Suranjan Talkh *(Colchicum luteum):* A review of an anti-arthritic Unani drug

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ABSTRACT: *Arthritis is among the most prevalent conditions and one of the biggest health care problems which affect hundreds of millions of people throughout the world and is a common cause of physical impairment in the community. Tibb-e-Unani claims to possess a number of effective and safe drugs useful in the treatment of arthritis. Suranjan Talkh (Colchicum luteum) is an important drug of Unani Medicine commonly used in the management of Waja ul Mufasil (Arthritis). It is mentioned by all renowned Unani authors in their books as a primordial drug in arthritis. Suranjan Talkh is an annual herb belongs to the family Colchicaceae (previously Liliaceae). It is used as a carminative, laxative, aphrodisiac and alterative, and is given for gout, rheumatism and diseases of the liver and spleen. It is also used for external application to lessen inflammation and pain. The present paper also reviews recent investigations carried out on Suranjan Talkh (Colchicum luteum) during recent times.*

Key Words: *Suranjan Talkh, Waja ul Mufasil, Colchicum luteum, arthritis.*

Introduction

The Hermodactyl or "Finger of Hermes" was unknown to early Greeks. It appears to have been first used medicinally by the Arabs or later Greeks and was first mentioned by Alexander of Tralles in 560 A.D. Tralles was the first to advocate the use of *Colchicum* to alleviate the pain of articular origin and it was then used intermittently for various forms of arthritis until the 13th century. Under the name of Suranjan or Hermodactyl, Dioscorides (1st Centuary A.D.) comprehends as Εφημερον in his book *Kitabul Hashais.* Dioskurides was aware of the poisonous nature of Colchicum which may or may not have been the species now used in medicine. Others later Greek physicians like Serapion and Paulus comprehends Suranjan as ΚολχιΚον and Ægineta (Dymock, 1891). Suranjan Talkh also known as *Colchicum luteum* is Unani medicine of great repute and is considered as first line of drug in the management of arthritis. It is mentioned by all renowned Unani authors in their books as a primordial drug for arthritis (Baitar, 1999). It is an annual herb belongs to the family Colchicaceae (previously Liliaceae) (Toplan et al., 2016). Allahlah, Qalb-al-Arz, Balboosa, Aqimaroon, Falhaqin, Yellow autumn crocus, Yellow saffron, Golden collyrium, Virkum, Hirantutiya, Surinjan, Haran tutiya, Suranjan Karwa are some of its vernacular name (Anonymous, 1987; Baitar, 1999; Anonymous, 2008). It is widely distributed in Afghanistan, Turkistan and Western Himalayas. In India these plants are found in the margins of the forests of North-Western Himalayas from Kashmir to Chambal between 700 to 2800 m altitudes (Bhattacharjee, 2004). The major supplies of the drug are received from Kashmir. The corms yield Colchicine which is official in the Indian Pharmacopoeia, United States Pharmacopoeia, British Pharmacopoeia and Japanese Pharmacopoeia (Chopra et al., 1958). The medicinal properties of this plant were well known to the Arabs. Early Arabian writers including renowned Unani physician and Author "Abu Sahl 'Isa ibn Yahya al-Masihi"(d. 1010 CE / 401 AH) described three kinds of Hermodactyl or Suranjan i.e. White, Yellow and Black. Mir Muhammad Hussain in his book *Makhzan* described that white variety is best which is not bitter in taste, next to it is yellow variety which can be used internally like white variety while the black variety is poisonous which can be only used externally. Habish Bin-ul-Hasan also states that white variety is the best while yellow and black variety is toxic (Baitar, 1999). According to Ibn-Sina (980-1037), one of the most significant thinkers and writers of Islamic Golden Age the flower of the Suranjan is the first flower which appears in spring in the moist valleys beneath the mountains which are yellow and white in colour (Dymock, 1891). According to Ibn-Sina, Suranjan consists of two opposite actions purgative and constipative (*Mushil wa Qabiz*), simultaneously. When there is action of *Hararat-e-Gharizi* and *Quwwat-e-Tabai* in the body, the purgative (*Mushil*) part get separated and expelled out the humour responsible for the pathology of disease around the joint. Later on costipative (*Qabiz*) part

acts and leads to narrowing the passage of humour coming towards the joint by *Cold and Dry kaifiyat* of the constipative (*Qabiz*) part on the joints and helps in retaining the healthy condition of the joint and strengths them (Baitar, 1999). There are two varieties commonly sold in Indian market; one is sweet and the other bitter. The bitter variety *Colchicum luteum* or Suranjan Talkh is distinguished from the sweet variety *Colchicum autumnale* or Suranjan Shirin by its bitter taste, smaller size, darker colour and a reticulated appearance of the corms. *Colchicum luteum* is a good Indian substitute for *Colchicum autumnale* which is official in the British Pharmacopoeia. The corms of *C. luteum* are occasionally adulterated with corms of the sweet varieties like *C. autumnale*, *Merendra persica, C. speciosum* and another plant *Narcissus tazetta* which finds their way into India. The corms of *C. luteum* have been examined at the Calcutta School of Tropical Medicine and they appear to resemble *C.autumnale* in their general form. Chemical analysis shows that they contain a large amount of starch, a small quantity of oily resinous matter and a bitter alkaloid. Following the assay methods laid down in the United States Pharmacopoeia, the percentage of the alkaloid in the air dried corms of *C. luteum* was found to be from 0.21 to 0.25 and in the seeds from 0.41 to 0.43 percent. The alkaloid thus obtained has the same properties as that of the official alkaloid colchicine obtained from *C. autumnale*. The seeds are usually not sold in Indian market (Chopra et al., 1958). Suranjan Talkh is used as carminative, laxative, aphrodisiac, lessens inflammation, pain, heat of the brain, applied to old piles to lessen pain and heal wounds, useful in headache, gout, rheumatism and diseases of the liver and spleen (Kirtikar & Basu, 1996). The fresh corms and aerial parts of a sample from Jammu yielded 0.70% of total alkaloids, the major being Colchicine, 0.40% and 0.20% respectively. The other alkaloids include β and ɣ Lumicolchicine, 3 demecolchicine, N formyl deacetyl colchicine, 3 demethyl N deacetyl N formyl colchicine, N desacetyl N desacetyl N formyl colchicine and Kessselringine (Anonymous, 2001). Colchicine was isolated by Pelletier and Caventouin 1820 (Trease & Evans, 2009). On treating with sulphuric acid (70%) or concentrated Hcl produces yellow colour due to colchicine (Ali, 2012).

Botanical description

Macroscopically, corm is pale yellow to deep brown in colour, 2.5-5 cm long and 1.5-2.5 cm broad, gibbously ovoid with a tapering apex and a prominent groove on one side. On careful examination at the base of this groove, a bed can be seen in good specimens. On the opposite convex side, a little below the apex, is present a small groove with an accessory bud. The apex of the corm is marked by a dark depression representing the position of the flowering shoot. At the bottom of the convex side is a prominent scar, marking the point of attachment with the parent corm, and numerous small root scars. The corm is extended to a flat tail like process beyond the scar. The corm possesses numerous longitudinal and transverse fissures which make their appearance on drying after treating with boiling water. The drug is odourless and is bitter in taste (Anonymous, 1987). Microscopically, in transverse section appears reniform being depressed in the region of the groove. The epidermis consists of rectangular cells some of which contain a few starch grains (Anonymous, 2008). At certain intervals this layer is found to be ruptured due to storage. Below the epidermal layer is a thin walled hypoderm is composed of similar cells but devoid of contents. The ground tissue is composed of thin walled parenchyma densely loaded with starch. Some of the cells near the periphery on the grooved side are more or less crushed laterally forming 2- 4 fine streaks. There are numerous scattered vascular bundles mostly located in the central region of the corm near the basal bud. The bundles near the periphery are poorly developed and more scattered. The vascular bundles are collateral with occasional bicollateral bundles. The xylem consists of annular or spiral elements. The starch grains in the parenchymatous ground tissue are simple, ovoid, spherical or polyhedral. They vary in size from 2 – 21 microns and possess 2 – 6 angled stellate hilum (Anonymous, 1987).

Mizaj Temperament)

With the consensus of various Unani authors the temperament of Suranjan is hot and dry 3^0 along with slight variation in grade of temperament (Azam 2014; Sina 2014; Lubhaya 1975).

Actions

The dried corm possesses good anti-inflammatory, analgesic and anti-arthritic activity (Ghani, 2010). It also possess carminative, laxative, aphrodisiac, alternative, aperient (Bhattacharjee, 2004), alterative (Khory & Katrak, 1993), expectorant, antidote, deobstruent (Kareem, 1875) and diuretic (Safiuddin, 1993) activity.

Therapeutic activity

In classical books of Unani medicine as well as in modern literature Suranjan Talkh (*Colchicum luteum* Baker) has been recommended in the management of arthritis, gout, sciatica, rheumatism, internal hemorrhoids and diseases of the liver and spleen (Kareem, 1875; Bhattacharjee 2004). It has anti-inflammatory activity, act as antidote for arthritic pain, gout, dropsy, liver and intestinal disorders (Ghani, 2010). It is also used for external application to lessen inflammation and pain. The dried juice is applied in

opthalamia. Flowers and corms are also used for treating weakness (Anonymous, 2008). It is also prescribed to treat myeloid leukemia. Anti-cancer activity of Colchicum has also been reported (Ali, 2012).

Adverse Effects (Muzir)

It has adverse effects on stomach (Baitar, 1999; Kareem 1875) and liver (Kareem 1875, Qasmi 2001).

Correctives (Musleh)

The musleh or correctives of Suranjan Talkh (*Colchicum luteum*) are Kateera *(Sterculia urenus*), Zaafraan (*Crocus sativus)* (Nabi 2007; Kareem 1875), Sugar (Kareem, 1875; Rafiquddin 1985), Zanjabeel *(Zingiber officinale)*, Filfil-e-Siyah *(Piper nigrum)* (Kabeeruddin 2007; Hakeem 2002) and Samagh-e-Arabi (*Acacia arabica*) (Anonymous, 1987)

Substitutes (Badal)

The various substitutes (abdal) of Suranjan Talkh (*Colchicum luteum*) mentions in various Unani classical literatures are Suranjan zard (Kabeeruddin, 2007), Hina *(Lawsonia innermis*) in Same dose as of Suranjan, Muqil (*Commiphora mukul)* in Half dose of Suranjan (Sina 2014; Kareem 1875), Suranjan Shirin (*Colchicum autumnale*) (Nabi, 2007; Anonymous, 1987), Asgandh (*Withania somnifera)* (Ghani, 2010) and Qust-e-Talkh (*Saussurea lappa)* (Ashraf, 1993).

Dosage (Miqdar-e-Khurak)

The various dosage of Suranjan Talkh (*Colchicum luteum*) mentions in various Unani classical literatures are 1.75 Masha (In form of suppository with goat fat) (Ghani 2010; Baitar 1999), 4.5gm with saffron and sugar, 2-3 gm (In compound formulations) (Baitar, 1999), 1-3 Ratti (Kabeeruddin, 2007), 250-500 mg (Anonymous, 1987) and 3 Masha (Nabi, 2007).

Formulations (Unani Murakkabat)

The important Unani formulations of Suranjan Talkh (*Colchicum luteum*) are Raughan-e-Waja ul Mufasil, Habb-e-Suranjan and Majoon-e- Suranjan (Kabeeruddin 2007; Safiuddin 1993).

Phytochemistry

The corm of *Colchicum luteum* was found to contain large amount of starch, small quantity of oily resinous matter and a bitter alkaloid that is Colchicine 0.21 to 0.25 percent (Anonymous, 2008). The other alkaloids includes are 3-demecolchicine, N-formyl-desacetylcolchicine, β and ɣ Lumicolchicines, 3-demethylcolchicine, 3-demethyl-N-deacetyl-N-formylcolchicine,N-desacetyl-N-desacetyl-N-formylcolchicine and kesselringine (Anonymous, 2001). The aerial parts showed the presence of 0.70 percent total alkaloids and the alkaloid content of seeds was 0.41-0.43 percent (Anonymous, 2008). Phytochemical studies showed the presence of various pharmacological groups especially alkaloids, phenols, flavonoids, sterols, tannins and saponins. Colchicine and other colchiconoid alkaloids are the foremost active ingredients isolated from this plant are responsible for the toxicity. Thus, it should be carefully used in the indigenous system of treatment to avoid any unwanted effect of the plant (Khan et al., 2011). In a phytochemical study of the ethanolic extract from the corms of *Colchicum luteum* Baker 1-4 compounds were isolated from the n-butanol fraction. These compounds were identified as Colchicine, Lumicolchicine, Chlorogenic acid and Tetrahydroxyflavone which were isolated for the first time from this species (Ahmad, 2010). It is observed that the major phenolic acid and flavon compounds are benzoic acid and its derivative vanilic acid, vanillin, coumaric acid, caffeic acid ferrulic acid luteolin and apigenin. Caffeic acid and luteolin are the primary compounds in terms of phenolic compound in the Colchicum species (Toplan et al., 2016).

Pharmacological Studies

The methanolic extract of the corms of *Colchicum luteum* Baker and its subsequent fractions demonstrated moderate to excellent antifungal activities against tested pathogens in antifungal bioassay. Excellent antifungal activity was shown against trichophyton longifusus up to 75%, and microsporum canis up to 85%, while the crude extract and subsequent fractions showed mild to moderate activities in an antibacterial bioassay with maximum antibacterial activity 58% against Bacillus subtilis (Ahmad et al., 2006A). In another study the methanol extract of the corms of *Colchicum luteum* Baker (Liliaceae) and its subsequent solvent fractions were screened for brine shrimp cytotoxic, phytotoxic, insecticidal activities. Profound cytotoxicity was displayed by crude methanolic extract (LD50 42.43 µG/ml). However, the cytotoxic potential was not much altered by the fractionation. The plant also express low phytotoxicity against Lemna acquinoctialis and the highest phytotoxicity was exhibited by the ethyl acetate fraction (33%) at 1000 µg/ml. Interestingly, negative phytotoxic effect was also computed; aqueous fraction expressed maximum phytotoxic effect (13.79%) at 10µg/ml. Overall insecticidal activity was observed in which the n-butanol fraction exhibited the highest activity against Callosdruchus analis (40%) followed by the chloroform fraction (35%). Study showed significant cytotoxicity of the extracts and therefore, can be a potential new natural source for the treatment of different types of cancers (Khan et al., 2011). *In vitro* enzymes inhibition activities of the crude methanolic extract and various fractions of *Colchicum luteum* were

screened against actylcholinesterase, butyrylcholinesterase, lipoxygenase and urease enzymes. A significant enzyme inhibition activity (89%) was shown by the crude methanolic extract and its fractions against lipoxygenase, while low significant activity (32-75%) was evident against butyrylcholinesterase. The crude methanolic extract and its various fractions demonstrated low activity (29-61%) against acetylcholinesterase and no activity against urease (Ahmad et al., 2006B). In a study on the basis of scavenging activity of the stable 1, 1-diphenyl-2-picrylhidrazyl (DPPH) free radical, the crude ethanolic extract and subsequent fractions of *Colchicum luteum* Baker offered promising antioxidant activity. The highest activity was displayed by chloroform fraction (91%), while the overall range was found (56-91%), expressed some correlation with the isolated compounds (Ahmad, 2010). *Colchicum luteum* hydroalcoholic extract (CLHE) produced a significant and dose dependant inhibition of joint swelling during the entire duration of the study in both, formaldehyde and CFA (Complete Freund's Adjuvant) induced arthritis. Serum TNF-alpha level was also reduced significantly in a dose dependant manner in all the CLHE treated groups. The expression of pro-inflammatory mediators (TNF-R1, IL-6 AND IL-1BETA) was also found to be less in the CLHE treated group as compared to control (Nair et al., 2011). *Colchicum luteum* hydroalcoholic extract (CLHE) showed significant anti-inflammatory and anti-granuloma activity in experimental models, *viz.* carrageenin-induced paw edema, subcutaneous cotton pellet implantation-induced granuloma formation, and complete Freund's adjuvant-induced stimulation of peritoneal macrophages in rats. There was a significant reduction ($P < 0.05$) of paw oedema in the CLHE-treated groups as compared to control. In the cotton pellet-induced granuloma model, there was a significant ($P < 0.05$) reduction in the dry granuloma weight and serum TNF-alpha, IL-6, and IL-1beta levels in the CLHE-treated group as compared to control (Nair et al., 2010). In a clinical study *Colchicum luteum* showed significant effect in gout as it possesses anti-inflammatory and analgesic effect. It reduces or minimizes the effect of symptoms/signs of the ailments. The study also reveals that the drug has no effect on the pulse, blood pressure, respiration and weight of the patients. On an average the oral use of Suranjan showed relief in symptoms in 94.3% of cases in 30 days without any side effect which included 20 cases of chronic gout (Siddiqui et al., 2002). The use of *Colchicum luteum* showed benefit in 82.4% cases of Rheumatoid Arthritis in 90 days (Javed et al., 2005). In a Unani compound containing *Colchicum luteum* showed significant Antiarthritic activity against Freund's adjuvant induced arthritis test in rat model (Rahman et al., 2014A). A Unani formulation containing *Colchicum luteum* as an ingredient showed remarkable effects on various efficacy parameters in cases of acute gouty arthritis (Rahman et al., 2014B). In an another study Majoon Suranjan (a polyherbal Unani formulation) containing *Colchicum luteum* showed Antiarthritic activity in three different experimental models viz. turpentine induced paw oedema model, formaldehyde and complete Freund's adjuvant induced arthritis model. Study suggested that the Antiarthritic activity of Majoon Suranjan was due to interplay between its anti-inflammatory and disease modifying activities (Singh et al., 2010).

Conclusions

Arthritis is among the most prevalent conditions and one of the biggest health care problems which affects hundreds of millions of people throughout the world and is a common cause of physical impairment in the community. Although Western medicine possesses many anti-inflammatory and anti-arthritic drugs but they are neither optimally effective nor safe. So, Traditional Medicines, including Tibb-e-Unani are being explored for effective and safe anti-arthritic drugs. It was concluded from the literature survey that Suranjan Talkh (*Colchicum luteum*) is mentioned in Unani classical literature for its various activity but especially in arthritis. Several preliminary studies also reported its effectiveness in arthritis. Therefore, *Colchicum luteum* must be explored for high throughput screening and scientific validation for its efficacy in arthritis as well as in type of arthritis like osteoarthritis, rheumatoid arthritis, gout etc. There comparative effectiveness in various forms of arthritis like osteoarthritis, rheumatoid arthritis, gouty arthritis etc. is also to be investigated. A comparative study of colchicum species are required to established relation of their active constituents with pharmacological activity in different forms of arthritis. Since, various studies reported its poisoning in humans as well as in cattle, therefore, its dose must be established which is optimally effective and safe. Before evaluating its pharmacological activity it should also be standardized to ensure uniformity in therapeutic efficacy.

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