

Saqmonia (*Convolvulus scammonia* Linn), An Important Medicinal Plant of Unani Medicine: A Comprehensive Review

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Abstract: Drugs described in Unani system of medicine are of natural origin. The medicinal plants are the main source of drugs in Unani system of medicine. They are used as such or in the form of various medicinal preparations or formulations. Many plants based drugs used medicinally and have pharmacological effect on human body. The drug *Saqmonia* (*Convolvulus scammonia*, Linn.) is recommended and used by the renowned Unani physicians since along. The present article covered the therapeutic potency, morphological characters, phytochemistry, method of preparation detoxification and pharmacological actions as well as toxicity of well-known unani drug saqmonia.

Index Terms: Saqmonia, *Convolvulus scammonia*, Unani, Detoxification.

I. INTRODUCTION

In Unani system of Medicine, medicinal plants and their products are effectively used from ancient time. They have many medicinal properties and recommended in various diseased conditions. Great Unani physician used the naturally occurring medicinal products like plant origin drugs, mineral origin drugs as well as animal origin drugs for the treatment of variety of diseases. Unani medicine also plays an important role in preventing and treating infectious diseases. Therapeutic effects of medicinal plant are due the presence of bio-active chemical constituents such as alkaloid, terpenoids, tannins, and phenolic compounds etc. [1].

II. DEFINITION OF TERMS

i. Scammony

It is a *Convolvulus scammonia* L., a twinning plant, similar to *Convolvulus arvensis* plant, but in comparison *Convolvulus. Scammonia* L., larger in size and having stout tap root [2].

ii. Scammoniae Radix

It is the root of *C. Scammonia*, which is an indigenous herb of eastern Mediterranean [2].

iii. Scammonium

Scammonium is a gum resin which is obtained after incising the living root of *C. scammonia* [2].

iv. Resinae Scammoniae

It is a mixture of resins of scammony root or Orizaba jalap root [2].

III. GEOGRAPHICAL SOURCE OF SAQMONIA

Plant of saqmonia is abundantly found and native of Palestine, Sham, Iraq, Iran, Jordan, Lebanon, Syria, Turkey and Ukraine [3–5].

IV. BOTANICAL DESCRIPTIONS

The plant of saqmonia is botanically known as *Convolvulus scammonia* L. also known as *Convolvulus scammonia* Var. *pseudoscammonia* Sa'ad. is a perennial herb of the family Convolvulaceae. It is a twinning perennial, stout, fusiform thick root, flowers like those of *Convolvulus arvensis*, and having irregularly arrow-shaped leaves and a thick fleshy root. The dried juice, virgin scammony, obtained by incision of the living root, it has been used in medicine as *scammonium*. Flowers are axillary, solitary, 3-peduncles, sepals 5, smooth, ovate, repand, obtuse, with a flexed point, and covered at the edge. Funnel shaped corolla, expanded, whitish in color having unpleasant odour. The leaves are on long petioles, alternate, sagittate, oblong, acute, entire, quite smooth, truncate and angular at the base, with acute, spreading lobes, and of a bright-green color. The stem are annual, numerous, round, smooth, branching from the main root, twining, slightly angular near the end, and 12-20 feet above the soil [6]. The roots are 3 to 4 feet long and from 9 to 12 inches in circumference; tapering, however it is usually occurring in short pieces, and it is about 5 cm (2 inch) thick at apex, it is cylindrical, kinky, externally yellowish-brown in color, furrowed and externally wrinkled, internally it is whitish, more or less changed to grayish-brown in color. In strength it is hard and heavy accompanied by fibrous fracture, covered with a light grey bark and containing a milky juice. It is sweetish followed by acrid in taste. Most of the bazar stuff is imported into India from Syria and Asia-minor [2,7].



Fig 1: *Convolvulus scammonia* L.^[24]



Fig 2: Scammonaei Radix (Root of scammony)^[25]



Fig 3: Scammonium ; gum-resin, original photograph by Author1

Table No.1: Vernacular name [1]–[5]

Synonyms	<i>Convolvulus scammonia</i> var. <i>pseudoscammonia</i> Sa'ad
Unani name	Saqmonia
Arabic	Mahmooda, Sigmonia, mahmoda, helablab
Farsi/ Persian	Saqmonia
English name	Scammony, scammony Syrian bindweed, purging bindweed
Sindhi	Mehmood
Panjabi	Sak munia
Spanish	Escamonia
Swedish	Hartsvinda
French	Scammonée
German	kleinasiatische Winde
India	Sak munia

V. ORGANOLEPTIC PROPERTIES AND COLLECTION OF DRUG

Scammonium is a gummy resin, obtained from this milky juice of the root by clearing away the earth from the upper part of the root and cutting off the top obliquely, about 2 inches below where the stalks spring. Then a vessel is fixed in such a position as to receive the exuding juice, which gradually hardens and becomes the Scammony of commerce. The best *Scammonium* is black, resinous and

shining when in the lump, but of a whitish-ash color when powdered, with a strong cheesy smell and a somewhat acrid taste, turning milky when touched by the tongue. It occurs in commerce in irregular pieces 1 to 2 inches or more in diameter [8].

Table 2: Morphological characteristics of Saqmonia [1]

Color	Externally blackish brown with dark brown surface
Shape	Irregular pieces
Size	1 to 2 inches or more in diameter
Taste	Acrid
Odour	Unpleasant

VI. CHARACTERISTICS FOR THE IDENTIFICATION OF SAQMONIA DESCRIBE BY THE UNANI SCHOLARS

Saqmonia is a very important drug in Unani system of medicine and also used in other alternative system of medicine. Pure saqmonia is brittle, easily breaks and dissolved in water. [3,5]. It is blackish brown with dark brown surface and having spongy surface. A good quality of saqmonia is clear, light in weight and spongy in texture. Pure and authentic saqmonia do not produce irritation when put on the tongue while resin from other plants produce irritation. Saqmonia of sham and philistine is of bad quality due to mixing of adulterants which results in non-spongy saqmonia. [11,12].

VII. CHEMICAL CONSTITUENTS

The root contains on an average 8% resin together with dihydroxy cinnamic acid, beta-methyl-esculetin, ipuranol, sucrose, a reducing sugar and starch. Resin consists of the glycosides and methylpentosides of jalapinic acid and methyl ester.

The active principle is the glucoside scammonin or jalapin, $C_{34}H_{14}O_6$. Root of scammony contains many active ingredients. The ether soluble extracts of resin gave glucose and hydroxyfatty acid, $C_{16}H_{32}O_3$ on acid hydrolysis. The ether insoluble extract of scammony resin yields seven organic acids (acetic, propionic, isobutyric, isovaleric, 2-methylbutyric, n-valeric and tiglic acids), two hydroxyl fatty acids (Ipurolic and rhamnose), on the other hand ether soluble resin i.e., jalapin yields same organic acids and monosaccharides, one type of hydroxyl fatty acids i.e., jalapinic acid. Study was carried out on the resin glycosides, the ether soluble glycoside of scammony roots subjected to examine and two genuine resin, glycoside were isolated. The ether soluble extracts of crud drug performed on saphadex LH-20, which yields 15% ether soluble resin glycoside i.e., jalapin. On successive chromatography of jalapin on saphadex LH-20, provide two pure genuine glycosides, such as scammonin I ($C_{50}H_{84}O_{21}$) and II ($C_{45}H_{78}O_{19}$). Scammonin I was the major resin glycoside and obtained in a yield of 56.9% from the total resin glycoside [8].

VIII. PROPERTIES OF SAQMONIA AS DESCRIBED BY IN UNANI SYSTEM OF MEDICINE

i. MIZAJ (TEMPERAMENT)

Mizaj of saqmonia is Hār 3° Yābis 3° (Hot 3° and dry 3°) [9,10], Hār 3° Yābis 2° (Hot 3° and dry 2°) [12].

ii. MUḌIR (SIDE EFFECT)

Large doses cause acute gastro-intestinal irritation, and, if absorbed, produce cystitis and nephritis [13]. Saqmonia is contraindicated in large dose because it absorbs towards the convexity of liver, due to which it excretes through diuresis inspite of diarrhoea [12].

iii. MUSLIH (CORRECTIVE)

Sikanjabeen, Nishasta (starch), Kateera (Gum) (*Tragacanthum indicum*), Mastagi (Gum resin) (*Pistacia lentiscus L.*), [9], Gulab (Rose petals) (*Rosa demesena*) [10].

Kundur muzakkar, anisoon (*Pimpinella anisum L.*), and bahi (*Cydonia oblonga Mill.*) along with the aab-e-karafs (*Apium graveolens Linn.*) are the muslih (correctives) of saqmonia. Iyarij feqra is the best corrective of saqmonia. According to a Unani physician and scholar, Ibn-e-Talmiz, sana maki (*Cassia angustifolia*) and anisoon (*Pimpinella anisum L.*) are the best correctives of saqmonia. Some scholars grind the saqmonia with the gul-e-banafsha for the correction [12].

IX. METHOD OF DETOXIFICATION OF SAQMONIA

Saqmonia is a drug which has third degree temperament, before use it needs to be detoxified. There are various methods of detoxification one of them is very common. Detoxify it with the help of apple and this the process is known as *Tashviya*, in which an apple or bahi is taken and make a cavity in the apple, after that saqmonia kept in the cavity and close the apple with the cutting portion, then wrap it with wheat dough after that kept in the hot ash to roast, when the flour became reddish, apples taken out from the ash and the saqmonia collected, this saqmonia is known as *Saqmonia mushawwa* (detoxified saqmonia) [10]. Other methods of detoxification are listed below [12]:

- Saqmonia kept in muslin cloth then put in the apple, apples covered with wheat dough, put in the ash to roast.
- Grind saqmonia with apple juice along with tukhm-e-karafs (*Apium graveolens Linn.*) in this way the saqmonia becomes detoxify.
- In another method of detoxification of saqmonia, the drug mix with Anisoon (*Pimpinella anisum L.*) and and Doqu (*Peucedanum grande C.B Clarke*) and grind slowly then roast the mixture on low flame. So obtained the saqmonia as *Mudabbar*.

- iv. Similarly, the saqmonia grind with the mastagi (*Pistacia lentiscus* L.) by stomne mortar and pestle, then kept in apple and roast it. Finally get the *Saqmonia Mushawwa*.
- v. In another way of Islah (correction), the mushawwa saqmonia can be given with Rubbus-soos (dried root extract of *Glycyrrhiza glabra* L.) and kateera (*Tragacanthum indicum*).
- vi. It is recommended by some Unani scholars that if saqmonia is grind in any one of Araq-e-gulab, Aab-e-bahi, of Aab-e-seb. The mixture obtained so far dried in shade and can be used as per the doses.
- vii. In the another method saqmonia grind with equal quantity of anisoon (*Pimpinella anisum* L.), at the time of usage aab-e-karafs added, it is considered to saqmonia mushawwa equivalent.

X. BADAL (SUBSTITUTE)

Elwa (*Aloe vera*), Halela zard (*Terminalia chebula*) [4].

XI. AFĀL (ACTION)

Muṣaffi-i-Dam (blood purifier), *Muqaww-i-Mi'da* (Tonic for Stomach), *Qawī Mushil-i-Ṣafrā'* (chologogue), *Jālī* (detergent), *Muḥallil* (resolvent). *Mukhrij-i-Janīn wa Mashīma* (Abortifacient) when use as pessary. In dose of 3.5 gm. (masha) saqmonia is *Mushil-i-Mirra Ṣafrā'* and *Mushil-i-Balgham* (phlegmagogue). If saqmonia is given to more than therapeutic dose i.e 1.75gm (0.5 dirham) it firstly causes constipation, then nausea and anxiety later on leads to sweating sometimes it causes diarrhoea, which become the major cause of death. Old saqmonia causes diuresis inspite of diarrhea. Saqmonia is the antidote for scorpion poisoning, locally as well as internally [3]. *Mudirr-i-Bawl* (diuretic), *Mufattiḥ Sudad* (deobstruent), *Mushil-i-Ṣafrā'* (chologogue), *Jālī* (detergent), *Musqīṭ-i-Janīn* (abortifacient)[3,5]. *Qawī Mus'hil-e-safra wa balgham* (Strong purgative of bile and Phlegm) [4], *Qātil-i-Dīdān-i-Am'ā'* (antihelminthic)[3,6,7]. Root of saqmonia is *Muharriq* (stimulant) and *Muḥallil* (resolvent) [5,8].

XII. ISTEMAL (THERAPEUTIC USES)

Bahaq (Pityriasis), *Baras* (Vitiligo), *Namash* (Naevus), *Qūbā* (Tinea, ring worm/dermatophytosis), *'Irq al-Nasā* (Sciatica), *Wajā al-Mafāṣil* (polyarthritis), *Kirm-e-shikam* (Helminthis) (Along with milk) [9,10]. Local application of saqmonia and root effective in baras (vitiligo), *beheq* (Ptyriasis), *Namash* and *kalaf* (melasma) whether it is used with vinegar or single. Locally (Tila), beneficial in vitiligo. 1 part saqmonia, ½ part barley flour (jau sattu) and vinegar, zimad (locally) of this mixture effective in joints pain and waja-ul-waj-wariq (hip joint pain). Specific action of saqmonia is *Muharriq-e-safr* and evacuates the morbid adhesive matter via ishal (diarrhea). No other herbal drug is equivalent to the saqmonia in comparison of its *Mushil-e-safrā'* action. *Ḥumūl* (pessary) of saqmonia is abortifacient. A piece of cloth soaked in root extract of saqmonia used as *ḥumūl* (pessary), it causes foetal death and leads to menorrhagia. Internal use also results in abortion. Effect of saqmonia is *Bil-khassa*, amulet of saqmonia prepare with horse skin when hang up in neck of a women, due to the effect of saqmonia women cannot conceive or not get pregnant. Saqmonia can used as contraceptive for both male and female [11,12].

XIII. TRADITIONAL USES OF SAQMONIA

A purgative drink was made by mixing of scammony and sugar in some water, this drink expels all the depositions and poisons. If this drink used for one month it treat the fever, shivers and quartan fever (malaria) for the rest of the year. Unani physician Discorides gave information about the purgative effects of sammony, the numerous simple and compound remedies of scammony for this purpose [6]. Scammony is hydrogogue, cathartic and is largely used in dropsy and anasarca [14]. From a long time saqmonia was used as abortifacient and uterotonic [15], and also used for the treatment of various diseases like emeda, ascites, hydroncus, simple obesity, ling fevers and ardent fever [16]. *Nutool* of saqmonia root decoction along with sirka (vinager) and roghan-e-gul is beneficial in headach. Application of powder paste of saqmonia root is effective in *baras* (Vitiligo) and *waja-ul-mafasil* (joint pain) as well as it resolves the inflammation. Pessary (*farzaja*) of root of scammony is abortifacient [2].

XIV. MIQDARE KHURAQ (THERAPEUTIC DOSE)

Dose of saqmonia resin is 250-625 mg and salt of root of saqmonia is 1-3 gm. [3,9,10].

XV. POSSIBLE MECHANISM OF ACTION OF SAQMONIA

After the oral administration of saqmonia, it reaches to the duodenum where resins of saqmonia mix with the bile and form a very strong purgative compound, which acts on intestinal mucosa and there is increase oozing of fluid which results in increase peristaltic movement and flatulence and finally leads to watery diarrhoea. First motion is soft but later on, watery stool passes away. This action is purely local. Saqmonia does not act via blood circulation it only acts locally on intestinal mucosa [10]

XVI. MASHHŪR MURAKKAB (COMPOUND FORMULATION)

Itrifal Zamani mulayyan, Qurs-e-mulayyan [3,10], Itrifal-e-Mushil [17], Jawarish-e-ood-e-mulayyan, Jawarish-e-Tabasheer Mushil, Jawarish-e-safarjali Mushil, Habb-e-Narmusk (18), Habb-e-Dawali [19], Habb-e-Aafiat, Habb-e-Barmak, Habb-e-Kheezaran, Habb-e-Kotwali, Habb-e-Lajward, Tiryaq-e-zahab [20].

XVII. ADULTERATION OF SAQMONIA

Saqmonia is adulterated with various substances. Inorganic substances, various starchy products, foreign resins like guaiac and root extract juice of *Convolvulus althaeoides*, a plant indigenous to the countries of the Mediterranean, are substituted with scammonium for the purpose of alteration [2].

XVIII. EVIDENCE BASED RESEARCH STUDIES**i. ANTICANCER AND CELLULAR PROTECTIVE EFFECT**

In an experimental animal, study carried out on mice at the doses of 10, 20, 40, 80, and 160 mg/kg. The effect of crude aqueous extract and crude alkaloidal extract of *Convolvulus scammonia* was tested on bone marrow cell multiplication, hepatic cancer cells (hepatic cell H22) implanted in mice. Inhibitory effect of crude aqueous extract of *Convolvulus scammonia* was compared with crude alkaloidal extract on bone marrow cell multiplication at the doses of 10, 20, 40, 80, and 160 mg/kg. Both extract were compared with colchicine. The crude alkaloidal extract in small doses showed distinctive percent of metaphase more than aqueous extract in high doses i.e., 160 mg/kg, both achieved 70% of inhibitory effect of colchicine. Both the extract were showed effective in reducing the tumor size, aqueous extract in dose of 1.2 mg/kg reduces the tumor size by 87.1% while alkaloidal extract in 1 mg/kg dose reduces the size by 87.9% [21].

Antitumor activity of crude alkaloid extract of leaf of *Convolvulus scammonia* L., evaluated on mice to assess the inhibitory effect against H22 tumor cells growth which is an invasive metastasis cell line. The extraction in a concentration of 20µg/ml was able to distract the microtubules of the cells within 60 minutes of exposure. In this concentration, the cells apoptosis was not detected by using DPPH staining, in other hand when the concentration was elevated up to 80 and 100 µg/ml, the apoptotic cell have been observed, and the duration of time was same i.e., 60 minutes[21].

ii. PURGATIVE EFFECT

Gum resin of *Convolvulus scammonia* L., used by the Unani scholars as a rigorous purgative in 1-3 grain doses. When saqmonia administered in weak, deliberated persons in a large doses more than therapeutic doses it acts as a strong intestinal irritant and lethal to the subject [9]. Active ingredients of saqmonia works when it reaches to the duodenum, in the duodenum active principle reacts with bile, and a chemical reaction occurs between it and taurocholate and glycocholate of sodium and it converted in to a powerful purgative [10,11]

iii. ANTIPLASMODIAL ACTIVITY AND CYTOTOXIC EFFECT

A study is reported in which, 20 methanolic extracts of various parts from 16 medicinal plants used in traditional medicine of Iran for the treatment of fever among which one was *Convolvulus scammonia* gum resin were evaluated for in-vivo antiplasmodial activity against *Plasmodium berghei* and on Madin–Darby bovine kidney cells cytotoxic effect was studied. The *Convolvulus scammonia* L. methanolic extract was found to be cytotoxic.[26]

iv. VASORELAXATION AND ANTI-PLATELET AGGREGATION EFFECT

Study was carried out in animal model, platelet aggregation activity was carried out in a concentration of 200µg/ml, tincture of *Convolvulus scammonia* L., not shown the antiplatelet activity. Vasorelaxant activity was evaluated on cylindrical strips of thoracic aorta, there was no observation of vasorelaxant activity [10].

XIX. CONCLUSION

Saqmonia is a gum-resin of *Convolvulus scammonia* L., it has been widely used in Unani system of medicine from the ancient time by the great Unani scholars for the treatment of infectious as well as chronic diseases like skin diseases *Pityriasis*, *Vitiligo*, *Tinea*, *Sciatica*, *arthritis*, *gastro-intestinal disorders*, *dropsy*, *anasarca*, *intestinal worm infestations*, *resolvent* and *blood purifier*. Recent scientific studies showed the anticancerous activity of scammoni resin. Saqmonia exhibit the medicinal properties due the presence of active constituents like *jalapin*, and *scammonin* (*scammonin I* and *II*). Therefore this review tried to bring many information together which helps better therapeutic utilization of the drug saqmonia in different diseases condition and also helpful to explore the scientific potential of drug in order to generate more scientific data.

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