high altitudes of the Himalayas from Kumaon to North-West Kashmir, covers the vast areas of plateau lands, mountain slopes, and in Gurez and Kistwar valleys. It is fairly common in Kulu valley and in Lahul and Spiti in Kangra district of Himachal Pradesh. It also grows in the Kurram Valley of North-Western Frontier province, and more abundantly and uniformly in Baluchistan, Chittral and Afghanistan than in the Himalayas.[6,8]

Botanical Description

It is a deciduous shrub 30–45 cm high with stems up to 1.3 cm diameter. Bark is rough and fibrous. Twigs are striated, hoary or somewhat white-woody. Leaves are 1.3–5 cm long, 2-pinnatisect; segments many, small, spreading, linear, obtuse, more or less gray-hoary or tomentose, bluish green. The upper leaves simple and linear. Petioles slender, up to 2.5 cm long, much shorter toward the ends of the shoots. Heads homogamous, 3–8 flowered, oblong or ovoid, a little more than 2.5 mm long, sessile or nearly so, in spicate fascicles in the axil of a small linear or subsetaceous leaf. Flowers yellowish, involucral bracts linear-oblong with scarious margins. Corolla with a short cylindric tube and narrowly campanulate limb. Artemisia's from different localities of the same geographical area also show variation, which may be due to various ecological factors affecting the general metabolism in the body. It has been found that the plants growing in xerophytic conditions are devoid of Santonin.

Artemisia's flowers grow at different times in different areas. In Sind valley of Kashmir, the flower grows in July, while in the inner dry regions of Chenab valley, the plants flower in late November. In Gharwal, flowering time is September. The age of individual plant and stage of growth affects the santonin content of the plant. Two-year-old plants yield more santonin than those which are 1 or 3 years old. The method and time of collection of these plants are also important because of the variation of the alkaloidal content in different months of the year as well as in the different parts and also at the various stages of its growth. The plant should be harvested during the spring and summer both for the luxuriant growth then and for the efficient drying of the harvest. Stripping the leaves and flower buds directly off the plant by hand is suggested. This enables the plants to put on fresh growth and at the same time, the stalks which lower the percentage content of the alkaloid can be excluded. The plants growing in the Gurez and Chenab valleys contain 1.2% santonin during the spring even 2.22% yield of santonin can be obtained. In Kathian also, the plant flourish well and yield even up to 2.79% of santonin.

The plants can be easily propagated be seeds or cuttings. At Yarikah (Kashmir), seeds were sown during April and May and covered with a fine sandy layer, when 15 cm tall, the seedlings were transferred to fields at 50 cm interval in rows 0.9 m apart. The plants show vigorous growth in spring and bear flowers. For good results, the crop should be kept free of white ants and weeds. Since

Figure 1: *Artemisia maritima* **L.**

Figure 2: *Artemisia maritime* **L. flowering**

the plants prefer dry soil. Irrigation is no problem. The plants put up a good vegetative growth in the 2nd year of cultivation.[6,10]

Ethno medicinal uses of *Artemisia maritima* L.

The plant is stomachic and acts against Ascaris in combination with Chenopodium. Flowering tops and buds are anthelmintic, useful in ascites and in hiccough. Its paste with water applied externally to inflammation and swelling. Flowers are a good source of santonin.[5,6]

The herb is used as a deobstruent, stomachic, laxative, and tonic. It is bitter in taste. A decoction or infusion of the fresh plant is used in cases of intermittent and remittent fever. The flower tops are used in indigenous medicine as an anthelmintic. A poultice of the flowering tops is locally applied to relieve pain.[6,7]

Application of the root juice externally to treat boils; a decoction of the leaves is taken orally to remove abdominal parasites.[11]

It is taken in the form of infusion to stimulate the appetite in the treatment of gastric and intestinal catarrh and intestinal parasitic infestations and also as a mild diuretic. It is a bitter tonic used in indigestion and in gastric troubles.[12]

Chemical Constituents

Santonin is a compound, isolated usually from the unexpanded flower heads of Artemisia's. For profitable utilization, the herb should contain not <1.2% of santonin. An average of 1.3% of santonin is obtained, if a collection is made at the correct stage of development of the plant, although individual samples carefully collected have been reported to contain up to 2.2%.

Beside santonin ($C_{15}H_{18}O_3$, M P 170-72°), the plant contains two crystalline compounds, *viz* β-santonin, a stereoisomer at C11 position (m p 216°-18°) and pseudosantonin (m p 190°). β-santonin is less anthelmintic in action than santonin, and pseudosantonin is devoid of anthelmintic property. Another bitter principal, artemisin (7-hydroxysantonin $C_{15}H_{18}O_4$, M P 208°) is also present in the plant. Steam distillation of the air dried herb from Jammu yields an essential oil (0.32%) with the following physical constants: sp gr20°, 0.9767; $n20°_D$,1.4880; $[\alpha]_D$,12°2'. Gas chromatography of the essential oil revealed the presence of the following constituents: α and β pinenes, camphene, cineol (34.5%), thujone, dicyclic aldehyde camphor, bornyl acetate, citral, α-terpineol, and a sequiterpene (possibly β-caryophyllene). (Anonymous, 1988). The wormseed yield from 1 to 2% of essential oil, having its characteristic smell and taste. The oil is slightly levogyrate, and chiefly consists of the liquid $C^{10}H^{18}O_2$ accompanied by a small amount of hydrocarbon.[7]

Volatile oil containing β-thujone, α-thujone, α-pinene, sabinene, p-cymene, sabinol cuminaldehyde, isobutyrate, isovalerate, sesquiterpene peroxysemiketal, 1,8-cineole, camphor, borneol, chrysanthenone, Aerial parts essential oil from Pooh, Himachal Pradesh, India contain 1,8-cineole (23.8%), chrysanthenone (17.5%), Aerial parts essential oil from Rhongtong Pass, Himachal Pradesh, India contain 1,8-cineole (37.3%), chrysanthenone (38.1%), aerial parts essential oil from Lahaul-Spiti, Himachal Pradesh, India contain 1,8-cineole (44.2%), camphor (9.2%), borneol (10.9%), sesquiterpene lactones santonin, fatty acids. Essential oil from the aerial parts growing in Chamoli district of Garhwal (Uttarakhand), India contain 1,8-cineole (23.6%), chrystanthenone (25.7%), germacrene D (6.7%). Aerial parts containing essential oil found in Lahaul-Spiti, Himachal Pradesh, India showed 1,8-cineole (27.2%), camphor (44.4%), camphene (5.9%).[13,14]

Method and Time of Collection of Santonin

The collection of santonin in the month of July and August give the maximum yield. In the first half of September, the santonin content decreases and after that it is either absent or only traces are present.

For the extraction of santonin, the crushed plant material is first subjected to steam distillation to separate the essential oil. It is then extracted with benzene in an extraction vessel. After 24 h, the solvent is distilled off and the residue is then boiled with lime water when santonin passes into solution as calcium santoninate. The solution, after filtering, is cooled and treated with hydrochloric acid until just acidic to Congo red and allowed to settle for 24 h in the dark. The precipitated santonin is filtered and the filtrate thrown away. Santonin thus obtained is contaminated with resinous matter, which is removed by repeated treatment with 4% sodium bicarbonate. The crude santonin of pale yellow color thus obtained is washed and dried at the room temperature in the dark. The dried santonin is dissolved in 80% alcohol or methylated spirit, treated with a decolouring charcoal (2%) and finally purified by recrystallization. The yield of santonin amounts to 90%–95% of its content in the plant.[5,6]

Santonin, a sesquiterpine lactone, is a classical remedy for the treatment of Ascaris and Oxyuris infections. In man, large doses (more than 0.3 g) cause poisoning; in children small doses of 1 grain (0.06 g) produced serious and in some cases fatal poisoning. Santonin usually administered in very small doses; it causes xanthpsy (yellow vision) and sometimes also violet vision. Leaves and buds also contain β-santonin (a stereoisomer at C11 position), less anthelmintic. Herb α-santonin and other bitter principle artemisin (7-OH-santonin). Essential Oil contains besides santonin, cineol (9.3%) and others.[5]

Artemisia's from different localities of the same geographical area also show variation, which may be due to various ecological factors affecting the general metabolism in the body. It has been found that the plant growing in xerophytic conditions are devoid of santonin.[6]

Pharmacological Studies

Anti-malarial activity

Extract of *Artemisia maritima* L. in ethanol and light petroleum were tested for anti-malarial activity. *In vivo* studies were carried out in mice using the Rane test. The entire compound prolonged survival time of mice as compared to control mice in the dose range of 640-320 mg/kg subcutaneously. Chloroquine sensitive (FDL-RI) strain of plasmodium falciparum was used for *in vitro* studies. Extract compound inhibited Schizont maturation in concentration dependent manner in the range of 2.5 trg to 40 pg per 100 ml blood.[15]

Hepatoprotective activity

The hepatoprotective activity of aqueous-methanolic extract of *Artemisia maritime* L. was investigated against acetaminophen and carbon tetrachloride-induced hepatic damage. The plant extract at a dose of 500 mg/kg showed significant activity against both acetaminophen and CCl_4 induced hepatic damage. Moreover, it prevented CCl_4 induced prolongation in pentobarbital sleeping time confirming hepatoprotectivity and validates the traditional use of this plant against liver damage.[16]

Anti-microbial activity

Flavonoid compounds present in *A. maritima* L. have been shown to be responsible for its anti-microbial activity.[17]

Antialgal activity

Ethanolic extract of *A. maritima* produced the highest inhibition of algal growth.[18]

Anti-bacterial activity

The plant showed anti-bacterial activity (Yashphe *et al*., 1979). Anti-bacterial effects was also assessed by an agar dilution assay demonstrated greater activity of *A. maritima* essential oil against *Staphylococcus aureus* and Pseudomonas aeruginosa compared to *Artemisia nilagirica*.[13]

Anthelmintic activity

Artemisia brevifolia whole plant possesses anthelmintic activity against nematodes.[19] The study was designed to evaluate *in vivo* and *in vitro* anthelmintic activity of *Artemisia vestita* Wall ex DC. and *A. maritima* L. against *Haemonchus contortus* in comparison with ivermectin to investigate the effect of plant extracts on survival of infective L3 and adults under *in vitro* condition. Plant extracts were given to *H. contortus*-infected sheep orally and it was infected with L3 stage of *H. contortus* at dose of 5000 larvae/sheep. A total of 25–30 larvae were incubated with plant extracts in PBS alone and ivermectin at different concentration used as the positive control. It was recorded that there is a significant decrease in fecal egg count (FEC) after posttreatment period for both plants. The highest FEC reduction for *A. vestita* was 87.2% at 100 mg/kg while for *A. maritima,* it was 84.5% on day 28 posttreatment. Investigated extracts indicated significant activity against larvae and adult worms.[20]

Anti-diabetic activity

It showed potent anti-diabetic activity.[21]

Anti-fertility activity

A. maritima has anti-fertility activity and its constituent namely santonin has been reported to be a potent anti-fertility agent in mice. Studies on hormonal and anti-hormonal effects of santonin in albino mice revealed that it had no androgenic, oestrogenic, anti-oestrogenic, progestational and anti-progestational effects. Santonin does not antagonize the effect of oxogenous gonadotropin.[14]

Juvenoid activity

Shade dried material was extracted with petroleum ether (40°–60°C) in Soxhlet's apparatus. The extract was filtered and dried under the reduced pressure. The residue was extracted with acetone and the acetone extract was

concentrated at reduced pressure at the room temperature. The acetone fraction in 500 µg concentration was used and it showed significant Juvenoid activity.[22]

Cytotoxic and anti-tumors' activity

It showed significant cytotoxic activity against *A. salina* leach and Daphnia magna Stratus. Extracts of these plants also showed anti-neuplastic activities in potato disk assay. The use of *A. maritima* L. against tumor has been documented in the review by Hartwell.[23]

Miscellaneous

The effect of the extract of *A. maritima* L. a medicinal plant, was found significantly toxic to the larvae of *Musca domestica* L., commonly known as housefly.[24] 1,8-Cineole has been shown to inhibit castor oil-induced diarrhea in rats,[25] prevent ethanol-induced gastric injury in rats.[26] and attenuate tri-nitrobenzene sulfonic acid-induced colitis in rats,[27] and so this compound may be an important component in the traditional use of 1,8-cineole-containing herbal medicines for stomach problems.

Cineole, a volatile oil isolated from the seeds of *A. maritima* shown to have more toxic effect as compared to that of santonin solution (0.0175%).[28]

- **Part used**
  - Soft aerial parts at the flowering stage and leaves are used[1]
  - Flower.[29]
- **Temperament (*Mijaz*)**
  - Hot 2° Dry 3°[30]
  - Hot 3° Dry 3°[31]
  - Hot 2° Dry 2°.[29,32,33]
- **Dose (*Miqdaar-e-Khuraaq*)**
  - 1.75–9 g[29]
  - 9 g[33]
  - 1–3 g.[34]
- **Toxicity or adverse effect (*Muzir Asraat*)**
  - Harmful for stomach[30,33,34]
  - Produce headache in excessive doses[31]
  - Harmful for head[29,32,34]
  - Harmful for lungs.[32]
- **Corrective (*Musliḥ*)**
  - *Banafsha* (*Viola odorata* L.)
  - *Masṭagī* (*Pistacia lentiscus* L.)
  - *Kishnīz* (*Coriandrum sativum* L.) and Turmus (*Lupinus albus* L.).[29,34]
- **Subtitutes (*Badal*)**
  - *Afsanteen* (*Artemisia absinthium* L.) in equal weight
  - *Qinbail* (*Mallotus philippensis* (Lam.) Mull. Arg.) in half weight or Barg-e-Pudina Barri (*Mentha spicata* L.)
  - *Baobarang* (*Embelia ribes* Burm. f.)
  - *Sudāb* (*Ruta graveolens* L.) in equal weight.[33,34]
- **Compound formulation**
  - *Itrifal-e-Habb-ul-Qara*, *Habb Qatil-e-Didaan*[35]
  - *Itrifal Qinbail*[36]
  - *Itrifal Didaan*.[34,36]
- **Taste of drug (seed);**
  - *Talkh* (Bitter)[9,31,34]
  - Salty and bitter with salty tint[29]
  - *Taiz* (Pungent).[32,36]
- **Pharmacological actions**
  - *Muqatteh* (Diluting), *Muhallil-e-Riyah* (Gas Resolvent)
  - *Musakhkhin* (Calorific), *Qaatil-e-Deedaan* (Anthelmintic)
  - *Mudir-e-Baul* (Diuretic)
  - *Mudir-e-Haiz* (Emmenagogue)
  - *Tiryaaq-e-Sumoom* (Antidote), *Mukhrij-e-Deedaan* (Vermifuge)
  - *Mulattif* (Demulscent), *Musakkin* (Tranquillizer/ Sedative), *Qabiz* (Astringent)
  - *Jazib* (Absorbant), *Musakhkhin meda* (Gastric Calorific)
  - *Mufatteh* (Deobstruent)
  - *Mudir Fuzlaat*
  - *Mohallil-e-Waram* (Anti-inflammatory)
  - *Mukhrij-e-Balgham* (Expectorant)
  - *Kasrat-e-Baul* (Polyuria), *Mufatteh Suddae-Jigar* (Liver Deobstruent), *Kaasire-Riyaah* (Carminative)
  - *Qateh Balgham* (Incisor of Phlegm)
  - *Mudammil* (Cicatrizant/Healing agent), *Jaali* (detergent)
  - *Munbit Shaar* (Hair Growing).[29-31,33,34]
- **Therapeutic uses**
  - *Daus Salab* (Alopecia), *Lasa't-ul-Aqrab* (scorpion sting poisoning)
  - *Doomful* (Boil), *Aashoob-e Chasm Barida* (conjunctivitis)
  - *Waram* (Inflammation)
  - *Habbul Qara* (Pin worm)
  - *Kirme-Shikam* (Intestinal Worms/Helminthiasis)
  - *Rutaila* (Tarantula)
  - *Huzaz* (lichen/Seborrhoea Dandruff), *Kalaf* (Freckles), *Taqashshure-Jild* (Ichthyosis)
  - *Fuwaaq (*Hiccough) *Sua'al* (Cough), *Faalij* (Paralysis), *Hudaar* (Rheumatism)
  - *Istisqaa* (Ascites)
  - *Maghs-e-Meda* (Tenesmus), *Warame-Meda* (Gastritis).[29-31,33,34]

Discussion and Conclusion

Herbal medicines are used worldwide in the traditional treatment of various ailments and diseases. An exhaustive survey of literature revealed that sporadic information is available on more than 30 species of Artemisia. These species have been investigated for their phytoconstituents and pharmacological activities. Terpenoids, flavonoids, coumarins, caffeoylquinic acids, and sterols constitute the major classes

of phytoconstituents of the genus. It is also found that *A. maritima* Linn. possess high percentage of terpenoids. In the present review, we emphasized on the summary which have been proven traditionally and on the scientific parameters. We have further emphasized to explore its botanical, phytochemical, ethno pharmacological, and pharmacological reports on the species maritima. It is considered safe and effective Unani Medicine without any adverse effect, so it can be concluded that *Darmana Turki* (*A. maritima* Linn) is traditionally and clinically proven drug.

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Conflicts of interest

There are no conflicts of interest.

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Review Article

Significant Diagnostic Indicators of Diseases in the Unani System of Medicine

Abstract

The Unani system of medicine has been known for its potential since ancient times. Unani physicians emphasized prevention and promotion of health preferably, rather than disease cure. With its glorious past, the Unani system of medicine has vast treasures of knowledge based on logic, observation, experiment, and empirical description. Both health and disease are described in their way concerning functions emanating from the body parts. All systems of medicine have evolved to alleviate human suffering, promote health, and prevent and treat diseases, each guided by its own philosophy and principles of diagnosis and treatment. The diagnosis of diseases plays a vital role in successful treatment. Hence, Unani legends have made the pathophysiological dimensions in three ways, that is, *Asbāb* (causes), *A'rāz* (symptoms), and *'Alāmāt* (symptoms and signs) of each disease for their proper understanding. Some specific signs and symptoms of different diseases were focused on here, as highlighted by several Unani scholars in their classical texts. This study focuses on diagnostic determinants based on *'Alāmāt*, which play a crucial role in identifying and understanding various health conditions. *'Alāmāt*, or clinical signs and symptoms, serve as key indicators in diagnosing diseases by providing insights into the nature, severity, and progression of an ailment. Existing literature was surveyed to collect relevant information regarding the diagnostic indicators. Furthermore, an attempt was made to elaborate related descriptions of the signs and symptoms of diseases from various classical books, manuscripts, indexed journals, and websites. The signs and symptoms of each disease were described painstakingly and categorized in a general and specific mode. It also illustrated how the earlier diagnostic indicators are still important and have relatively more weight in diagnosing diseases. The literature survey revealed that the diagnostic indicators are variable because the involvement of the organs and disease patterns is quite dissimilar. The essence and temperament of each organ differ, so the disease tendency among them fluctuates and is inconstant. The general symptoms may be the same for a particular group of temperament, but the specific one is distinctive. It is concluded that understanding diagnostic indicators is necessary as the diagnosis of a disease is impossible without approaching it.

Keywords: *'Alāmāt, concept of disease, health, Sū'-i-Mizāj, Tashkhīṣ*

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Introduction

In the Unani system of medicine, Tibb is classified into two types: Nazri and 'Amalī. Nazarī is further classified into four types: (1) Umūr Ṭabi'iyya (essential factors), (2) Aḥwal-i Badan (condition of the body), (3) Asbāb (causes), and (4) Dalā'il (indicators). The Dalā'il, that is, signs and symptoms, indicates one of the three states of the human body, that is, health, disease, and the intermediate state.[1-3] Some of the signs show the equitability of temperament. Some show the evenness of structure, that is, constitution, position, quantity, and a number of the organs; some are accidental, that is, beauty and comeliness; and some are final, that is, complete functions and their continuance in perfection.[4]

Signs and symptoms indicate the disease as rapid pulse in fever because it indicates the fever as such. Some of them indicate the location of the disease. For example, a serrate pulse in the case of pain in the chest region suggests that the swelling is in the pleura and diaphragm. Similarly, a wavy pulse in a similar condition indicates that the swelling is in the substance of the lungs. Some signs also indicate the cause of the disease, such as signs of repletion in its different states. Each type of sign corresponds to a particular type of repletion; each type of sign shows a particular type of repletion. Some of the symptoms are temporarily determined. They begin and

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end with the disease, such as acute fever, pricking pain, dyspnea, dry cough, and serrated pulse with pleurisy. Some of these symptoms appear at the end of the disease, for example, signs of crisis, lack of maturation, and death. Some of the symptoms show the disease of external organs. They are discernible either by sensory perceptions such as color or the sense of touch in hardness, softness, heat, and cold or by all the senses together with the constitution of the organ, with their position, movements, and rests. Some of the symptoms reveal the internal states, as a tremor of the lip reveals vomiting. Some of the symptoms show the internal states of the organs, such as shortness of fingers, which denotes smallness of the liver.[4,5]

To make inferences from stools, such as in the case of jaundice, whether they are black or yellow is based on the sense of sight. Similarly, the inference from flatulence and indigestion from borborygmus is based on the sense of hearing. The drawing of inferences from odors, tastes, etc., is also the same kind. Inference of consumption and hectic fever from the curving of the nails is concerned with the sense of sight, but it is in the category of joint senses. Some of the visible things reveal some internal matters, such as redness of cheeks, which shows swelling of the lungs, and the curving of the lungs, which indicates the ulcer of the lungs.[4,5]

These are a few examples of how a disease shows its manifestations throughout the body, resulting in changes in humoral or structural properties. Both humoral and structural changes in the body alter the functions from a natural to an unnatural state. This is because the Mizāj of the body indicates the normal function, whereas the Sū-i-Mizāj is an abnormal state of the body.

Methodology

The methodology framework of the current study consisted of three steps:

1. Literature review: Most of the information was gathered from different classical sources with their Urdu translations such as Kamil us Sana ‘a, Al-Qanūn Fil Tibb, Zakhira Khwarazm Shahi, Kitabul-ul-Kulliyat, Kulliyat Qanūn, Kulliyat Nafīsī, Kitab-ul-Mukhtarat fit Tib, and Kitab al Taiseer
   Secondary sources, including periodicals, journals, and theses, were consulted.
2. Literature analysis: The collected data were carefully examined before being organized systematically and comprehensively. The relevant literature was compiled based on the current and previous spectrum of understanding.

Observation

Khilṭi Amrāḍ (Humoral doctrine and diseases)

The material world is nothing but a chain of cause and effect. A cause for its existence binds everything. Every incident and every phenomenon in this vast universe is the manifestation of a particular cause. Every disease has an underlying cause. The treatment of a disease cannot be successfully carried out so long as its cause is not detected. In every medical system, some factors are instrumental in causing diseases. For example, modern medicine believes in microorganisms and holds them responsible for causing disease. However, Unani medicine considers disequilibrium in the quality or quantity of the fluids of the body as the real cause of disease. From the perspective of Unani medicine, it is called the humoral doctrine. According to the doctrine stated above, as long as the humor of the body remains in the right proportion, both in quality and quantity, health is maintained, However, any disturbance in their quality or quantity leads to disease.[1]

Various reasons can affect not only the quality but also the quantity of Akhlāṭ in the body.

The pathological changes that occur in Akhlāṭ can be summarized as follows:

1. Change in consistency, that is, Khilṭ becomes thick or thin
2. Increase or decrease the quantity of Khilṭ either local or systemic
3. Putrefaction of Khilṭ
4. Iḥterāq of Khilṭ [Figure 1].

Tashkhīṣ (diagnosis)

Rabban Tabari enunciated a law for this medicine that “a state cannot exist without a cause.” Hence, it is necessary to know about the causes of the states of the body. These causes may be evident or noticeable, but sometimes, they are hidden, so the senses cannot perceive them. Knowing about these causes, signs, and symptoms provides guidance.[1,6]

The difference in signs and symptoms of health and disease helps determine the body’s prevailing state. Identifying and differentiating these symptoms and concluding the existing state is known as tashkhīṣ. Keep the following points in mind when the diagnosis of the disease is made.

1. History
2. Examination
3. Investigation.[7]

Rabban Tabri is in view that an appropriate diagnosis has been made by asking various questions, examining pulse, urine, and stool, and knowing specific conditions and functions of A‘ḍā’-i-Ṭabī‘iyah (vegetative organs) as he mentioned three methods of diagnosis in his book Firdaus ul Hikmat.

1. Mu‘āina (observation): diagnosis would be made by observing the color, ahsās, pulse, etc.
2. Mujāssa (palpation): Diagnosis is based on the experience of skin warmth, coldness, smoothness, or hardness through palpation
3. “Sawālāt” or questioning (history taking): Diagnosis is based on asking about diseases of the patients or their relatives. For example, the onset of disease, either its

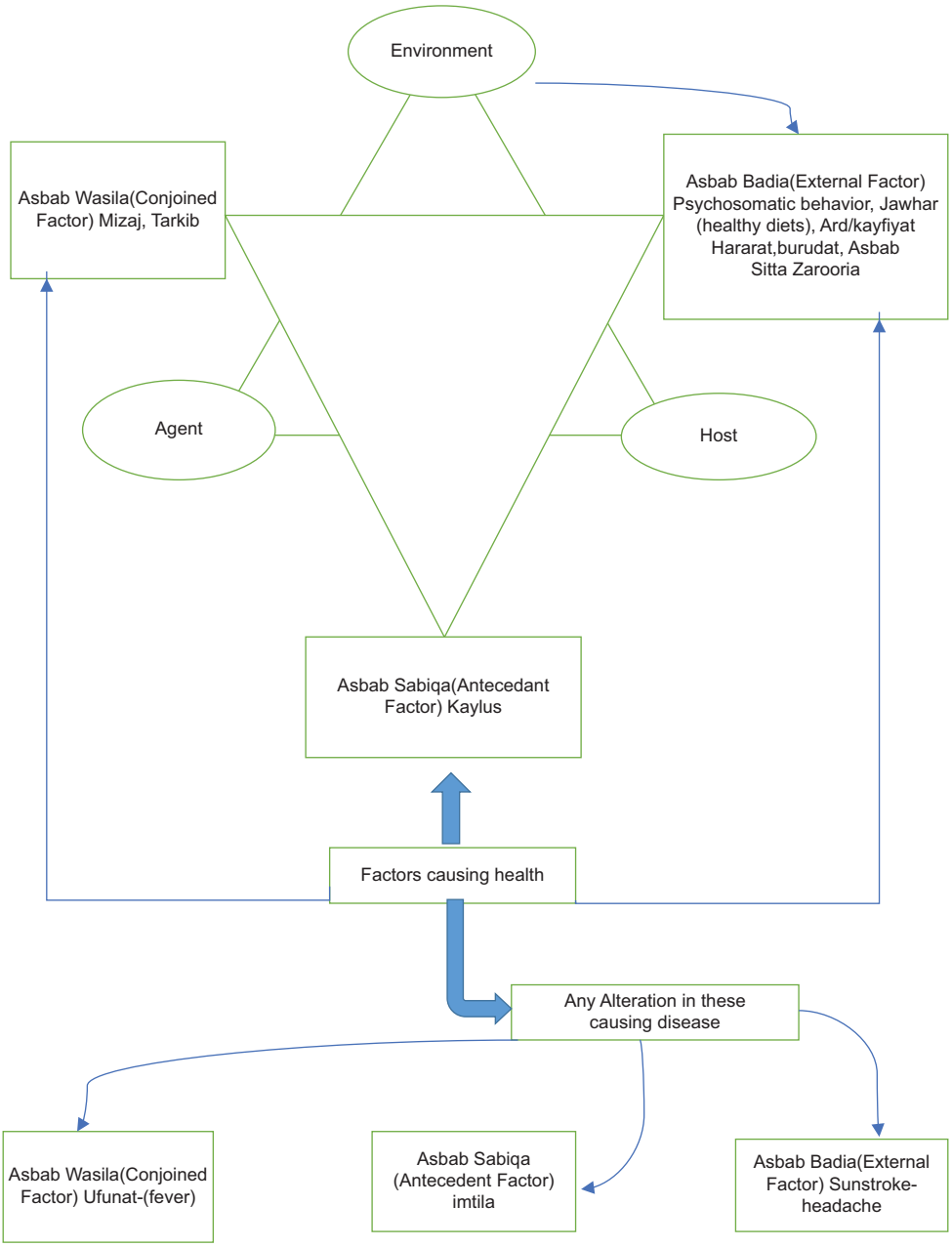

Figure 1: Epidemiological Triad: In light of the Unani System of Medicine[37]

aggravation or its regression, favorable and unfavorable factors like food and other activities, etc.[8]

When a physician wants to understand the degree of the disease, he or she should thoroughly examine the patient's pulse, urine, and stool and observe the changes for at least 3 days. Positive changes in these three suggest that the disease will be resolved in the following days, while negative changes indicate that the disease duration will be extended. Inquire about the patient's pain and sleep patterns; if both are normal, the brain is in good shape. A normal appetite indicates that the digestive organs are in good condition when asked about hunger.[9] The above description of diagnosis and evaluation methods suggests that Unani physicians had a vast knowledge about the importance of history-taking and evaluation methods. The diagnosis is made by observing signs and symptoms, which are referred to as Ilmul Dalā'il or Dalā'il-Tashkhīṣ. According to Majusi, Ilmul Dalil pertains to understanding symptoms as reflections of the body' condition.[3]

Dalā'il Tashkhīṣ / A'rāḍ-wa-'Alāmāt (Diagnostic Tools – Signs and Symptoms)

Ibn Nafis states that 'Alāmāt are the manifestations of health and disease, directly or indirectly reflecting the conditions of the body.

The entity that presents before the disease and prompts the disease is known as the "cause," while the entity that appears after the disease is called A'rād.[8]

A‘rāḍ is one of the unnatural states of the body inferred due to the disease and is subordinated to it. When they appear after a disease, physicians call them A‘rāḍ, and when the physicians take help to diagnose a disease, they are called ‘Alāmāt.[2,3,14]

Some Unani physicians use the term A‘rāḍ specifically as the complications of the diseases, whereas ‘Alāmāt indicates any state of the body. However, some physicians used the term A‘rāḍ as a synonym for ‘Alāmāt. The categories of ‘Alāmāt are given in Table 1.[1-3,10,11]

Allama Nafees summarized the ‘Alāmāt in two ways: either the Mizāj or Tarkīb.[12] Almost all Unani physicians claim different parameters for determining Mizāj. However, there were controversies regarding the numbers and types of determinants. The determinants conceptualized by various scholars are given in Table 2.[13]

Different states of A‘ḍā’ Ra’īsa and their ‘Alāmāt

Most of the scholars categorized the compound organs as A‘ḍā’-i-Ra’īsa (vital organs)[19] and Ghayr Ra’īsa. Some of the compound organs, known as A‘ḍā’-i-Ra’īsa, serve as centers for the origination of Quwa, which are essential for bodily functions and the maintenance of life:

- Quwwat-i-Nafsāniyya (psychic faculty) originates from the brain, which controls sensation, judgment, and motor activity. The brain provides the body’s capacity for sensation and movement through its nerves. ‘Alāmāt of the temperament of the brain is given in Table 3[3,15]
- Quwwat-i-Ḥaywāniyya (vital faculty) originates from the heart, which provides life, blood, Rūh Ḥaiwāni, nutrition, Rutūbat, and innate heat to the whole body. ‘Alāmāt of the temperament of the heart is given in Table 4[3,14,15]
- Quwwat-i-Ṭabī‘iyya (vegetative faculty) originates from the liver, providing nutrients to the whole body for its survival, sustenance, and removing waste.[20,21] It provides Badl Mā Yataḥallal (replenishment) against the dissolute matter of the body. ‘Alāmāt of the temperament of the liver is described in Table 5[3,14]
- Quwwat-i-Tanasuliyya is an essential organ for the continuation of generations and species.[11]

Ibne Hubal Baghdadi believes that ‘Alāmāt represents the diseased organs of the body. If the disease occurs in an external organ, it can be diagnosed by external senses such as changes in skin color or its Kayfiyāt (hotness, coldness, firmness, or smoothness) or changes in quantity or quality of other external body parts.[10]

‘Alāmāt associated with diseases of A‘ḍā’ Bāṭina (internal organs)[1,3,11,12]

Anatomical structure helps with the diagnosis of internal sickness in the following ways:

1. Organ substances, either fleshy or nonfleshy, help diagnose excretory body parts
2. Khilqat or Shakl (form): Any differences in shape can aid in distinguishing between organs and associated swellings. If Waram is crescent in shape under the ribs on the right side, it indicates Waram Jigar. Moreover, if it is not, the Waram belongs to another body organ
3. Retention of something: Whether an organ holds it or eliminates it fast, for example, in Am‘ā’ Ṣā’im (jejunum),

Table 1: Categories of *‘Alāmāt*

Categories of *‘Alāmāt*
According to Galen, knowledge of the present state of the body is known as “*Dāl*.” Galen states that this benefits the patient merely because it shows him what to do[1-3,10,11]
Knowledge of the past state, known as “*Muzakkir*,” is advantageous to the physician alone because physicians understand the past state of the patient and do accordingly, for example, a wet body indicates sweating[1-3,10,11]
Knowledge of the future state is known as ‘*Taqaddimatil m‘arifa’/Sabiq al‘Ilm* is advantageous to both (patient and physician). Because of this, it causes them to estimate the dexterity of art and get greater reliance of people upon him. Furthermore, it makes the patient understand the precautions that need to be observed[1-3,10,11]
Ibn Sina mentioned that a category of signs and symptoms which explains the health and disease known as *‘Alāmāt Ṣiḥḥiyya* and *Maraḍiyya*, respectively[5]
‘Alāmāt-e-muwaqqita (some symptoms have a temporal component): Such as acute fever, prickling pain, dyspnea, dry cough, and serrated pulse with pleurisy
‘Alāmāt-e-ghayr muwaqqita (some symptoms have no time relationship): Sometimes, they have the sickness, and sometimes they do not, such as a headache in the event of a fever
‘Alāmāt concerning the structure
‘Alāmāt Jawhariyya (structural signs): Signs related to the body’s structure, that is, normality or abnormality of structure, number or quantity, and position
‘Alāmāt ‘Arḍiyya - related to external factors, that is, the pleasing or displeasing look of an organ
‘Alāmāt Tamamiyya (functional signs) - related to the functions of the organs
‘Alāmāt in respect of *Mizāj*
‘Alāmāt jawhariyya: Normalcy of *Mizāj* or dominance of heat, cold, dryness, or wetness
‘Alāmāt ‘Arḍiyya: Moderation of *Malmas* (touch) like hotness, coldness, wetness and dryness, or immoderation of *Malmas*
‘Alāmāt tamamiyya: Well-established *Quwa* or disturbance in *Quwa*[11]

Table 2: Determinants for *Mizāj* by various physicians

Determinants			
Galen (129–200AD) described[13] Touch (*Kaifiyat jawhariyya*) Firmness and flaccidity Muscularity and adiposity Hairs Complexion	Rabban Tabari (770–850 AD) described[8] Body complexion Hairs Muscle and fat Touch Function	Majusi elucidates the following[3] Touch Complexion Hairs Physique Body functions	Ibne Rushd viewed only three[14] Functions of organ Body complexion Physique
Ismail Jurjani followed the description of *Mizāj* as stated by Galen[2]		Razi (850–923AD) followed the doctrine of Majusi, and he differed in some ways by mentioning the "Excreta of the body" instead of "hairs"[15]	
Ibne Sina described the most accepted ten determinants known as *Ajnāse 'Ashra*[1,16]			
Malmas (touch)[4,11,17]			
Laḥm-o-Shaḥm (muscularity and adiposity)[4,11,17]			
Body hairs[10,18]			
Considerable parameters to determine the temperament with hairs are as follows:			
Rate of growth (slow or fast)			
Color (blackish/white/brown/black)			
State of texture (fine/coarse)			
Distribution			
Density (dense or sparse)			
State of shape (curly/straight)			
Lawn al-badan (complexion)[4,10,18]			
Hāyat al-A'ḍā' (physique)[4,10,18]			
Kayfiyāt i-Infi'āl *(*responsiveness of the body organs)[1,10]			
Nawm-o-Yaqẓa (sleep and wakefulness)[4,10,18]			
Af'āl-i-A'ḍā' (functions of organ)[4,10,18]			
Fuḍlāt e Badan (excreta of the body)[4,10,18]			
Infi'ālāt Nafsāniyya (psychic reactions)[4,10,18]			

Table 3: *'Alāmāt* of the temperament of the brain

Signs of moderate temperament: The nasal secretions originating from the brain are balanced in both quality and quantity. Sleep and wakefulness are within the normal limit. People who are not so weary as well as not energetic with temperate memory[14]
Hot and dry temperament: Active in all works, brave, aggressive, abusive, quick in deciding, and sleeplessness. The secretions from the brain are lesser in amount, thicker, and processed. All the characteristics of hot temperament exaggerate with dryness[3,15]
Hot and moist: Somnolent and dreamy, moderate in actions, and secretions of the brain are excess in amount and processed. Such a person easily suffers from coryza[3,15]
Cold and moist: Sluggish and dumb, easily forget things, weak understanding, slow and weary in almost all functions, and excess sleep. Secretions from the brain are excess in quantity and raw in consistency[3,15]
Cold and dry: People comparatively sleep less than people who have a cold and moist temperament, and almost all features of a cold temperament are exaggerated. The secretions are moderate but raw in consistency[3,15]

nothing can be held therein but excretes fast. The feces usually stay in A'war (colon) and Mustaqīm (rectum)

4. Site: It is also important to note that pain on the left side indicates the disease of Ṭiḥāl
5. Mushārikat/relationship: Whether the pain is produced by the involvement of a neighboring organ or a specific organ. If a disease is confined to a specific organ, it typically indicates that the root cause originates within that organ itself. This direct correlation helps in diagnosing and treating the condition effectively. However, in cases where a disease manifests in a particular body part without an apparent local cause, it suggests the involvement of a neighboring or connected structure. For example, if a person experiences unexplained pain or dysfunction in a finger without any visible injury or infection, the underlying issue may stem from a spinal nerve injury
6. Nature of organ: The nature of the particular organ should be known, that is, Chhalle (rings) indicates injury in Qaṣaba al Ri'a and Ghalīẓ Qashr indicates an

Table 4: *'Alāmāt* of the temperament of the heart[14]

Moderate temperament: *Nabḍ* is moderate between *'Aẓīm* (Magnus), and *Ṣaghīr* (small) and *Sarī'* (fast) and *Baṭi* (slow), *Mutafāwit* (infrequent), and *Mutawātir* (frequent). Breathing rates moderate, moderately psychic reactions such as anger, understanding, bravery, and cowardice[22]
Hot and dry temperament: The condition of the pulse and breathing is *'Aẓīm*, *Sarī'* and *Mutwātir*; individuals with this temperament get angered easily. He is vigorous in all functions[3,14,15]
Hot and moist temperament: The pulse is *'Aẓīm* and rate is moderate, and *Malmas* is *Layyin*. The same is true with breathing, and anger comes easily and disappears quickly[3,14,15]
Cold and dry temperament: Pulse and breathing are *Ṣaghīr*, *Ṣulb*, *Baṭī*, *Mutafāwit*. A person will be a coward, fool, and lazy and his heart will look old[3,14,15]

Table 5: *'Alāmāt* of the temperament of the liver

Moderate temperament: Blood of red color, and the complexion is whitish red. Some people consider it a dusky color. Moderate built if veins in moderate between narrow and wide[14]
Hot and dry temperament: It produces excess *Ṣafra'*. The body's complexion becomes yellowish and dull with sunken eyes and dryness of the lips and mouth. Due to excess heat in the liver, *Ṣafra'* can be changed into *Sawdā'*, which causes to increase in the viscosity of blood[3,14]
Hot and moist temperament: The dominant humor is blood because its signs of dominancy are seen in the body. Vessels are wide and soft[3,10]
Cold and dry temperament: The dominant humor will be *Mirra-i- Sawdā'*. Furthermore, its complexion is bluish, greyish,[15] and narrowed vessels[14]
Cold and moist temperament: The complexion is lime white and causes excess production of phlegmatic blood[14]

ulcer of the large intestine. If it is delicate, it indicates injury to the small intestine

7. Nature of functions: Whether or not the diseased organ causes the derangements of functions.

The above salient points are based on anatomical structure, which provides crucial knowledge for diagnosing internal organ diseases.

In addition, the following features help diagnose internal organ diseases:

I. Functional disturbances: These are the direct and most reliable indicators of internal illness:
   1. Nuqṣān Afʿāl (Impairments): These include conditions such as poor vision or shortsightedness. Similarly, a weakened stomach results in slow digestion
   2. Taghayyur Afʿāl (Altered Functions): This refers to changes where things do not appear in their original form, such as visual hallucinations, illusions, or improper digestion leading to food decomposition in the stomach
   3. Buṭlān Afʿāl (loss of function) such as eyesight loss or absolute digestive upset.

II. Excretions: These can assist in the diagnosis of internal diseases.[3]
   1. If Thufl Rāsib (sediments) is deposited in urine and akin to Subūs, it indicates urinary bladder disease; if it is similar to pieces of meat, it indicates kidney disease
   2. If the cough produces an excretion with a cartilaginous texture, known as Kurri, it indicates that a structure like Lisān al-Mizmar has been damaged, undergone necrosis, and is being expelled during coughing[3]
   3. A considerable amount of blood in the stool shows the illness in the large intestine. On the contrary, less blood in the stool indicates that the small intestine is afflicted[3]
   4. A conspicuous amount of blood in sputum implies lung diseases, whereas a small amount shows disease in the Qaṣba al Ri'ya
   5. If the cough contains ḥalqa (clusters of membranes), it indicates that the Jirm (tissue) of the lungs has been affected and undergone necrosis. This suggests that the Ruṭūbat (moisture) of the lungs is being expelled during coughing
   6. If food is expelled without being completely digested, the wound is accessed to the stomach. If fuḍla (stool) is excreted, the wound is accessed to the intestine, but if urine is produced, the wound is accessed to the bladder
   7. If an ulcer in the chest and it seems the air is coming from the same, the pleural membrane will be ruptured
   8. A high amount of bleeding from the body indicates that a vessel has ruptured
   9. If bleeding occurs in spurts and is brick red, the Rag Jahinda has been ruptured.[3]

III. Wajaʿ/pain: The symptoms of discomfort/pain are elicited in the following ways:[11]
   1. Location
   2. Nawʿiyat (nature), for example, Wajʿa Thaqīl (dull aching) may indicate the affliction of an insensitive organ or an organ that has been turned insensitive by Waram; Wajʿa. Tamaddud (stretching) occurs due to an excess of morbid material, and Wajʿa Lazaʿ (irritating pain) reveals that there is an irritating morbid matter in the organ
   3. If pain is accompanied by fever, it indicates less sensation in the pain-related organ. If pain is accompanied by Imtidād (stretching), it implies that the pain is in the nerves. If there is no excess of tamaddud, the disease should be in the muscles. If there is Takassur (shattering) along with pain, the disease will be in Ghishā' (membrane) covering the bone.[3]

IV. Waram: The distinguished features related to Waram are of three types:[11]
   1. Waram Jawhar, for example, Ḥumra (erysipelas) denotes dense bilious humor, whereas hard swelling denotes Sawdā'
   2. Site if swelling in the lower part of the right chest indicates inflammation of the liver, while the lower

part of the left chest indicates the inflammation of the spleen
3. Shakl (Shape), a longitudinal swelling, indicates the inflammation of abdominal muscles over the liver.

V. Waḍ'a (position)/Mushārikat: It helps in making a diagnosis in following ways:[3]
   i. Relationship
   ii. Site

The site:

1. Pain in the fingers can serve as an early indicator or Sabab Sabiq of an underlying condition, specifically a disease or injury affecting the sixth cervical nerve (C6) in the neck
2. A change in body color: Whether blackish or whitish can suggest the presence of liver illness[3]
3. A change in tongue color indicates Tap Muḥarriqa (hyperpyrexia)[3]
4. A change in the shape of the nail indicates Sil (phthisis)
5. The excretion of fluid-like Ghusāl Gosht (washed meat) indicates the Ḍu'af al Jigar
6. If the symptom is Ikhtilāṭ Dhahn (brain fog) or cognitive impairment accompanied by fever, and it resolves once the fever subsides, it indicates that the condition originated from neighboring organs and secondarily affected the brain. However, if Ikhtilāṭ Dhahn persists even after the fever has resolved, it suggests a primary brain disorder.[3]

VI. Retention and evacuation/elimination:[11]

- Derived from a specific organ:

1. Its nature aids in diagnosis, for example, the expectoration of cartilaginous particles from bronchial rings indicates bronchial ulceration
2. Quantity, for example, thick mucus implies colon ulceration and thin mucus suggests small intestine ulceration
3. Color, for example, red cast in urine denotes an illness of a fleshy organ like the kidneys, while white cast indicates an illness of a nervine organ like the bladder.

- If the evacuated materials are not from an organ's substance, it can signify sickness in the following ways:
   1. Normal humor, for example, blood
   2. An unusual humor, such as menstrual blood
   3. Totally abnormal matter, such as a stone
   4. Abnormal evacuation, whether physiological or pathological, for example, increased or decreased feces or micturition
   5. The quality of evacuating things is abnormal, though the evacuating things are in a natural way, for instance, dark urine or tarry stools
   6. The pathways or channels for evacuation become abnormal, even though the excreted substances themselves are natural. For example, in Īlā'ūs disease, fecal matter is expelled through vomiting.

'Alāmat Amrāḍ of A'ḍā' Ẓāhira (external organs)[1,3,11,12]

External inspection of the body may occasionally show sickness of internal organs, such as diabetes. The flushing of the cheeks indicates pneumonia, whereas the curling of the nails indicates lung ulcers. The signs of movement and inactivity are vital in apoplexy, epilepsy, syncope, and paralysis. Shivering, rigors, hiccups, sneezing, yawning, stretching, coughing, jactitation, and convulsions are all signs of abnormal motor activity. Sneezing and hiccupping are examples of physiological movements, while tremors and convulsions are examples of symptomatic features of disease. Some are entirely voluntary, such as restlessness, tossing, and turning in bed, while others are somewhat voluntary and partially involuntary, such as coughing and micturition. Involuntary physiological movements can result from sensory perception, as in Qush'rira (shivering), or spontaneously, as in Ikhtilāj (Nictitation).

These movements differ in many ways and are classified into seven types

1. Coughing is innately more vigorous than Ikhtilāj (delicate twitching motions), and movement differs depending on their nature/essence
2. Sometimes, the difference in movements depends on the number of exciting elements, for example, the movement of sneezing is more in number than coughing because the coughing is performed solely through the movement of the chest organs, whereas sneezing is accomplished by the combined motions of the chest and head organs
3. Sometimes, movements differ according to severity; for example, a dry hiccup is more severe than a moist productive cough. However, the movement of a cough is stronger than a dry hiccup
4. Sometimes, the difference in movements depends on Tabī'at. Therefore, the Tabī'at takes support from its Aṣlī Āla (original organ). For example, defecation is generally aided by abdominal muscle contractions, whereas coughing is aided by outside atmospheric pressure
5. Sometimes, the movement difference depends on its origination, for example, coughing and retching
6. Sometimes, the difference in movements is dependent on active faculty involvement. For example, nictitation and coughing are controlled by physical movement. Nictitation is an entirely natural reflex, whereas coughing is controlled by the voluntary nervous system.
7. Sometimes, the difference in movements depends on the difference in humor, for example, coughing is due to phlegm, and nictitation is due to Rīh.

The signs and symptoms mentioned above are commonly connected with disorders of the external organs.

- There are a few examples of diseases that will be described below in the mentioned Tables 3-5 based on 'Alāmāt for their diagnosis.

Table 6: Diseases identified based on their corresponding '*Alāmāt* (clinical signs)

'Alāmāt	Description	Disease
'Alāmat-i-Amraḍ-i-Dam		
Itching all over the surface of the body.[1,23]	A disease accompanied by fever and the appearance of numerous characteristic vesicular rashes spreading over the entire body surface[9]	*Chechak/Judarī* (Smallpox)
The appearance of vesicles in the shape of a needle tip or millet grains, followed by pus		
Throbbing and severe pain	It is a type of *Damwī Waram* (sanguineous inflammation), which is hot and occurs near the nail's root (sinus unguis)[2,3,24]	*Dākhis/Basahrī* (Paronychia/Whitlow)
Fever		
Usually, the nail falls off after separating from the nail bed		
Reddish breakouts or vesicles accompany severe itching	This condition causes tiny reddish eruptions on the skin that are quite itchy. If *Sabab-i-Damwī* is the cause, the eruptions are reddish, firm, and irritating[3]	*Sharā Damwī* (Sanguineous Urticaria)
Reddish eruptions occur because of the extreme heat when *Dam* is the causative matter		
These eruptions are more common and more painful during the night[24]		
In cases of external trauma, a large volume of blood is expected to be lost rapidly.[25,27]	*Nafth al-Dam* stands for blood and phlegm expectoration. The blood that appears with a cough could come from the head, palate, throat, uvula, trachea, lungs, stomach, or liver[3,25,26]	*Nafth al-Dam* (Hemoptysis)
If *Imtilā'* "is the source of the disease," then "*Alāmat -i-Imtilā'* will be present. Moreover, the patient feels relief after the episode or attack of hemoptysis[27]		
If a cough accompanies, it originates in the head. If *Nakseer* appears before the hemoptysis, the blood comes from the skull[25,27]		
The face turns red	Headache can be caused by *Sū'-i-Mizāj Hārr* precipitated by hot matter (blood). Its quality causes *Sū'-i-Mizāj* in the head, whereas its quantity causes *Imtila* in vessels and pressure over the nerves, eventually causing headache[25,27]	*Ṣudā' Damwī* (Sanginous Cephlagia or Headache)
Nabḍ has an '*Aẓīm*		
The Qarūra (urine) will be bright red and viscous		
A sweet taste in the mouth, throbbing pain, and pain worsening after consuming sweet items		
'*Alāmāt-i-Amraḍ-i-Balgham*		
Headache before the onset of the disease, voluminous vessels around the neck, sparking in front of the eyes, vertigo, legs, and hands becoming cold, twitching in the body, heaviness in legs, difficulty in moving and grinding of teeth during sleep, etc.[22,25]	*Fālij* is a condition where entire organs of one side of the body become paralyzed longitudinally. It is widely accepted by physicians that immobility of any portion of the body; or loss of movements of a portion or organ of the body is called *Fālij wa Istirkhā'*. Similarly, the losses of sensation are called *Khadar*[25,28]	*Fālij* (Paralysis)
In the beginning, there is laziness, a lack of desire to do any work, general body pain, tension/stretching in the forehead, headache, heaviness in the eyes, dryness of the nose, sneezing, redness of the eyes, and a flow of secretions from the nose that are thin at first but thickened later, as well as some having the disturbance in the smelling and hearing faculties	*Zukām* is a Unani word meaning running nose[29] If a thin mucoid fluid is expelled from the nose, it is referred to as *Zukām*, and if the same secretion is directed toward the throat, it is referred to as *Nazla*. Both *Nazla* and *Zukām* originate in the brain, which is affected by cold and heat, resulting in congestion[29]	*Nazla-o-Zukām* (Coryza)
During the disease's resting phase, the patient remains asymptomatic but experiences frequent attacks, weakness, anxiety, and respiratory muscle pain	*Dama* is a respiratory disease in which the airway gets obstructed because of inflammation, spastic contraction in smooth muscles of bronchioles, or adherence of *Lesdār Balgham*/mucus on the walls of bronchioles[31,32]	*Dama* (Asthma)
The patient initially experiences a mild cough and breathlessness. Due to insufficiency of *Nasīm* patient sits in a bending forward position. After that episode of dry cough with a small amount of *lesdār* (sticky material), expectoration starts. The patient gets relief after expectoration[32]		
The affected part of the body is shiny and greasy; on touching, it feels moist, even if pressed down. Because of providing matter to the organs mixed with vitiated things, the very same site of the organ is deprived of nutrition[3,33]	Leukoderma is derived from the Greek words (leuko-white) and (derma-skin). The skin becomes white partly or completely; hence is called leukoderma.[29] It is a whiteness that appears on the body's exterior, particularly on the face, legs, and hands. At times it may appear on the entire body[3,25]	*4.Barṣ* (Vitiligo)
The affected part is white. At times, the affected skin underneath the muscle becomes white. Even the bone of the affected part becomes whitish as well[3,33]		

Contd...

Table 6: Contd...

'Alāmāt	**Description**	**Disease**
'Alāmat-i-Amrāḍ-i- Ṣafrā'		
Intense itching with burning that feels like a stinging sensation	These are minute, red, prickly eruptions (*Buthūr*) that appear on the skin surface of the body. These resemble millet grains. The causative matter of these eruptions is hot and *Raqīq Ṣafrāwīa Khilṭ*[2,24]	*Ḥaṣaf/Khusk Reshah* (Miliaria Rubra)
Itching with burning is associated with anxiety[24]	It is also known as *Pitti*[1,34] Hippocrates was the first who describe *sharā*, which is a papulous itching lesion caused by nettles and mosquitoes[27] It is a reddish papulous eruption of the skin, which is associated with intense itching[1,2]	*Sharā*
Sharā', which is caused by *Balgham boraqi* is worst at night in comparison to that *Sharā'*, which is caused by *Dam-e- Ṣafrāwī*[1]		
Dukhānī Dakār	*Sū'-i-Haḍm* is also called *Fasād al-Haḍm*[1] when food gets putrefied instead of complete digestion. *Su' al-Haḍm* is caused by *Ḍu'f al-Mi'da*[3,25]	*3.Sū'-i-Haḍm/Bad Haḍmī* (Dyspepsia/ indigestion)
Bilious vomiting		
Fish-like smell or radish smell from mouth		
Excessive thirst		
Cold diets have been found to reduce abdominal pain		
Dukhānī Dakār (burning/belching)	To diagnosis of *Ḥurqa al-Mi'da*, assess if *Sozish* (acidity) occurs on an empty stomach or after food (the initial stage of digestion) intake. If acidity decreases during hunger, it is due to *Ghalīẓ* (heavy) diet. If acidity is felt in an empty stomach and relieved after taking the diet, then acidity is due to the stagnation of *Raṭb Mādda*. If the pouring of *Khilṭ-i-Ṣafrā* causes *Ḥurqa al-Mi'da*'[25]	*Ḥurqa al-Mi'da/ Sozish/Tezabiyat* (Hyperacidity)
Bitter taste in mouth,		
Excessive thirst, restlessness,		
Nausea, vomiting, and gets discomfort quickly		
The stool is mixed with *Ṣafrā'*	It is an abnormal movement of the rectum that occurs to expel harmful substances from the intestines. Not anything comes out during defecation except a mucilaginous fluid and saffron blood[25]	*Zaḥīr* (Dysentery)
The stool is thin in consistency		
Burning sensation around the anus		
Tenesmus[35]		
'Alāmat-i- Amrāḍ -i-Sawdā		
During the initial stages of the condition, the patient experiences depression, perverted thinking, loneliness, delusions, and hallucinations due to the absence of external stimuli	Unani physicians classified "melancholia" as a disorder causing a disturbance in mental functions, causing perpetual grief, fear, and impaired analysis and understanding[37]	*Mālankhūliya* (Melancholia)
If the disease is caused due to *Burūdat* of *Fam-i- Mi'da*, the symptoms are inordinate appetite, sour eructation, burning sensation in an empty stomach, and excessive fecal matter[1,3]	A state of inordinate appetite in which the desire for food is never satisfied. The patient always remains hungry like a dog.[1,2,3,25,30,36] Also known as *Shahwat Kalbiyya*	*Jū'al-Kalb* (Canine Appetite)
Round elevated, itchy, scaly, and blackish or reddish patches on the affected part of the skin[35]	It is a disease manifested by the periodical occurrence of roughness over any part of the skin caused by Sawdā' -i-Muḥtariq (Burnt black bile)[36,38]	*Qūbā* (Ringworm)
The appearance of blackish spots on the skin, shedding scales on rubbing and leaving the area red	This condition results in blackish scaly patches on the skin due to accumulation of Sawdā' under the skin following the admixture of Dam with *Sawdā' Ṣafrāwī* and excessive intake of *Sawdā'* producing foods[27,30,35,36]	*Bahaq Aswad*
Black-colored spots on the body	Spots on the body are caused by the accumulation of black bile under the skin, which cannot dissolve due to the skin's worsening and thickening matter[30]	*Barash* (Freckle)
Bluish, black, or red spots united to form a patch appear on the face	*Dam Sawdā' -i-Muḥtariq*, a condition causing spots to unite, usually occurs during pregnancy and *Ḥummā Rib*' and is commonly seen on the cheeks, forehead, upper lips, etc[27,30]	*Kalaf* (Melasma)

Contd...

Table 6: Contd...

'Alāmāt	**Description**	**Disease**
Black-colored circular spots	Spots slightly raised from the skin's surface are primarily caused by burnt black bile[30,35]	*Khīlān* (Mole)
Hard eruptions on the surface of the skin	If the edges of these eruptions are circular, then these are known as *Masāmīr*. If the edges are slanting, these are known as *Qarn*. The predominance of viscous black bile produces these. It is commonly seen in the hands and feet[30]	*Thālīl* (Warts)

- Table 6 presents a few examples of diseases identified based on their corresponding 'Alāmāt (clinical signs) for diagnostic purposes

Conclusion

Unani medicine is concerned with the human body's health and disease states. Ibn e Sina enunciated a law that "a state cannot exist without reason." As a result, understanding the causes of various body states is essential. Epidemiological triad: The enlight of the Unani System of Medicine is explained in Figure 1. These reasons could be evident or concealed. To know these causes, 'Alāmāt act as a guide. According to Unani physicians, both states of the body have unique signs and symptoms. These signs represent both Mizaj and Tarkīb of the organs. In terms of their state of health, both Mizājī 'Alāmāt and tarkībī 'Alāmat are normal. However, in the state of disease, either Mizājī 'Alāmāt or tarkībī 'Alāmāt or both are abnormal depending on the Asbāb-i-Maraḍ.

Among the two types of diseases, Sū'-i-Mizāj is the most common disease in the human body. To determine the temperament of an organ, the physician considers two things: the functions and the fudhlāt of the organ. A physician will inquire about abnormalities in functioning and the kind of fudhlāt to diagnose Sū'-i-Mizāj of an organ or the entire body. The other elements that may affect the Mizāj of the human body are nonmodifiable, that is, age, gender, season, lifestyle, and habitat, and should be considered by the physician during the diagnosis.

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Conflicts of interest

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Review Article

Anti-COVID-19 Unani Drugs: A Scoping Review on Drugs Having Potential Activity against SARS-CoV-2 and COVID-19

Abstract

The global COVID-19 pandemic has underscored the urgent need for effective therapeutic interventions. Traditional medicine systems, including Unani, offer a wealth of herbal and natural remedies with potential antiviral and immunomodulatory properties. This exploratory review examines the role of Unani drugs as potential candidates against Severe Acute Respiratory Syndrome Coronavirus 2 and related respiratory viruses, including influenza. The Unani Pharmacopoeia features numerous formulations and individual drugs with documented antiviral, anti-inflammatory, and respiratory-supportive properties. However, the current evidence is largely preclinical, with limited clinical validation. This paper highlights the need for rigorous pharmacological studies, clinical trials, and standardization of Unani formulations to ensure their safety and efficacy. By integrating traditional knowledge with modern scientific approaches, Unani medicine has the potential to contribute to the development of effective, affordable treatments for COVID-19, and other respiratory illnesses.

Keywords: *Anti-SARS-CoV-2, COVID-19, influenza, respiratory*

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Introduction

Coronavirus disease 2019 (COVID-19) first emerged in the Chinese city of Wuhan and rapidly spread throughout the world in a pandemic that was unprecedented in history in severity and magnitude.[1] The causative agent of the disease, named Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is a single-stranded, enveloped, positive sense RNA virus that belongs to the genus Betacoronavirus in the family Coronaviridae, named so because of their "crown-" or "wreath-"like appearance.[2,3] SARS-CoV-2 is known to mutate at a fast pace, estimated to be approximately 1.1×10^{-3} substitutions per site each year, which roughly translates to approximately one mutation every 11 days. Due to this characteristic, it gives rise to several recombinants and mutant retains, which keep on evolving, thereby rendering the existing vaccines and antiviral medications ineffective.[3]

COVID-19 infection may range from asymptomatic, presymptomatic, mildly symptomatic, or severe illness. The first three constitute nearly 30%–60% of all cases, which account for 4.2%–44.4% of the secondary cases. Furthermore, it is known to cause persistent symptoms for 6 months or longer which include sleep difficulties, cognitive disorders, joint pains, fatigue, gastrointestinal disorders, chest pain, dyspnea, increased risk of thromboembolism, palpitation, and immune dysregulation. These symptoms were collectively named as postacute COVID-19 syndrome.[4] The treatment options include the use of antiviral drugs which act on the causative agent and immunomodulators, neutralizing antibodies, and steroids which protect host tissues from the effects of infection.[5]

In Unani medicine, the management of *ḥummā-i-wabāiya* (epidemic fevers) is described with the use of immunomodulatory, anti-inflammatory, and antipyretic drugs. There is also a concept of *māna'e-'ufūnat* (anti-infective) drugs in Unani medicine, which are prescribed for certain types of fevers and infectious diseases.[6-8] In this review, we aim to present an overview of the potential drug candidates in Unani medicine which may be beneficial for COVID-19 and its complications.

Methodology

The present review is aimed at exploring the potential drug candidates in Unani medicine which may have an antiviral

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Table 1: Unani drugs studied for anti-coronavirus disease 2019 and anti-severe acute respiratory syndrome coronavirus 2 activity

Origin/family	Name of drug	*Mizāj* (temperament)	Description in Unani literature	Type of study and study design	Scientific studies on SARS-CoV-2 infection or COVID-19 complications	Bioactive compounds
Lythraceae	*Punica granatum* L. (*Rummān*)	*Bārid*; mo'tadil in *Raṭūbat wa Yabūsat*,[15] Peel is *Bārid-Yābis*[16]	Beneficial in *ṣafrāvī* (bilious) fevers as it expels *muta'ffin akhlāṭ* (putrified humors); prevents *ta'ffun* of *akhlāṭ* (putrefaction of humors).[16] Juice is beneficial for *Su'āl-i-ḥār* (cough associated with hot temperament)[17]	Randomized, double-blind placebo-controlled trial on COVID-19 patients (*n*=48)	Intervention: 500 mL of whole pomegranate juice or placebo Outcomes: Significant decrease in inflammatory markers (CRP, IL-6, ESR), improved oxygen saturation	Polyphenols (anthocyanins) from pomegranate juice[18]
Amaranthaceae	*Spinacia oleracea* L. (*Pālak*)	*Bārid* and *Raṭab* in first degree[19]	Nutritive, relieves dryness of respiratory tract, dry cough, and fever, suitable for patients of all temperaments,[19,20] *Joshānda* clears hoarseness of voice[21]	*In vitro*	Anti-oxidant, antibiotic, anti-inflammatory, useful as diet in COVID-19	β-carotene, α-tocopherol[22]
Animal-origin drug	Honey (*'Asl*)	*Ḥār wa Yābis* in second degree[23]	Beneficial for cough when taken with *Roghan-i-Gul*, nutritive,[23] *mufattiḥ sudad-i-'urūq* (de-obstruent for vessels), *māne'-i-'ufūnat* (anti-infective)[20]	*In silico*	Interferes with SARS-CoV-2 replication	3-phenyllactic acid, CAPE, lumichrome, galangin, chrysin, caffeic acid[24]
Animal-origin drug	*Corallium rubrum* L. (*Busud*, coral)	*Bārid* in first degree, *Yābis* in second degree[19]	*Muqawwī Qalb* (cardiotonic), beneficial in *Khafqān* (palpitation)[19]	*In silico*	Natural biophores against SARS-CoV-2 Spike protein	Canthaxanthin, astaxanthin[25]
Apiaceae	*Ferula assa-foetida* L. (*Anjudān/ Hilteet*)	*Ḥār Yābis*[21]	Useful for *Ribw* (asthma) when used in *la'ūq* and *ḥubūb*[21]	RCT	H_2S-donor, decrease in cough, dyspnea, anoxia, anorexia, myalgia, pneumonia, CRP and cytokines in COVID-19 patients	Organic sulfides (thiophene, disulfides, polysulfide derivatives)[26]
Boraginaceae	*Borago officinalis* L. (*Gāozabān*, *Lisān al-thūr*)	*Ḥār Raṭab* in first degree[20,27]	Beneficial in *Su'āl-i-Yābis* (dry cough), *Ḍīq al-Nafas* (dyspnoea)[27]	RCT	↓ serum ferritin, CRP, bilirubin, IL-6, IL-8, TNF-α, ALT, AST, and PCT in COVID-19 patients with cytokine storm and ARDS	Compound formulation containing borage[28]
Brassicaceae	*Brassica oleracea* L. (*Karnab*)	*Ḥār* in first degree, *Yābis* in second degree[27]	Beneficial for chronic cough, reduces headache, clears voice[27]	Molecular docking analysis	Anti-viral against SARS-CoV-2	3-p-coumaroylquinic acid, 4-p-coumaroylquinic acid, astragalin[29]
Fabaceae	*Lablab purpureus* subsp. *purpureus* (L.) sweet (*Lablāb*)	*Bārid Raṭab*[30]	Beneficial in cough, *mufattiḥ-i-sudad* (de-obstruent)[27]	*In silico*	Antiviral against SARS-CoV-2, HIV and influenza	Mannose-specific lectins[31]

Contd...

Table 1: Contd...

Origin/family	Name of drug	*Mizāj* (temperament)	Description in Unani literature	Type of study and study design	Scientific studies on SARS-CoV-2 infection or COVID-19 complications	Bioactive compounds
Fabaceae	*Glycyrrhiza glabra* L. (*Aṣl us Sūs*)	*Mo'tadil ḥār*[23]	Beneficial in *Sual* (cough), *Khushunat-e-Halaq* (dryness of throat), *Ḍīq al-Nafas* (dyspnoea), *Ribw* (asthma)[20,23]	*In vitro*	Inhibition of entry and replication of SARS-CoV-2	Triterpenoids[32]
Iridaceae	*Crocus sativus* L. (*Za'frān*)	*Ḥār* in second, *Yābis* in first degree[16]	*Mufattiḥ sudad-i-'urūq* (de-obstruent for vessels), relieves difficulty in breathing, clears *'ufūnat* (infection),[16] strengthens respiratory organs[20]	*In silico*	Anti-SARS-COV-2	Crocin, crocetin[33]
Malvaceae	*Althaea officinalis* L. (*Khiṭmī*)	*Mo'tadil ḥār*[20]	Relieves *Su'āl-i-ḥār* (cough caused by hot temperament)[20] Seeds are beneficial for *zukām-i-ḥār*[21]	RCT	Relieves dry cough and respiratory irritation, suitable for COVID-19 patients	Mucilage polysaccharides, arabinans, glucans, flavonoids[34]
Myrtaceae	*Syzygium aromaticum* (L.) Merr. and L.M. Perry (*Qaranfal*)	*Ḥār wa Yābis* is third degree[27]	*Mufarriḥ* (enhilarant), *muqawwī-i-dimāgh* (brain tonic), prevents cold[27]	*In silico*	Inhibition of SARS-CoV-2	Kaempferol, bicornin[35]
Poaceae	*Hordeum vulgare* L. (*Sha'īr*)	*Bārid wa Yābis* in first degree[20]	Beneficial in respiratory diseases, causes *tarṭīb wa tabrīd* (humification and cooling) in febrile illnesses[20]	RCT	Anti-pyretic, ↓ CRP, ESR, creatinine and hospitalization duration in COVID-19 patients	Persian barley water (fibers, minerals, unsaturated fatty acids, vitamins), phytic acid, catechin, lutein[36]
Rosaceae	*Prunus amygdalus* Batsch (*Bādām Talkh*)	*Ḥār* in third degree and *Ratāb* in first degree[27]	Beneficial for chest and lungs, removes morbid matter from organs, *mufattiḥ-i-sudad* (de-obstruent)[27]	*In silico*	Anti-COVID-19, immune-modulatory, anti-inflammatory, promotion of recovery and repair	Ephedra-bitter almond couplet (quercetin, luteolin, β-sitosterol, glabridin)[37]
Solanaceae	*Hyoscyamus niger* L. (*Ajwayn Khurāsānī*)	*Bārid wa Yābis* in third degree[20,38]	Useful for *Ribw* (asthma) when used in *la'ūq* and *ḥubūb*[21]	RCT	↓ Symptoms of COVID-19 (dry cough, sore throat, chest pain, fever, headache, dizziness, shortness of breath, diarrhea, abdominal pain)	Methanolic extract[39]
Thymelaeaceae	*Aquilaria malaccensis* Lam. (*'Ūd*)	*Ḥār Yābis* in second degree[20]	*Muqawwī-i-A'ḍā-i-Raīsa* (tonic for vital organs), *Muqawwī wa Mufarriḥ Qalb* (cardiotonic and exhilarant)[23]	*In silico* *In vitro* *In vivo* Clinical studies	Immunomodulatory, anti-inflammatory, neuroprotective, anti-SARS-CoV-2	Aromadendrene-II, phytol, octacosane, hinesol, agarospirol[40]
Violaceae	*Viola odorata* L. (*Banafsha*)	*Bārid Raṭab* in first degree;[20] flower: *Bārid* in second degree, *Raṭab* in third degree[30]	Beneficial in *Humma* (fever), *Nazla, Zukam, Zatul Janb* (pleurisy), *Zat-ur-Riya, Sual* (cough)	RCT	↓ Symptoms of COVID-19 (↓ cough, ↓ muscle pain, ↓ headache, ↓ diarrhoea, ↓ anosmia, ↓ fatigue)	Caffeic acid, pyrocatechol, cyclotides, saponins, mucilage[41]

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Table 1: Contd...

Origin/family	Name of drug	*Mizāj* (temperament)	Description in Unani literature	Type of study and study design	Scientific studies on SARS-CoV-2 infection or COVID-19 complications	Bioactive compounds
Vitaceae	*Vitis vinifera* L. (*Ḥiṣram*, *Zabīb*)	*Bārid* in second degree, *Yābis* in third degree[16]	Beneficial in high fever, relieves epigastric burning caused by hot humors[16]	*In silico*	Inhibition of SARS-CoV-2 and HSV-1	Phenolics[42]

SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2, COVID-19: Coronavirus disease-2019, RCT: Randomized controlled trial, CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate, AST: Aspartate transaminase, ALT: Alanine transaminase, ARDS: Acute respiratory distress syndrome, PCT: Procalcitonin, IL: Interleukin, HSV: Herpes simplex virus, TNF-α: Tumor necrosis factor-alpha, CAPE: Caffeic acid phenethyl ester

activity against SARS-CoV-2. We searched the Unani classical literature for drugs which have been prescribed for respiratory illnesses, fevers, and the symptoms which are similar to the spectrum of post-COVID-19 complications. Then, we explored the scientific basis of their activities in COVID-19 or its complications on the major scientific search engines (PubMed, Springer, and ScienceDirect). The keywords used for the search were "COVID-19" OR "coronavirus disease 2019," "post-COVID," and more, along with the names of the drugs. The drugs for which any study demonstrated empirical evidence of anti-SARS-CoV-2 inhibitory activity or evidence of direct benefit in COVID-19 were included in the study.

Scope of Unani Medicines in Suppressing COVID-19

In the present era, the use of many antimicrobial agents is being discouraged due to their toxic effects on the human body, especially, causing an increase in reactive oxygen species which lead to multiple lingering health effects over time. In this context, herbal medicines are being hailed as the future of microbial control due to the realization that they possess many additional benefits such as anti-inflammatory, antioxidant, anticancer, and health-protective, besides their primary actions. Due to these actions, the herbal medicines are able to afford protection from long-term complications in addition to the treatment of existing illness.[9,10] In this context, many herbal medicines have been explored for their possible role as antimicrobial, particularly antibacterial and antiviral effects, with highly encouraging results. It is also documented that herbs are used as the primary anti-infective medicines in some countries. A unique benefit observed is that most herbal antimicrobial agents can cause free radical scavenging, thereby protecting from numerous short- and long-term adverse effects.[9]

During the COVID-19 pandemic, Unani medicines have been extensively utilized in India as an adjuvant to conventional drugs and also as prophylactic therapy in mild patients in home isolation.[11] In a randomized placebo-controlled clinical study, the Unani formulation *Tiryāq-i-Wabā'ī* was used as an adjuvant to standard care in mild-to-moderate COVID-19 patients. It was observed that the use of *Tiryāq-i-Wabā'ī* for 45 days resulted in a 50% increase in absolute lymphocyte count, mean lymphocyte percentage, CD4 cells, and CD8 cell count. The results were statistically significant.[12] In another study, the Unani formulation *Tiryāq-i-Arb'a* and Unani *Joshānda* (a decoction made with *Zizyphus jujuba*, *Cordia dichotoma,* and *Cydonia oblonga*) was used in mild-to-moderate patients of COVID-19, along with the standard therapy. The effects were compared with a similar group of patients on standard therapy alone. It was observed that the Unani medicines promoted early resolution of the disease and prevented progression to severe illness.[13] In a multicenter cohort study on 5023 persons from 21 cities in India, it was observed that the prophylactic use of Ayurveda, Yoga, Unani, Siddha, and Homeopathy medicines was associated with statistically significant protection against COVID-19 and progression to severe disease in COVID-19 patients.[14] Hence, it is highly likely that herbal medicines including Unani medicines, definitely cause some degree of suppression of SARS-CoV-2. Some important Unani medicines prescribed for respiratory illnesses and their activity against COVID-19 and SARS-CoV-2 are summarized in Table 1.

Conclusion

The exploration of Unani drugs as potential candidates against SARS-CoV-2 and COVID-19 highlights the significance of traditional medicine in addressing modern health crises. Unani formulations, rich in bioactive compounds with antiviral, anti-inflammatory, and immunomodulatory properties, offer a promising complementary approach to combating COVID-19. The integration of traditional knowledge with modern scientific research has revealed compounds such as glycyrrhizin, thymoquinone, and others as having potential antiviral efficacy. However, the limited clinical validation of these drugs underscores the need for rigorous research to establish their safety, efficacy, and mechanisms of action against SARS-CoV-2.

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Conflicts of interest

There are no conflicts of interest.

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Research Article

Pharmacognostical Studies and *In vivo* Anticonvulsant Effect of *Banṭāfulun* (*Potentilla reptans* L.) Leaves Found in Kashmir

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Abstract

The present study was carried out to evaluate the pharmacognostical characteristics of *Bantafulun* (*Potentilla reptans* L.) leaves and to assess its effect against maximal electroshock (MES)-induced seizures in albino Wistar rats. The leaves of *Bantafulun* were properly identified and subjected to physicochemical standardization including ash values, extractive values, moisture content, swelling index, foaming index, and fluorescence analysis that helped in determining the quality and purity of the drug. Preliminary phytochemical screening was also carried out on three different extracts (petroleum ether, ethanol, and hydroalcoholic) of *Bantafulun* leaves which revealed the presence of carbohydrates in petroleum ether extract: carbohydrate, tannin, anthraquinone glycoside, coumarin glycoside in ethanolic extract: carbohydrate, tannin, flavonoid, anthraquinone glycoside, steroids in hydroalcoholic extract. The anti-epileptic effect of this drug as mentioned in the classical Unani literature was evaluated against seizures induced by MES. The test drug within the dose of 300 and 1000 mg/kg showed moderately important effects on the duration of hind limb tonic extension (HLTE) ($P < 0.05$). The test drug significantly reduced the duration of HLTE ($P < 0.05$), while the standard drug, phenobarbitone completely inhibited the HLTE in animals.

Keywords: *Fluorescence analysis, hydroalcoholic extract, maximal electroshock, phenobarbitone, Potentilla reptans*

Introduction

A seizure is a paroxysmal event due to abnormal, excessive, and hypersynchronous electrical discharge from the central nervous system (CNS). The characteristics of seizures differ and depend on where the commotion first begins in the brain and how far it extends.[1] Epilepsy is the most common neurological disorder, in which a person has two or more recurrent unprovoked seizures. It is the second most common disorder of the CNS after brain stroke with an incidence of 0.3%–0.5% in the world.[2] In modern medicine, many drugs are used for the treatment of different types of seizures to decrease the incidence and severity of seizures with minimum side effects.[1] These drugs are barbiturates, phenytoin, carbamazepine, valproate etc.[3] In the Unani system of medicine, epilepsy is referred to as *Sar'* or *mirgi* as mentioned in the classical Unani literature such as *Al-Qanun fi'l Tib* of *Ibn Sina* (980–1037), *Kamil al-Sana'* of *Ali Ibn Abbas Majusi* (10th century CE), *Kitab al-Hawi* of *Razi* (865–925), *Haziq* of *Ajmal Khan* (1868–1927), and *Iksir Azam* of *Azam Khan* (1813–1902 AD).[4] According to *Jālīnūs*, this disease is caused by viscid morbid humors which produce obstruction in the passage of *Rūḥ* (pneuma),[5] whereas other Unani Scholars have mentioned that convulsions occur because of incomplete obstruction in the *Buṭūn-i-Dimāgh* (cerebral ventricles) caused by *Ghalīz Mādda* (viscous matter). Such type of viscous matter may be produced from *balgham* (phlegm) or *Sawdā'* (black bile) and rarely by *safra* (yellow bile). According to Ibn Sina, *Sar'* is caused by the stoppage of the function of *A'dā-i-Nafsāniyya* (nerve impulses) due to the presence of abnormal morbid matters.[6]

Medicinal plants have been a focus of attention to researchers due to their fewer side effects in treating diseases compared to chemical drugs.[7] Numerous efforts have been made previously to get hold of anticonvulsants from plant sources and these attempts will continue until a suitable treatment option is obtainable.[1] In Unani Medicine, *Bantafulun* (*Potentilla reptans*

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L.) has been used for the treatment of epilepsy since ancient times. It grows near lakes or in moist places. The leaves of the plant resemble the leaves of a mint plant and each branch contains five or more leaves. The leaf margins are toothed and blunt at the tip; the flowers are saffron-white; the root is long and red. Both roots and leaves are commonly used for the treatment of various ailments such as epilepsy, diarrhea, toothache, jaundice,[8-10] hemorrhoids, and bleeding gums. Since the drug has not yet been validated on modern scientific parameters, the present study was carried out to evaluate the pharmacognostic properties and anti-epileptic effect of hydroalcoholic extracts of *Bantafulun* (*P. reptans* L.) in albino Wistar rats in maximal electroshock-induced seizures in rats.

Materials and Methods

Collection of plant material

The test drug *Bantafulun* (*P. reptans* L.) leaves were collected in April 2021 from the natural sources of Kashmir Valley. The plant was identified and authenticated by Prof. Akhtar Malik, KASH Centre for Biodiversity and Taxonomy, University of Kashmir, and submitted the specimen under voucher no. 3515-(KASH).

Preparation of extracts

The leaves of *Bantafulun* (*P. reptans* L.) were first shade-dried and coarse powder was made using an electric grinder. The extraction was carried out at the Drug Standardization Research Unit of the Regional Research Institute of Unani Medicine, Srinagar. Successive extraction with different solvents in increasing order of polarity, for example: petroleum ether, ethanol, and hydro-alcohol were made using a Soxhlet apparatus. For extraction, the samples were first defatted with petroleum ether. The extracts obtained were filtered and solvents were removed by heating at 30°C–40°C on a hot plate, to yield dry extracts. Thereafter, the extracts were weighed and the yield percentage was calculated with reference to the weight of the crude drug. The dried extracts were kept in a refrigerator at 4°C for further use.[11]

Dose of test drug

The therapeutic dose of *Bantafulun* (*P. reptans* L.) for adults is 3–10 g. The dose for rats was calculated using conversion factor 7.[12] After conversion, it was calculated as 300 and 1000 mg/kg b.w. Since the test drug was used in the form of extract, the dose was calculated further as per the yield obtained after extraction, and it was found to be 40 and 130 mg/kg b.w. The standard drug, phenobarbitone was administered i.p at a dose of 30 mg/kg b.w. to animals.

Animals

Adult albino Wistar rats of either sex aged between 2 and 3 months, weighing 150–200 g, were used. The animals were procured from the animal house of the Indian Institute of Integrative Medicine (IIM), Jammu. They were housed in the animal house of the Regional Research Institute of Unani Medicine, Srinagar, according to the standard laboratory conditions of CPCSEA guidelines and provided with food and water *ad libitum*. The research protocol was approved by the Institutional Animal Ethics Committee of the Regional Research Institute of Unani Medicine, Srinagar, India vide Reg No. 927/GO/Re/S/2006/CPCSEA.

Methodology

Maximal electroshock test

The study was carried out as per the method described by Kaushik *et al*. and Nirmala *et al*.[13,14] with slight modifications. A total of 24 albino Wistar rats were used in this study. The rats were divided into four groups with six animals in each group and the treatment was given for 7 days. The seizures were induced on the 7th day in all animals by the method of Maximal Electroshock using a convulsometer by delivering a current of 150 mA through the ear electrodes for 0.2 s. Group I (Control group) was administered distilled water orally and was subjected to hinStandard group) received 30 mg/kg phenobarbitone i.p and was subjected to MES after ½ h; Group III (Test Group 1) received 300 mg/kg of hydroalcoholic extract of *Bantafulun* (*P. reptans* L.) leaves and was subjected to MES after 1 h; Group IV (Test group 2) received 1000 mg/kg of hydroalcoholic extract of *Bantafulun* leaves orally and were subjected to MES after 1 h. The duration of various parameters such as tonic hind limb flexion, tonic hind limb extension, clonus, stupor, and incidence of recovery or death were noted.

Results and Discussion

The present work demonstrates physicochemical and preliminary phytochemical evaluation of *Bantafulun* (*P. reptans* L.) leaves which will help in the proper identification of this

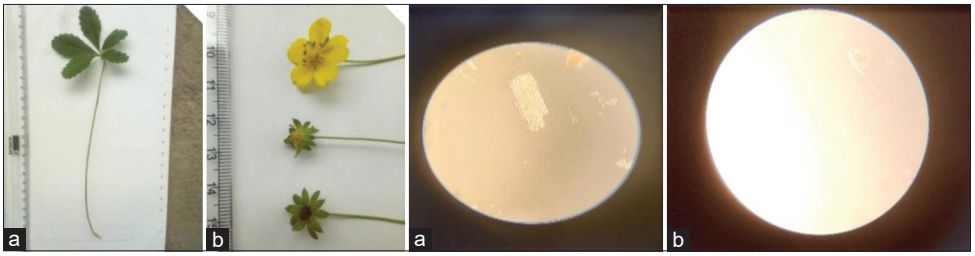

Figure 1: 1: Measurements of (a) leaves (b) flower, 2: (a) Part of Vascular tissue (b) Covering trichome

plant for future investigation. The macroscopic characteristics of *Bantāfulun* (*P. reptans* L.) leaves were perceived as digitately compound, dark green in color, aromatic odor, bitter in taste, size 2.5 cm, shape obovate or oblanceolate [Figure 1a and Table 1] while fresh flower is yellow, actinomorphic, 15-20mm broad, 10mm long [Figure 1b and Table 1]. The powder microscopy of leaves shows the presence of part of vascular tissue [Figure 2a] and covering trichome [Figure 2b].

In physicochemical standardization, various parameters such as ash value, moisture content, extractive values, foreign organic matter, pH value, swelling index, foaming index, and fluorescence analysis were carried out. The alcohol- and water-soluble extractive values help to determine the quality as well as purity of the drug. The extractive value of the test drug was found to be 17.8% (hot extraction water) and 10.6% (hot extraction alcohol). The percentage of foreign organic matter in the test drug was found to be 0.016% [Table 2]. Only in the dry condition, the percentage of active principles in the plant is determined. The moisture should be kept minimum to prevent the drug from various kinds of decomposition and the moisture content in our test drug was found to be 5%, i.e., within normal range. In this study, the total ash, water-soluble ash, and acid-insoluble ash values

Table 1: Macroscopic charaters of the leaves and flowers of *Banṭāfulun* (*Potentilla reptans*)

Condition	Fresh
Macroscopic characters of leaves of *Banṭāfulun* (*Potentilla reptans*)	
Type	Digitately compound
Color	Dark green
Leaflets	Five
Odor	Aromatic
Taste	Bitter
Length	2.5 cm
Shape	Obovate or oblanceolate
Macroscopic characters of flowers of *Banṭāfulun* (*Potentilla reptans*)	
Color	Yellow
Symmetry	Actinomorphic
Inflorescence	Axillary
Flowering	April–August
Length	15–20 mm broad, 10 mm long

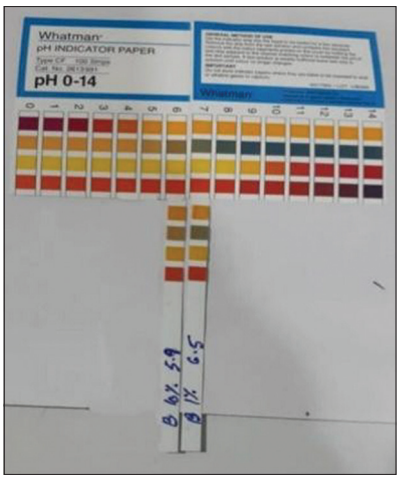

Figure 2: pH determination of *Bantafulun (Potentilla reptans* L.) leaves

Table 2: Physicochemical constants of *Bantafulun* (*Potentilla reptans* L.)

Particulars	Weight of drug (g)	Weight of ash (g)	Percentage yield
Total ash value	2	39.06	1
Acid-insoluble ash value	2	38.90	0.5
Water-soluble ash value	2	27.63	0.5
Extractive values	**Solvent**	**Value (%)**	
Cold extractive value	Water	18.2	
	Alcohol	16	
Hot extractive value	Water	17.8	
	Alcohol	10.6	
Loss on drying			
Part used	**Weight of drug (g)**	**Loss on drying (g)**	**Percentage loss on drying**
Leaves	2	0.1	5
Part used	**Swelling index**		
Leaves	0		
Part used	**Foaming index**		
Leaves	0		
Sample	**pH**		
pH of 1% solution	6.5		
pH of 10% solution	5.9		
Foreign organic matter analysis			
Plant part	**Weight of drug (g)**	**Weight of foreign matter (g)**	**Percentage of foreign matter**
Leaves	5	0.001	0.016

were found to be 1%, 0.5%, and 0.5%, respectively. These values suggest that the test drug was free from adulteration. The fluorescence analysis was done and observed in the daylight, and ultraviolet light at 254 nm and 365 nm [Table 3] to find out the presence of any adulterants and specific compounds.

Table 3: Fluorescence analysis

Treatment	Daylight	UV (254 nm)	UV (360 nm)
Powder as such	Green	Green	Brown
Powder treated with methanol	Green	Green	Pinkish
Powder treated with ethyl acetate	Green	Green	Red
Powder treated with $CHCl_3$	Green	Green	Red
Powder treated with 10% NaOH	Green	Green	Black
Powder treated with picric acid	Green	Green	Black
Powder treated with petroleum ether	Green	Green	Pinkish
Powder treated with glacial acetic acid	Green	Green	Pinkish
Powder treated with NH_3	Green	Green	Green
Powder treated with conc. H_2SO_4	Black	Black	Green
Powder treated with conc. Hcl	Green	Green	Blackish
Powder treated with conc. HNO_3	Orange	Green	Black

Preliminary phytochemical screening was carried out on three different solvents (pet ether, ethanol, and hydro-alcoholic) of *Banṭāfulun* (*P. reptans* L.) leaves. Phytochemical screening of the test drug revealed the presence of carbohydrates in petroleum ether extract: Carbohydrate, tannin, anthraquinone glycoside, coumarin glycoside in ethanolic extract: Carbohydrate, tannin, flavonoid, anthraquinone glycoside, steroids in hydroalcoholic extract [Table 4]. TLC is the most common, versatile method of choice for herbal analysis. TLC is used to support the identity of a compound in a mixture when the retention factor (Rf) of a compound is compared with the Rf of a known compound. This has also been used for confirmation of purity and identity of isolated compounds.[15] The TLC profile of petroleum ether extract (a), ethanolic extract (b), hydroalcoholic extract (c) can be seen in Figure 3 and Table 5.

Maximal electroshock (MES) test

From the data, it is revealed that the test drug within the dose of 300 and 1000 mg/kg showed moderately important effects on the duration of hind limb tonic extension (HLTE) ($P < 0.05$) [Figure 4 and Table 6].

Table 4: Phytochemical screening of petroleum ether, ethanolic, and hydroalcoholic extracts of *Bantafulun* (*Potentilla reptans*)

Tests	Inference extract	Petroleum ether extract	Ethanolic extract	Hydroalcoholic extract
Carbohydrates				
Molish's test	Violet ring	+	−	−
Fehling's test	Brick red ppt.	−	+	+
Benedict's test	Brick red ppt.	−	+	+
Tannins and phenolic compounds				
5% $FeCl_3$	Deep blue-black color	−	+	+
Lead acetate	White ppt.	−	+	+
Flavonoids				
Shinoda test	Pink color	−	−	+
Alkaloids				
Mayer's test	Cream ppt.	−	−	−
Hager's test	Yellow ppt.	−	−	−
Wagner's test	Reddish brown ppt.	−	−	−
Dragendroff's test	Orange ppt.	−	−	−
Anthraquinone glycosides				
Borntrager's test	Pink color	−	+	+
Cardiac glycosides				
Keller–Killani test	Reddish brown ring at junction	−	−	−
Legal's test	Pink color	−	−	−
Coumarin glycosides	Yellow fluorescence	−	+	−
Saponin glycosides				
Foam test	Persistent foam	−	−	−
Proteins				
Biuret test	Violet or pink color	−	−	−
Million's test	Brick red	−	−	−
Steroids				
Salkowski test		−	−	+

+: Positive, −: Negative

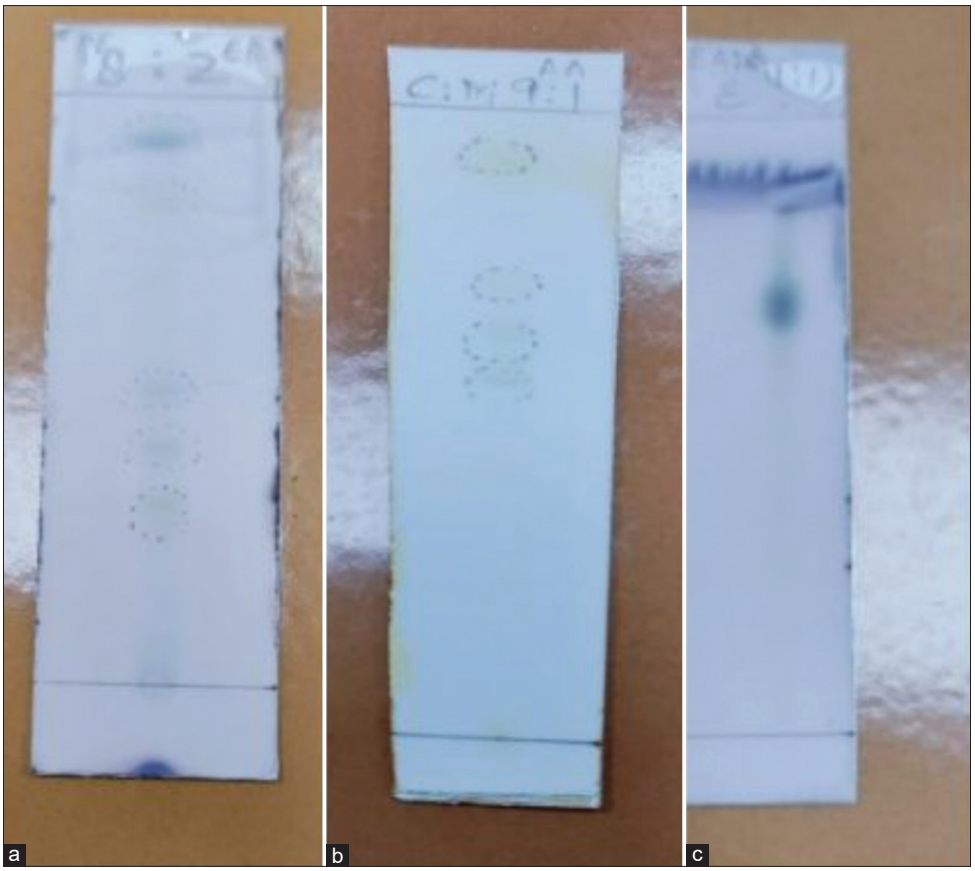

Figure 3: (a) TLC of petroleum ether extract (b) TLC of ethanolic extract (c) TLC of hydroalcoholic extract

Table 5: TLC profile of *Banṭāfulun* (*Potentilla reptans* L.)

Sample	Solvent system	Spraying reagent	Number of spots	Rf values
Petroleum ether extract	Petroleum ether: Ethyl acetate	Anisaldehyde	5	0.246
				0.353
				0.430
				0.707
				0.380
Ethanol extract	Chloroform: Methanol	Anisaldehyde	4	0.142
				0.222
				0.476
				0.793
Hydroalcoholic extract	Ethyl acetate: Ethanol	Anisaldehyde	1	0.628

The test drug significantly reduced the duration of HLTE ($P < 0.05$), while phenobarbitone completely inhibited the HLTE in animals.

Various studies carried out on *Bantafulun* (*Potentilla retans* L.) as an anti-inflammatory. Antimicrobial, anti-oxidant but no study on the antiepileptic effect of this drug has been conducted. Perhaps, it was mentioned in Unani classical text that this drug has good results in epilepsy. Therefore, the antiepileptic activity of hydroalcoholic extract of *Banṭāfulun* (*P. reptans* L.) leaves was carried out by screening model; maximal electroshock (MES). The test drug within the dose of 300 and 1000 mg/kg showed moderately important effects on the duration of HLTE ($P < 0.05$) [Figure 4]. The test drug significantly reduced the duration of HLTE ($P < 0.05$), while phenobarbitone completely inhibited the HLTE in animals.

The two most important neurotransmitters involved in the regulation of brain neuronal activity are the excitatory neurotransmitter glutamate and the inhibitory neurotransmitter gamma-aminobutyric acid (GABA).[16] The mechanism of action of antiepileptic drugs includes modulation of voltage-gated cation channels, potentiation of GABA activity, and inhibition of glutamatergic processes. Substances effective against the MES model are considered to block sodium channels.[17] The MES-induced convulsion model causes the activation of Ca and Na channels and drugs inhibiting this reflux can prevent MES-induced tonic hind limb extension.[18] Inhibition of the MES test predicts activity against generalized tonic–clonic and cortical focal seizures, lack of activity against MES-induced seizures suggests that the drugs are effective in suppressing seizures.[19] Few reports stated that

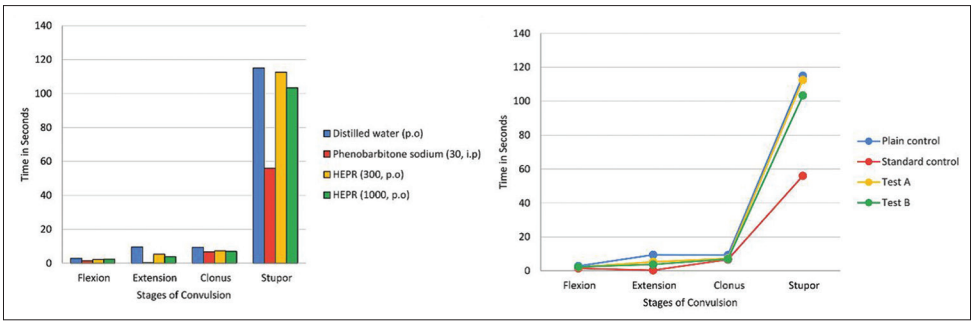

Figure 4: 1: Effect of Hydroalcoholic extract of *Bantafulun* (*Potentilla reptans L.*) in Maximal electroshock (MES) induced seizures in rats. 2: Effect of Hydroalcoholic extract of *Bantafulun* (*Potentilla reptans* L.) in Maximal electroshock (MES) induced seizures in rats

Table 6: Effect of hydroalcoholic extract of *Bantafulun* (*Potentilla reptans* L.) on maximal electroshock-induced seizures in rats

	Plain control	Standard control	Test A	Test B
Flexion	2.833±0.753	1.500±1.225	2.167±0.408	14.000±0.516
Extension	9.500±1.517	0.333±0.816	5.333±1.633	23.000±0.753
Clonus	9.333±0.516	6.667±1.033	7.333±1.633	42.000±2.098
Stupor	115.00±11.384	56.000±20.967	112.500±16.121	103.000±14.720

n=6 in each group, Test used: ANOVA with *post hoc* Tuckey Kramer comparison test, $P<0.05$

flavonoids act as GABAA-Cl-channel complex due to structural similarity to benzodiazepines, potentiating its effects.[18] Based on the presence of flavonoids in hydroalcoholic extract, it was hypothesized that the activity of hydroalcoholic might be because of this.

Conclusion

The study demonstrated the pharmacognostical and anticonvulsant properties of *Bantafulun* (*P. reptans* L.) leaves in albino Wistar rats. Physicochemical standardization confirmed the purity and quality of the drug, while phytochemical analysis revealed bioactive compounds such as tannins, flavonoids, and glycosides. The hydroalcoholic extract exhibited significant anticonvulsant activity against MES-induced seizures, as evidenced by the reduction in HLTE duration at doses of 300 mg/kg and 1000 mg/kg ($P < 0.05$). The activity is likely linked to the modulation of sodium and calcium ion channels and the potentiation of GABAergic activity, aligning with the mechanisms of standard anticonvulsants such as phenobarbitone. This validates the traditional Unani use of *Bantafulun* for epilepsy, suggesting its potential as a complementary therapeutic option for managing seizures.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Case Report

Management of *Ḥasāh-al-Mathāna* (Vesical Calculus) through Unani Compound Formulations and *Inkibāb* (Local Steaming) - A Case Study

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Abstract

About 5% of urinary tract stones consist of vesical calculus, known as *Ḥasāh al-Mathāna.* Its bimodal peak incidence ages are 3 years old children and 60 years old in developing countries. The treatment of vesical calculus in youngsters remains difficult despite advancements in lithotripsy technology because of the harmful effects of surgery and the difficulty in passing stone pieces. Therefore, it is possible to avoid surgery by using safe and alternative treatments like the Unani medicine. This case study presents a 45-year-old female patient having a vesical calculus and treated with Unani medicine; *Ma'jūn Ḥajrul Yahūd* 5 g, *Sharbat Buzūrī* 2 tsf, *Arq Kāsnī* 30 mL, *Araq Mako* 30 mL twice a day orally for about 18 days, 10 sittings of local steaming on left hypochondrium, and hypogastric region were also given to the patient for 10 consecutive days. In this case, the patient showed excellent and significant results as this treatment flushed out 14–15 mm calculi without any operation. Hence, this case study suggests that the abovementioned Unani formulations and local steaming of herbal decoction can serve as an excellent alternative treatment for vesical calculus with minimal side effects in comparison to the conventional system of medicine.

Keywords: *Diuretic, Ḥasāh-i-Mathāna, lithotryptic, Unani medicine, vesical calculus*

Introduction

Ḥasāh al-Mathāna (vesical stone) is the formation of calculus or stone in the urinary bladder. About 5% of all urinary tract stones (*Ḥasāh al-Majra-i-Bawliya*) are urinary bladder stones.[1,2] The prevalence of vesical stones is very high in hot and dry climates such as mountains, deserts, or tropical areas. Its incidence varies with age and gender, i.e. higher in males with a reported male: female ratio of 10:1 and 4:1. In developing countries, the age distribution includes bimodal peaks of incidence i.e. 3-year-old children and 60 years in adults.[3,4] Etiopathologically, it can be classified as primary and secondary vesical calculus, Primary vesical calculus (oxalate stone) occurs in sterile urine. Secondary vesical calculus (phosphate stone) occurs in the presence of infection; it is the most common bladder stone. Usually, it is a phosphate stone.[5] Children with primary vesical calculus usually live in places having a diet low in animal protein, dehydration, and frequent diarrhea.[6] The second kind typically affects adults and is brought on by persistent bacteriuria, neurogenic bladder dysfunction, bladder outlet obstruction, and extraneous factors such as bladder diverticula and catheters with urinary diversion or bladder augmentation.[7] According to the Unani concept, the causes of bladder stones are the same as those of kidney stones such as thick viscous humor, concentrated, and sticky fluids, *Su'-i-Mizāj Harr Mathāna*, narrowing of the neck of the bladder, etc.[8] The typical symptoms of bladder calculi are colicky pain, incontinence of urine, dysuria, hematuria, anuria (rarely), itching, postmicturition dribble, etc.[9,10] Urinary bladder stones can be easily treated using extracorporeal shock wave lithotripsy, even with minimally invasive techniques. However, it is not recommended for youngsters due to the difficulty in passing stone pieces and the potential side effects of surgery. Thus, it is possible to avoid surgery using safe and alternative treatments like the Unani medicine. Drinking lots of fluids, taking *Mufattit-i-Hasāt* (lithotriptic), *Mudirr-i-Bawl* (diuretic), and *Dafi'-i-Tashannuj* (antispasmodic) drugs are suggested Unani treatments for removing the stone.[11]

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Case Report

A 45-year-old menopausal, hypertensive, hypothyroidic female presented with a diagnosed vesical calculus, to the outpatient department of RRIUM Srinagar on August 06, 2024 with complaints of incontinence of urine, loin pain, suprapubic pain referring to the labia, dysuria, increased frequency, postmicturition bleeding, nausea, lower backache from 2 months. The onset of pain was gradual, aggravating during the walking and relieving in the supine position, frequency of urine was higher during the day. The patient had a severe urinary tract infection and had taken various antibiotics but showed resistance to everyone. The patient was also taking tablet telmisartan 40 mg, tablet thyronorm 75 µg, and tablet rosuvastatin 40 mg, respectively, for other comorbidities. She had no other history of lifestyle disease, family history, personal history, or known drug or environmental allergic history. All other demographic data such as age, sex, religion, and marital status of the patient were recorded. Proper physical and systemic examination was done. The diagnosis of vesical calculus was confirmed by a USG [Figure 1] of the abdomen/pelvis for the kidney, ureter, and bladder. Radiological findings were suggestive of a single vesical stone measuring 14–15 mm within the lumen of the bladder. As she was diagnosed case of a bladder stone and previously had taken so many drugs such as antibiotics, alkalizers, and antispasmodic which were prescribed by a physician but got no results, the doctor explained to the patient that there was no option other than surgery. Hence, the patient came to the RRIUM Srinagar for an alternative treatment. Other investigations like KFT, LFT, Blood Sugar fasting, Blood coagulogram, Urine culture was also done before and after treatment [Tables 1 and 2].

Examination of the patient

The patient was properly examined. The patient was found conscious, stable, and well oriented. The build of the patient was good with fair color, height: 5 ft., weight: 68 kg, and body mass index: 25, there was no pallor, anemia, cyanosis, icterus, or palpable lymph nodes. The vitals were as, pulse – 72 b/m, temperature – 97.4, respiratory rate – 18/min, systolic blood pressure – 170 mmHg, and diastolic blood pressure – 100 mmHg at baseline. Written informed consent was taken from the patient for both procedure and publication.

Intervention and follow-up

According to Unani classical literature, a treatment regimen was given as follows: *Ma'jūn Hajrul Yahūd* (5 g), *Sharbat Buzūrī* (2 tsf), *Arq Kāsnī* (30 mL), and *Arq Mako* (30 mL) were administered orally after meals, twice daily for 18 days. The patient was also given local steaming of herbal decoction for 10 consecutive days on the left hypochondrium and hypogastric region. The patient was advised to avoid spicy foods, a high-salt diet, and tomato and spinach. After a full course of treatment, she was strictly instructed to follow-up.

Inkibāb (local steaming)

The procedure was performed under standard operating procedures for *Inkibāb* (local steaming) apparatus [Figure 2] in a sitting position. Under all aseptic precautions, part (left hypochondrium and hypogastric region) was exposed to the steam of herbal decoction for 10 min using local steaming apparatus. After completion of the procedure, part was dried using a towel and the patient was kept in place for a while to avoid exposure. The herbal decoction was

Table 1: Investigation reports before treatment

Investigation	Results
KFT	Urea (38 mg/dL), creatinine (0.82 mg/dL)
LFT	Within normal limits
Blood sugar fasting	78 mg/dL
Blood coagulogram	Within normal limits
Urine culture	The culture showed mixed bacterial growth
USG	Large vesicle calculus (14–15 mm) Grade I=II fatty liver Postmenopausal uterus with fibroid

KFT: Kidney function test, LFT: Liver function test, USG: Ultrasound

Table 2: Ingredients of oral Unani compound formulations

Name of compounds	Composition
Compounds for oral use	
Ma'jūn Hajrul Yahūd	*Maghz Tukhm-i-Kadu* (18 g), *Maghz Tukhm-i-Khyārayn* (18 g), *Maghz Tukhm-i-Kharpaza* (18 g), *Ḥabb-i-Kāknaj* (18 g), *Hajrul Yahūd* (180 g), Pure honey (Q.S)[12]
Sharbat Buzūrī	*Bīkh Kāsnī, Bādiyān, Bīkh Bādiyān, Tukhm Kharpaza, Tukhm-i-Khyārayn, Tukhm-i-Kāsnī,* each 125 g, sugar 5 kg, *Sat-i-Limo* 12 g, *Natrūn Banjāwi* 7 g[13]
Araq Kāsnī	*Tukhm-i-Kāsnī* 450 g, water 5 L[13]
Araq Mako	*Mako Khushk* 300 g, water 2 L[13]

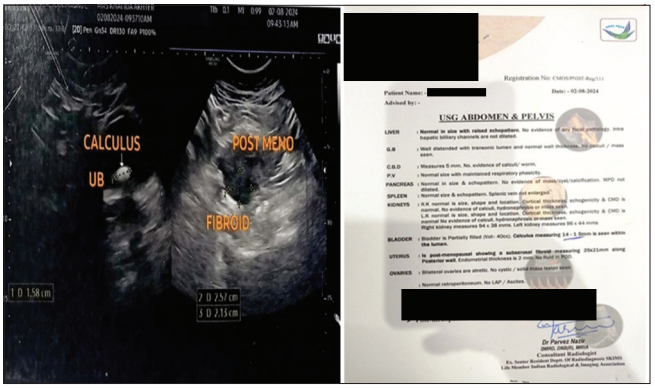

Figure 1: Pretreatment-ultrasound shows urinary bladder calculus (14–15 mm)

prepared with *Gul-i-Babūna*, *Gul-i-Tesū*, 10 sittings of the same were given for 10 consecutive days.

Results

The treatment showed excellent results as the vesicle stone measuring 14–15 mm [Figure 1 and Table 2] was flushed out [Figure 3a,b and Table 3] on the 10th day of treatment without any difficulty. All symptoms resolved immediately after the removal of the stone except incontinence of urine and urine infection which took a few days to get resolved. All the drugs were found to be safe and effective. The drugs act through their diuretic, lithotriptic, and antispasmodic properties.

Discussion

The improvement achieved in this case can be attributed to the use of herbomineral compound formulations which include *Ma'jūn Hajrul Yahūd, Sharbat Buzūrī, Arq Kāsnī,* and *Arq Mako* for 18 days along local steaming for 10 consecutive days. The possible beneficial effects of these drugs can be exhibited due to the following properties:

The use of *Ma'jūn Hajrul Yahūd* in *Hasāh al Kulya wa Mathāna* (urinary stones) is mentioned in one of the classical Unani books "*Bayāḍ-i-Kabīr*." It acts as *Mudirr-i-bawl* (diuretic), *Mufattit Hasāt* (lithotriptic), and *Mukhrij-i-Ḥasāh* (stone remover) due to its ingredients. Its therapeutic uses are *Hasāh al-Kulya wa Mathāna* (urinary stones), *Uṣr al-bawl* (dysuria), and renal colic.[12,14] *Sharbat Buzūrī Mu'tadil* is mentioned in *Murakkabat Advia* and *Bayāḍ Kabīr* as one of the best medicines for the removal of morbid matters from the liver, kidney, and bladder and for compound fevers.[12,13] *Sharbat Buzūrī Mu'tadil* mainly acts as a *Mudirr-e-Bawl* (diuretic) and has anti-urolithiatic activity. It prevents stone formation by forming soluble calcium compounds with citric acid. *Bīkh Kāsnī* one of the ingredients of *Sharbat-i-Buzūrī* possesses anti-inflammatory and nephroprotective activities.[15] *Arq Kāsnī* mentioned in renowned books of Unani medicine, acts as *Mulattif* (Demulcent), *Mubarrid* (Refrigerant), *Dāfi'i-Sozish* (antiphlogistic), *Māni-i-Iltiḥāb* (anti-inflammatory), *Mudirr-i-Bawl* (Diuretic),[13,16] and *Nāfi' Gurda* (nephroprotective).[17] It is used in *Du'f-i-Gurda* (weakness of the kidney), and *Waram-i-Jigar* (Hepatitis).[16,18] *Arq Mako* acts as *Mudirr-i-Bawl* (diuretic), *Man-i-Iltiḥāb* (anti-inflammatory), *Mubarrid* (refrigerant), and *Mufattit Sudad* (deobstruent). Its therapeutic uses are, *Sudad* (obstruction) *Ihtibās* (retention), *Taskīn Ḥarārat* (antipyretic), and *Amrad-i-Jigar* (hepatic diseases).[12,13]

Along with the herbomineral compound formulations, the patient was also prescribed local steaming produced by the decoction of *Babuna* and *Gul-i-Tesu* with the help of *Inkibāb* equipment [Figure 2] daily 10 min for 10 consecutive days. It works by dissolving the morbid matter and induces perspiration to eliminate morbid matter from the surface of the skin which is the main cause of stone formation.[19] Local steaming (Inkibāb) works by following mechanisms

Table 3: Investigative reports immediately after treatment (on the 24th day)

Investigation	Results
KFT	Urea (35.2 mg/dL), creatinine (0.79 mg/dL)
LFT	Within normal limits
Blood sugar fasting	93.3 mg/dL
Urine culture	The culture showed the presence of *Escherichia coli*
USG	Grade I=II fatty liver Postmenopausal uterus with fibroid
ESR	30 mm/h

ESR: Erythrocyte sedimentation rate, KFT: Kidney function test, LFT: Liver function test, USG: Ultrasound

Figure 2: (a) Equipment for *Inkibāb* (steam application), (b) Decoction of *Muḥallilāt* (*Gul-i-Babūna* and *Gul-i-Tesū*)

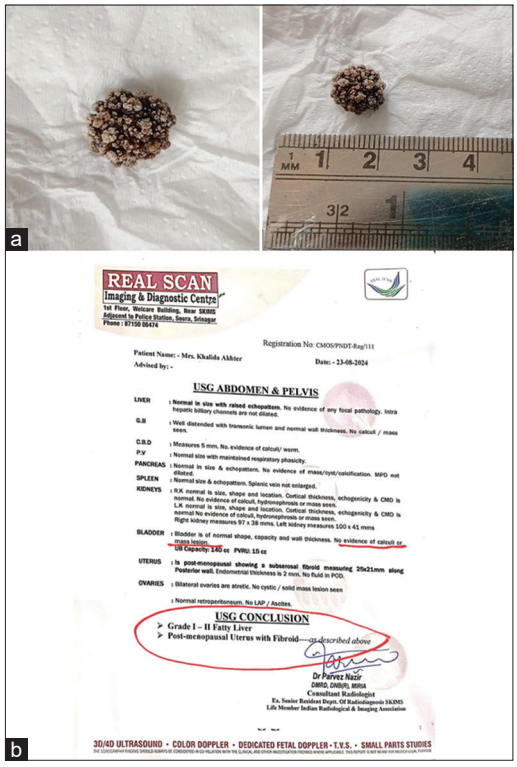

Figure 3: (a) Showing flushed-out vesicle calculus (diameter 1 cm). (b) Posttreatment-no stone in ultrasound report

(1) *Taḥlīl*: *Tahlīl* means dissolving waste product in the body. It is attributed to the hot water and heat along with *Muḥallil* and *Mufattih-i-Sudad* effects of *Babūna* and *Gul-i-Tesu*[12,18] which is used in *Inkibāb*. (2) *Taqti'*: To break and remove morbid matter from interstitial spaces of the body organs.[20]

Conclusion

It can be inferred from the above literature that the herbomineral compound formulation along with local steaming used for the treatment of vesical calculus is highly effective and safe. This treatment facilitated the complete expulsion of vesicle calculus with significant improvement in symptomatology without any difficulty. Hence, such Unani treatment can be used for vesical calculus as an alternative treatment to avoid surgery. Further scientific evaluation needs to be carried out at a large sample size.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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