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A Comprehensive Review Of Pharmacological Action And Pharmacognostical Screening Of *Iris Ensata Thunb*.

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Abstract

Herbal drug has got importance globally due to its medicinal, an ornamental and economic value. They have been used to treat numerous ailments for many years by ancient peoples. They are also mentioned in various Classical Unani literature and many of them are validated too. Irsa is also an herbal drug used mainly for respiratory diseases since ancient time and proved to be effective in Clinical trials performed in COPD and Bronchial Asthma too. It is also used in Liver diseases, Skin disease, Neuromuscular disorder, reproductive disorder, GIT ailments, antidote due to its anti- inflammatory, de-obstructive, Expectorant, Concoctive, Astringent, Immuno-protective, Anti- convulsant, Blood Purifying Properties. There are lots of researches performed on it to evaluate its Chemical constituents such as alkaloids, few Anthocyanins, Flavones and Flavonoids that pertains certain pharmacological activities that needs to be compiled to pave pathway for new researches yet to be perform in future.

***Index terms*:** Irsa; *Iris ensata Thunb*; Iridaceae; Flavonoids; Unani System of Medicine

I. INTRODUCTION

During the last few decades, Indigenous or Herbal medicine or Traditional system of Medicine has gained importance in the field of Medicine in most of the developing countries due to dependence of mass on traditional system of Medicine. Besides the availability of Allopathic system of Medicine, traditional medicine has its own place due to its holistic approach for the treatment. But in this scientific era, treatment described

in Classical Unani Literature need to be scientifically validated to boost confidence among traditional Medicine Practitioner and Patients through assessing their Safety, Efficacy and Toxicity of the recommended drug so that it can be explored more**.**

In Greek Language, Irsa means rainbow due to its multi coloured flowers. It has various species used as medicine for thousand years ago in several doses form of drug in Unani and other traditional system of Medicine. Many of exotic species are cultivated in India where its beautiful flowers are used as

Ornaments[1,5]. It is a perennial herb distributed at Western Himalayan region 5,000 to 9,000 ft high in Temperate Asia.

Irsa has anti- inflammatory, deobstructant, demulcent, expulsive, antispasmodic activities mentioned in Unani Classical Literature and is widely used in respiratory diseases like Coryza, Cough, Asthma, Pneumonia, and other ailments [2,3,4].

II. Taxonomic Classification[9.]

Kingdom	Plantae
Division	Tracheophyta
Class	Magnoliopsida
Order	Asparagales
Family	Iridaceae
Genus	Iris L.
Species	*Iris ensata Thunb*

III. Vernicular name [2,4,8]

Language	**Common Name**
Arabic	Urooq-us-Sosun
Persian	Bekh-e- Sosun Asmanjoni, Bekh-e-Banafsha
Hindi	Iirsa, Sosun
Kashmiri	Krishun, Marjal, Unarjal
Urdu	Irsa
Greek	Iirsa, Kasoras
Bhote	Tesma
Chinese	Li Shih, Ma Lien
English	Orris root
Scientific name	*Iris ensata Thunb*

IV. Habitat and Geographical Distribution

The Herb is found in Iran, Arab and Temperate Asia including India, China and Nepal. It grows in western Himalayan region of the northern Indian states of Jammu and Kashmir, Himachal Pradesh and Uttarakhand between 5,000 and 9,000 ft [2,3,4].

V. Botanical Description

Iris ensata Thunb. is a perennial herb. Its rootstock are stout, prostate and creeping. Stems are tufted, short or 45-60 cm in height, stout or slender in shape. Leaves are 45 cm Long and 6-8mm wide, linear, rigid and grooved in shape and greenish blue in colour. Spathes are 7.5-10 cm long consist of 1-3 flowers. Flowers are White or Lilac in colour. Sepals and Petals are stalked and contains purplish veins. sepal blades are rhomboid-ovate, blunt, entire, and shorter than claw that is neither crested nor bearded, 3.8-5cm long and 1.3-2cm wide. Perianth-tube is absent. Petals are oblanceolate, erect and 6mm wide. Stamens are three in number located at the outer perianth segments base. Filaments are distinct. Anthers are linear. Ovary are 3-celled, cylinder shaped and 2.5cm in length. Ovules are numerous. Style is linear. style-arms are three in number, linear, have large crests, sharped bifid tip and 2.5cm in length. Capsules are 6-ribbed, beaked, ribs are round, 3.8-7.5cm in length and 1.3-1.7cm in breath [2,3,4].

Fig 1: *Iris ensata Thunb* Plant

Fig.1: Image Courtesy: Herbal Garden, Regional Research Institute of Unani Medicine (RRIUM), Srinagar, Kashmir.

Fig. 2: *Iris ensata Thunb*. Flowers

Fig.2: Image Courtesy: Herbal Garden, Regional Research Institute of Unani Medicine (RRIUM), Srinagar, Kashmir

Fig. 3: *Iris ensata Thunb*. Flowers

Fig.3: Image Courtesy: Herbal Garden, Regional Research Institute of Unani Medicine (RRIUM), Srinagar, Kashmir

I. MORPHOLOGY

Macroscopic features

The root of *Iris ensata Thunb* has medicinal value that are used dried, dark brown in colour, small pieces of various shape usually elongated that has transverse wrinkles. Its inner surface is light brown in colour. The root has hard and fibrous fracture. It has Pungent odour and light biter and aromatic taste.

Fig.4: Macroscopic structure of dried root of *Iris ensata Thunb*.

Fig.4: Image Courtesy: M/s Faquir Chand Pradeep Kumar, Kirana Kothi, Barahdwari, Aligarh-202001 (U.P.)

Microscopic features

On roots transverse section, it is seen that there is an outer single epidermal layer contains typical parenchymatous cells with thick outer wall. The cortical layer consists of multi-layered Parenchymatous cells,

rectangular to oval shaped with oil globules and various yellowish-brown contents in most of its part. The endodermal cell is 4-5 layered, polygonal to oval shaped and has highly thick cell wall and few of them are present as compact masses. Vascular bundles are only found in the internal pith of endodermis that are numerous and scatter arranged similar to roundish shape when tapered from one side. Vascular bundles comprise of Phloem and scattered Xylem elements covered by fibrous sheath of Lignin where cells are 1-3 layered. The endodermal pith contains Parenchymatous cells that are thin walled, compact, and polygonal to oval shaped**.**

POWDER OF ROOT

When crude drug is powdered, it contains epidermal fragments, parenchymatous cells in cortical region, more thickened walled endodermis, vessels, and fibres fragments. The vessels are long, lignified and generally has spiralled and pitted thickenings [3,4].

II. DESCRIPTION OF IRSA MENTIONED IN UNANI LITERATURE.

It means rainbow (Quus qazah, Dhunak) in Greek language due to different coloured flowers making such pattern. It is also known as kasuras, Abaremooni in Rome, Aqaarsosai in Suryani, Baekh-e-sosun in Iran. Irsa is the root of Sosun Aasmani juni (Kaboodkohi). Its grasses have long and wide leaves. It is smaller and less sticky but have similar height than big sosun. Its flowers have aroma.

Maqadwaniya and Loriqaa are most potent and valuable and much better is of the region where herb grown have roots that are small, strong, thick and hard to break, reddish in colour, nodular, aromatic, corrosive to taste and due to its aromatic smell produces sneezing on grinding. White irsa is called Roman Irsa or Neeuwah that is less potent than above mentioned species of Irsa.

Its roots have medicinal value. Its roots are hard, nodular, wide, 1 finger long and aromatic. Bark of roots are of blue and red colour. Pulp of roots are of yellow, reddish, and white colour. Older roots become insect bored due to moisture content and hollow space present in it. Due to its aromatic odour, roots are dried in shade by binding them together with Flex seeds rope so that it will remain be strong, spacious, and away from any crest, trough or projection. It is harvested at the end of Rabi season that is mainly end of month of March at Night time as moisture content is more during day time at the start and end of Rabi season and ultimately more prone to produce infections [5,7,8].

III. MIZAJ (TEMPERAMENT)

Hot 2⁰dry 2⁰

The Unani Pharmacoepia of India- Part-1, Vol. -2, Standardisation of Single

drugs of Unani Medicine Part3

1st pt. of Hot 2⁰ dry 2⁰

Muheet-e-azam, Khazainul advia

last pt. of Hot 2⁰dry 2⁰

Al Qanoon, Aljama almufredah aladvia wa

alaghzia-1st Part; Vol.2, Khazainul advia

Hot 3⁰dry 3⁰ [10]

Muheet-e-Azam, Hhazainul Advia [5,7,8].

IV. DOSE

3-5 gm

Standardisation of single drugs of Unani Medicine

5-7 gm

The Unani Pharmacopoeia of India

1 taula 1 maasha 7 ratti-2 taula 4 ratti = approx. (13.875g – 24.5g)

Khazainul advia

3.5-10.5 gm

Gazruni in Shareh Qanoon [3,4,7].

V. ACTION AND USES

Pharmacological actions

Anti-inflammatory (Muhallil-e-Waram), Demulcent (Mulattif), De-obstructant (Mufateh-e-Sudad), Expectorant (Munaffis-e-Balgham), Calorofic (Musakhhin), Munaqqi (Emetic), Concoctive (Munzij), Detergent (Jali), Mild Astringent (Qadr-e-qabiz), Immunoprotective (Muhaffiz-e-Quwa wa Arwah), Desiccant (Mujaffif), Sedative (Musakkin), Anti- Convulsant (Dafa-e-tasannuj), Blood Purifier (Musaffi-e-dam) [2,3,4,5,6,7].

VI. THERAPEUTIC USES

Root of Irsa has medicinal value in Unani system of Medicine in several dosage forms such as powder, Syrup, deciction, Paste, enema, Pessary, infusion, gargle, ear drop, Cicatrizant.

Neuromusculoskeletal System

- Due to demulcent and calorofic property, it is used in imtala, Istarkha (Atony/Flaccidity), Tasannuj (Spasm), falij (Hemiplegia), hatak (tremor).
- Used as Enema in Sciatica.
- When paste is applied, induces muscle production over the bone and fast healing of deep wounds.
- It is used in Joint pain, Muscle injury and wounds.

Head and Neck

- Due to its sedative and hypnotic property, its paste with Oil and Vineager is beneficial in Chronic headache, induces sneezing and lightens the mind.
- Its decoction with Vineager is used in case of Tinnitus as ear drop.
- Used with Olive oil in case of deafness as ear drop.
- Due to Anti-inflammatory property,used as paste in Spleen inflammation, ascites, bone fracture, muscle injury wounds.
- Used with Vineager and Rose oil in headache.
- Used in rashes over scalp.
- According to Ibn Sina, it has hypnotic property, so it is used in Chronic headache, its seeds also releives headache and hence produces sleep and its leaves too is used to relief headache if inhaled daily for 3 days.
- When its decoction is irrigated (Nutool), it relieves all types of head diesases such as headache, dementia and nightmare in children, boost power protection.
- When it is wet grinded and smelled, it removes eyes morbid matters and fresh paste if applied clears Vascular keratitis/ Pannus (jala).

- Its decoction when used as nasal dop relieves nose bad smell, as gargle to relief toothache and Uvulitis (Waram-e- Lihaat).
- When chewed cleans mouth from bad smell of Alcohol consumption.
- Increases tear production.

Respiratory System

- Due to its Concoction of Phlegm and Expectorant Property, used in Coryza and Cough, Tonsilitis (Waram al-Lawzatayn), Bronchial Asthma (Diq-al-Nafas), Catarrhal Diphtheria, Pneumonia (Zaat-ur-ria), Chest pain, breathlessness/ dyspnoea (Usr al-Tanaffus)
- It expels all the waste sputum from chest when chewed.
- Used as Cardiac tonic.

Gastro-intestinal and Liver diseases

- Due to its anti-inflammatory property, its decoction is effective in Ascites and hence boosts liver.
- Relieves coldness of Organ, Jaundice, Piles.
- When old and thick root of Irsa is used with Honey water, it clears phlegm (Balgham) and marrh Safra in the form of diarrhoea.
- Relieves bad smell and gangrene of Anal Fistula.
- Relieves tiredness when its paste is applied or consumed with Vineager or honey.

Antidote

In Snake bite or other reptiles bite and drug poisoning.

Skin Diseases

- Due to its Concoctive, detergent and de-obstructant property used alone or in combination with Kharbaq Siyah in Melasma (Jhai).

  and Naevus/ Blamishes (Namash).

- Softens the hard and thick inflammation, lymphadenopathy (Khanazeer) and Acne vulgaris (Basoor-e-labniya).

Obstetrics and Gynaecological disorder

- When put in anus kills helminthes and relieves inflammation of Uterus.
- When used with Honey as Pessary (Farzaja) induces abortion (Isqaat).
- Its steam is used in uterocolic.
- Used with alcohol to treat oligomenorrhoea and amenorrhoea.
- Its oil is used in uterine ulcer.

Male reproductive system

Nocturnal emission / Nightfall (Kasrat-e-Ahtalam), Protatorrhoea Spermatorrhoea (jiryaan-e-mani wa mazi), imsaak (delayed ejaculation)**.**

Others

- Its decoction is used in fear.
- Effective in Fever with chills and rigors**.**
- Venereal affections.

- Liver Complaints**.**
- According to Ibn sina, its oil is used to reduce mass growth due to Piles [2,3,4,5,6,7, 8].

VII. SUBSTITUTES

According to Razi, its substitute is Majaryun (10.2gm) with Camel milk in case of bilious diarrhoea [3,4,5,6,7,8].

VIII. FORMULATIONS

Majoon-e-Rahul Momineen, Zimad-e-Khanazeer, Arq-e-Chobchin, Sharbat-e-Zoofa [3,4,7,8].

IX. SCIENTIFIC STUDIES

Biochemical Constituents

Various studies had been performed to identify various bioactive compounds extracted from its flowers, leaves and roots responsible for various pharmacological actions and on study alkaloids, flavonoids and their derivatives, quinones, terpenes, steroids, tannins and simple phenolics were found.

PHYTOCHEMICAL STUDIES

Anthocyanins

- There are six types of anthocyanidins such as delphidin (1), Cyanidin (2), Petunidin (3), Pelargonidin (4), Malvidin (5) and Peonidin (6) are pigments found generally in flowers and fruits of iris species.
- Non-acylated anthocyanins and 3-0-rutinoside-5-0-glucosides of Petunidin and Malvidin were found.
- Rutinosides and 3-0-(p-coumaroylrutinosides) of delphinidin, Petunidin and Malvidin were reported from iris flowers as minor pigments.
- Cyanidin and Peonidin were also found from 7 cultivars of iris flowers of *Iris ensata thumb.*
- Anthocyanin obtained from various part of plant has anti-obesity, Antidiabetic, Anticancerous, antimicrobial and anti-inflammatory effects[11].

Flavones

There are three types of rare simple flavones such as 5-hydroxy-2-methoxyflavone, 5-hydroxy-3'-methoxyflavine and 5-hydroxy-4'-methoxyflavone reported to be found in callus tissue of Iris ensata thumb.

C-Glycosyl flavone

Common C-glycosylflavones such as isovitexin, Vitexin, iso orientin, orientin and vicenin-2 were obtained from its flowers and leaves. Out of those C-glycosylflavones, isovitexin were obtained from its flowers as 7-0-glucoside, 2"-0-rhamnoside and 2"-0-xyloside[12].

Flavonoids

- Anthocyanin was isolated from the dull magneta Purple and mulberry Purple flowers of Japanese garden iris, *I.ensata* (= *I.Kaemferi*) in an experiment t performed in 1940 which is named as "ensatin" and characterized as malvidin 3-0-coumaroyldiglucoside) that was later on completely identified in 2014 as 3-0'-[(4"-E-p-coumaroyl-α-l-rham-no pyranosyl)-(1 to 6)-β-d-glucopyranoside.
- Another acylated glycosides of del-phinidin and Petunidin were also reported from *I.ensata*. producing Purple to Blue colors of Iris flowers whereas C-glycosylflavones were actually colourless but shifted the anthocyanins colors bathochromically.
- Japanese Garden Iris (*I.ensata*)'s flowers are reddish purple and Purple to Blue in colour that contain approximately same amount of anthocyanins except for a part of reddish-purple cultivars

contain Cyanidin and Peonidin glycosides. In invitro examination, it was proved that C-glycosylflavone, isovitexin is a co-pigment substance of *I. ensata* flowers[13].

S. No.	Part Used	Phytochemical Constituents	Authors	Year	References
01	Flowers/Fruits	Anthocyanins	Khoo HE et.al	2017	11
02	Flowers/ Leaves	Flavones	Boltenkov EV et. Al	2005	12
03	Flowers	Anthocyanins/Acylated glycosides/ C-glycosyl flavones	Iwashina T et.al	2020	13
04	Rhizomes/ Ethyl acetate, Chloroform & Methanol	Flavonoids, Phenols, Carbohydrates & Tarpenoids	JI Wagay et.al	2018	27
05	Flowers	Anthocyanins	Kitahara K et. Al	2014	28

Table1: Phytochemical Studies of *Iris ensata Thunb*.

X. PHARMACOLOGICAL STUDIES

Antibacterial activity

Sajad H Wani et. Al conducted a study to evaluate the anti-bacterial activity f aqueous, hexane and methanolic extract of rhizome of different species of Iris growing in valley of Kashmir Himalaya in which both Gram +ve and Gram -ve bacterial strain were included with the help of agar well diffusion method and found effective with highest inhibition zone seen in methanolic extracts followed by hexane and aqueous extracts with highest inhibition zone in *Iris croceae* [14].

Anti-inflammatory, Demulcive and De-obstructive activity

Zaidi SAR performed a Single blinded Placebo Clinical trial on Sharbat-e-Unsul Murakkab whose one of the ingradient is Irsa is evaluated for Sual-e-Muzmin and showed anti-tussive, mucolytic, anti – Catarrhal & bronchodilation activities[15].

Hepatoprotective effect

A standardization study was conducted on a Non-pharmacoepial Majoon, prepared at Dawakhana – Ajmal Khan Tibbiya College and Hospital, AMU, Aligarh by Bushra Iqbal from deptt. Of Ilmul Advia under the guidance of Prof. Naeem Ahmed Khan. Above Majoon is used for Liver ailments and Irsa is one of its constituents and on qualitative/ Phytochemical analysis of NPM, Phenols, tannins. Sterols/terpenes, Flavonoids, Reducing Sugar was found and is ultimately responsible for pharmacological action they were formulated[16].

Topical effect

A Controlled randomized, Single-blind Clinical trial was conducted according to the GCP Guidelines by Humaira Bano et. al., on an Unani herbomineral Cream to evaluate its topical effects on Acne vulgaris. Irsa is one of the constituents of this cream and found effective in reducing the inflammatory lesions in comparison to Control group[17].

Topical effect of Tila-e-Muhasa in Acne Vulgaris

A Single -arm Clinical trialwas conducted by Meenu Doni et.al., from the Dept. Of Moalejat, Luqman Unani Medical College & Hospital, Bijapur, Karnataka in which Tila-e-Muhasa whose one of the gradients is Irsa is used to relief Signs & Symptoms like Papules, Pustules, erythema, Comedones & Itching[18].

Antioxidant activity

A research work was performed by Aijaz Ahmad et al., in which antimicrobial as well as antioxidant activity on their respective parameters. Dried leaves of *Iris ensata Thunb* was extracted in methanol, Petroleum ether and ethyl acetate solution and showed anti-oxidant activity[19].

Antifungal Activity against Trichosporon asahii

A research work was performed by Veena Unaiyal et. al., on the Leaves extracts of *Iris ensata Thunb* against Methanol, Ethanol, Chloroform and Acetone solutions with the help of Tube Dilution broth assay and Agar well diffusion assay and showed antigungal activity[20].

Antihyperglycemic activity

A research work was performed on streptozotocin induced hyperglycemic rabbits that were treated with aqueous extract of dried roots of *Iris ensata* for 21 days. The drug was found effective in reducing the blood glucose level in diabetic rabbits induced through STZ as well as in normal rabbits[21].

Analgesic, Anti-Inflammatory and Anti-Microbial Activities of Irsa in Cervicitis

A Clinical study was performed by Salma Mirza and et. al., in the Patients of Iltehabe Unqur Rehm (Cervicitis) in Majoon form at the dose of 10gm that was divided in two doses and locally its extract was also applied in the form of Humool (Pessary) OD for 15 days after menstruation for three consecutive Cycle. The effect was evaluated on subjective parameters such as low backache, lower abdominal pain and dyspareunia and was found effective in resolving the symptoms [22].

Antiproliferative activity

A research work was performed by Sajad H Wani and et. al., in methanolic extracts of dried rhizome of different species of Irsa growing in Kashmir Valleys against the anti-cancerous activities and extracts were found effective in showing inhibitory effect on proliferation of A549 and Caco-2 cell lines which was dose dependent. I. ensata was with maximum efficacy among *I. spuia, I. kashmiriana, I. germanica and I. ensata*[23].

Case study of Palmar Plaque Psoriasis

A 55 years old patient came at OPD with the complaints of patchy scales on palmar surface of both the hands accompanied with itching for 5 years followed by blood or fluid oozing occasionally. The patient was treated with market prepared Unani formulation Syrup Dermofresh and Syrup Antox-U (20 ml each) mixed with equal amount of hot water for 21 days. Irsa is one of the ingradients of the formulation that was found effective in relieving symptoms and patches were almost disappear at the end of treatment[24].

S. No.	Plant Parts/ Extracts	Pharmacological activities	Authors	Year	References
01	Rhizomes	antibacterial activity of methanol, Hexane and aqueous extracts of rhizome of different Iris species	Wani SH	2012	14
02	Flowers/ Leaves	Anti-inflammatory, Demulcive and De-	Boltenkov EV et. al	2005	12

		obstructive activity of Sharbat-e-Unsul Murakkab in Sual-e-Muzmin			
03	Non-Pharmacopeial Majoon	Hepatoprotective effect of NPM in reducing elevated Hepatic Profile of Hepatitis-B.	Bushra Iqbal et.al	2019	16
04	Herbomineral Cream	Topical effect of Herbomineral Cream on Acne Vulgaris.	Humaira Bano et. al	2009	17
05	Unani formulation	Topical effect of Unani formulation in reducing Papules, Comedones and Pustules of Acne Vulgaris	Dani M	2022	18
06	dried leaves	Antimicrobial and anti-oxidant effect of Methanolic, ethyl acetate and Petroleum ether of dried leaves	Ganaie AA	2018	19
07	Leaves extract	Antifungal activity against Trichosporonasahii causing Ttichosporonosis	Veena Uniyal et.al	2018	20
08	Dried roots	Antihyperglycemic activity of aqueous extract of dried roots	Ahmad W	2012	21
09	Majoon	Analgesic, Anti-inflammatory and Anti-Microbial activities in Cervicitis	Mirza S	2015	22
10	Dried rhizome	Methanolic extract shows anti-cancerous activities	Sajad H Wani et.al	2017	23
11	Unani formulation	Syrup Dermofresh & Syrup Antox-U shows relief in Palmar Plaque Psoriasis	Ahmad et.al	2021	24
12	Seed	Seed shows anti-hyperglycaemic activities	A Aftab	2017	25
13	Topical application	Drug shows Anti-fungal effect for Seborrheic dermatitis of Scalp in Unani Medicine	S Ansari	2020	26

Table 2: Pharmacological and Clinical activities of *Iris ensata Thunb*.

XVI. RESULT & DISCUSSION

Iris ensata Thunb, also knowns as Irsa are one of the important drugs used for treating respiratory ailments and other diseases as well by Ancient Physicians in the Unani System of Medicine. Root of the drug, *Iris ensata Thunb* has more medicinal value has been in use for thousands of years. It contains various chemical constituents such as alkaloids, glycosides, tannin, starch, Phenol, Flavonoid and their derivatives, quinones, terpenes, steroids, Proteins, resins and so on. It contains anthocyanins such as delphidin, Cyanidin, Petunidin, Pelargonidin, Malvidin and Peonidin are pigments found generally in flowers and fruits of iris species has anti-obesity, Antidiabetic, Anticancerous, antimicrobial and anti-inflammatory effects. Common C-glycosyl flavones such as isovitexin, Vitexin, iso orientin, orientin and vicenin-2 were obtained from its flowers and leaves. Flavones are also found. Various flavonoids sich as Anthocyananins and acylated glycosides of delphinidin and Petunidin were also reported from *I. ensata*. producing Purple to Blue colours of Iris flowers that exhibit anti-oxidant activity, anti-microbial activity which ultimately exhibits hepatoprotective, nephroprotective, anti-proliferative, de-toxifying activity, anti-diabetic activity.

XVII. CONCLUSION

Since *Iris ensata Thunb*. had been used in various occasions since very early for decorative purpose, as food and for many medical conditions to serve human needs. It is endowed with lots of health benefits as we known from the literature either from Classical Unani Textbooks or from various research articles published of various phytochemical studies as well as Pharmacological studies. It also paves the way for many more studies with the help of Possible Literature on the drug mentioned in Unani Classical Literature.

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ABBREVIATIONS

GIT: Gastro-intestinal tract
COPD: Chronic Obstructive Pulmonary Diseases
ft: feet
º: degree
Vol.: Volume
+ve: Positive
-ve: Negative
&: and
et al.: and others
GCP: Good Clinical Practices
OD: Once a day
OPD: Out-Patient Department
gm.: Gram
ml: Milliliter
STZ: Streptozotocin