E ISSN 2350-0204

IJAPC

VOLUME 11 ISSUE 3 2019

www.ijapc.com
Greentree Group Publishers (GGP))

Int J Ayu Pharm Chem

REVIEW ARTICLE

www.ijapc.com

e-ISSN 2350-0204

Gulnar Farsi (Flowers of Punica granatum Linn.): An important Unani Drug-An Overview

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ABSTRACT

Medicinal plants play significant role in the evaluation of great therapeutic agents. It is estimated that about 80% of people in emergent nations still depend on traditional medicines based on plants and animals. Herbal medicines have a lot of demand nowadays and their demand is increasing day by day. In traditional medicine Unani system of medicine is an oldest system of medicine, where Gulnar (Flowers of *Punica granatum* Linn.) is well known herbal drug, and it is use as medicine since centuries in Unani medicine and be a member of family Punicacae/ Lytheraceae. The plant of *Punica granatum* Linn is large deciduous shrub or small tree, cultivated throughout India and it is the flower of wild variety that does not have fruits (abortive variety). Pomegranate is one of the oldest known drugs. It is mentioned in the Ebers papyrus of Egypt written in about 1500 BC. As stated in Quran, pomegranates raise in the garden of paradise. Its flowers are bell shaped and reddish pink in colour. In classical Unani literature, Gulnar have been found to possess qabiz (astringent), mudammil (cicatrizant), dafe kharoje maqad (anti rectal prolapse), dafe nafsuddam (anti haemoptysis), habis (styptic) properties etc. Many works have been done on the phytochemistry and biological activity of this drug in the last few ten years. This review gives a keen view on its Unani literature, phytochemistry and pharmacological properties of Gulnar Farsi.

KEYWORDS

Ebers papyrus, Gulnar, Phytochemistry, Traditional medicine, Unani.

Greentree Group Publishers

Received 00/00/19 Accepted 00/00/19 Published 10/11/19

INTRODUCTION

Gulnar Farsi (Pomegranate) is the flower of undomesticated variety of *Punica granatum* Linn. family Punicaceae /Lythraceae[1-3], that does not bear fruits (abortive variety)[1,4,5]. Pomegranate is one of the oldest known drugs and in the Ebers papyrus of Egypt written in about 1500 BC it is mentioned in it[6]. In *Khazainul Advia* it is reported that it is a flower of a tree which is similar to pomegranate tree, which produces no or very less fruits and the taste of fruit is Khat-mitha (sweet-sour)[7]. Safiuddin (2013) also describes in his book *Adviyae Mufrada* that it is the famous and common flower which is produced on the pomegranate tree which doesn't produce fruit[8]. It is cited in Unani literature as *Julnar* that is derived from Persian word *Gulnar*. It also bears various other names such as *Gulnar, Hazara, Inhaftyana, Falustoon, Gulnar Farsi, Gul-e-Anar, Hazar Bahi, Sad berg*[9-13], *Julnar*[9,14-17], *Aqmaurrumman, Zehraturrumman, Junbadurrumman*[10,15].

It is called in Unani as Baloositrun which is the male variety of *Punica granatum* tree. The flowers of wild variety are known as *Ward-ur-Rumman*, while the flowers of cultivated variety are known as *Junbad-ur-Rumman*. It is of different types, some are white, pink and red in color[10, 17, 18]. Gulnar Farsi is top in all the types. According to Dioscorides, the flowers has astringent and bitterish taste, but without any odour. The extract of its flowers is similar to the extract of lihyatut-tees[9, 10, 12,19].

Miller, in his Botanical Dictionary, has mentioned four varieties of the *Punica granatum*: two varieties have double flowers of a beautiful red colour for which they are much prized in India, and by way of distinction, have got the Hindoostanie name Gul-anar[20].

Gulnar Farsi is in use as medicine in various pharmacopeial preparations among Unani in other traditional medicinal practices also throughout the world. Though the whole plant has medicinal value but its flowers and rind are more frequently used as medicinal agents in various pathological conditions. In Unani medicine it has been reported that Gulnar Farsi to be effective as anti-pyretic, anti-diarrhoeal, anti-haemoptysis, anti-epistaxis, anti-ulcers, haemostatic, immunomodulator, tonic for tooth and gum, astringent, anti-helminthic, styptic, cicatrizant , anti-dysentric , tonic for vital organs[2,5,7,10-12,21-23].

It is used in diarrhoea, dysentery especially in bleeding type, epistaxis, haematemesis, bleeding gum, haemoptysis, intestinal ulcers, stomatitis, gastritis, haemorrhages, haemorrhoids, tootache, bad smell, rectal prolapse etc[7,10-12].

Taxonomical classification:

Kingdom: Plantae

Sub kingdom: Tracheobionta

Super division: Spermatophyta

Division: Magnoliophyta

Class: Magnoliopsida

Subclass: Rosidae

Order: Myrtales

Family: Puniaceae

Genus: Punica

Species: granatum

Table 1 Vernaculars[2, 6, 24-29]

USA	Pomegranate
Ethiopia	Roman
Egypt	Roman, Pomegranate
Jordan	Romman
East Africa	Mkoma manga
Turkey	Nar
Nepal	Darinkobokra, Darim
Arabic:	Sham-al-rumman, Rumman, Shajraturruman, Julnar
Omman	Ruman, Seog-ryu
Brazil	Roma
Burma	Salebin, Talibin, Thale
French	Balaustier
Hindi	Anar, Dalim, Dharmb, Dhalim, Darim
Bengali	Dalimgachh, Dalim, Darim
Gujrati	Dalamb, Dadamb
Kannada	Dalimba, Dalimbe
Kashmiri	Daan
Malayalam	Dadiman
Marathi	Dalimba
Oriya	Dalimba
Punjabi	Daan, Danu, Daran, Dariun, Daru, Daruna, daruni, Dharu
Sanskrit	Dadima-Phalam, Bijapur, Dadima, Daimasara, Dadimba, Dalika, Dantabija, Dantabijaka, Karaka,
Tamil	Madalaip-pazham, KalumalMedelai, Madulam, Madulumgam, Pumadalai, Pulimadalai, Padimadalai, Tadimam, Tusagam
Assamese	Dalim
Urdu	Anar, Anarmitha
Sind	Anar-dakum
Persian	Gulnar,Anar, Darakhteanar
Unani	Baloositrun
English	Pomegranate, Abortive

Morphology:

A large deciduous shrub or a small tree, bark smooth, grey, thin, many times armed with small axillary or terminal thorns. Leaves opposite, 2.5-6.3 cm long, 1.5-2 cm broad, oblong-elliptic or oblong-lanceolate, obtuse, smooth, entire, meticulously pellucid-punctate, shining above, bright green beneath, base narrowed into a very short petiole 2-3 mm long. Flowers 3.8-5 cm long mostly solitary some times 2-4 jointly, terminating short shoots, sometimes slightly axillary or sessile. Calyx-tube companulate, adnate to and produced beyond the ovary, tough, lobes 5-7 valvate or more or less orange coloured, pinted about 1 cm long and 0.5 cm broad at the base. Petals are 5-7, oval shaped, scarlet, wrinkled, and placed between the calyx lobes. Stamens are very numerous and placed on the calyx below the petals at different levels, anthers elliptic, dehiscing longitudinally. Ovary inferior, many celled, the cells organized in two concentrical circles, style long, bent, stigma capitates. Carpels coalescing early and owing to unequal growth and arranged into 2 tiers, 5-9 on upper, 3 in the lower and fruits are abortive[2, 28-30]. The flowers occur throughout the year but mainly during February to May and from September to October[2].

Geographical distribution:

It is considered to be the native of Asia, Iran, Afghanistan, Arabia and Baluchistan, found growing wild salt range warm valley and outer hill of Himalayas between 900 and 1800 meter, and cultivated throughout India almost on all type of soil but preferably on deep loamy soil[2,24,29,31].

***Hasa's Mustamala* (Part Used):**

Flowers[2]

***Mizaj* (Temperament):**

Cold and Dry in I[st] degree[7]

Cold and Dry in 2[nd] degree[2,5,10,11,13]

Cold in I[st] and Dry in 2[nd] degree[9,12,17,23]

Cold and wet[32]

***Miqdar Khuraq* (Doses):**

5-7 gm[2]

7gm[10]

7 masha[5,7, 14,23]

3-7 masha[12]

Table 2 *Afa'al* (Pharmacological actions) Of Gulnar Farsi

Habis (Styptic)[9,11,20,22]	Attar, 1305 H; Ainslei, 1984; Hakeem, 2002; Kareem, 1888
Habis-e-dam (Haemostatic)[2,10,12,13,28]	Anonymous, 1987; Ibn Baitar,2000; Kirtikar and Basu, 1987; Lubhaya, 1977; Usmani, 2008
Qabiz (Astringent)[2,3,5,11-14,22]	Ainslei, 1984; Anonymous, 1987; Chopra *et al.*, 2006; Fazallullah, 1918; Hakeem, 2002; Kareem, 1888; Lindley, 1981; Lubhaya, 1977; Nabi, 1958; Usmani, 2008
Daaf-e-Ishaal (Anti diarrhoeal)[2,5,7,10,14,34]	Anonymous, 1987; Fazallullah, 1918; Ghani, 2010; Hakeem, 2002; Ibn Baitar, 1984; Majeed, 1935; Nabi, 1958
Naaf-e-Ishaal Safrawi Wa Damwi (Anti bilious and bloody diarrhoea)[5,10,12]	Fazallullah, 1918; Ghani, 2010; Hasan, 1887; Ibn Baitar,1984; Hakeem, 2002; Lubhaya, 1977; Nabi, 1958; Usmani, 2008
Daaf-e-ratubat-e-medawaama'a (Anti stomach and intestinal secretion)[10]	Ibn Baitar, 2000
Mudammil-e-Qurooh (Cicatriziant)[7,10,22]	Ghani, 2010; Hakeem, 2002; Ibn Baitar, 2000
Raade (Derivative)[11-13]	Hakeem, 2002; Kareem, 1888; Lubhaya, 1977; Usmani, 2008
Mujaffif (Demulscent)[5,11-13,22]	Hakeem, 2002; Kareem, 1888; Lubhaya, 1977; Nabi, 1958; Usmani, 2008
MuqawwiAaza (Tonic)[5,7,11,22,23,33]	Fazallullah, 1918; Ghani, 2010;Hakeem, 2002; Hasan, 1887; Kareem, 1888; Lindley, 1981; Nabi, 1958; Usmani, 2008
Muqawwi-e-Dandan Wa Lissa (Dental and Gums tonic) [5,7,11-14]	Fazalllullah, 1918; Ghani, 2010; Hakeem, 2002; Hasan, 1887; Kabeeruddin, YNM; Kareem, 1888; Lubhaya, 1977; Nabi, 1958; Usmani, 2008
Daaf-e-Zaheer (Anti dysentery)[2,3,7,33]	Anonymous, 1987; Chopra *et al.*, 2006; Lindley, 1981; Ghani, 2010
Daaf-e-Kharoj-e-Maqad (Anti rectal prolapse)[7,36]	Ghani, 2010; Masihuzzama, 1960
Daaf-e-Nazfud-Dam (Anti epistaxis)[28]	Kirtikar and Basu, 1987
Daaf-e-Nafsud-Dam (Anti haeomptysis)[4,7,12,14]	Fazallullah, 1918; Ghani, 2010; Kabeeruddin, YNM; Lubhaya, 1977; Nadkarni 1982
Daaf-e-Ramad-e-Chashm (Anticonjunctivitis)[7]	Ghani, 2010
Naaf-e-Qula-e-Dehan (Stomatits)[7,12,13,22]	Ghani, 2010; Hakeem, 2002; Lubhaya, 1977; Usmani, 2008
Naaf-e-Badbu-e-Dehan (Anti foul breath)[7,12,22,23]	Ghani, 2010; Hakeem, 2002; Hasan,1887; Usmani, 2008

Qatil-e-Deedan-e-Shikam (Anti helminthic)[3,28,29]	Chopra *et al.*, 2006; Kirtikar and Basu, 1987; Nadkarni,1982
Daaf-e-Qai (Anti emetic)[28]	Kirtikar and Basu, 1987
Naaf-e-Qurooh-Ama'a (Anti ulcerative colitis)[7,10]	Ghani, 2010; Ibn Baitar, 2000

Table 3 *Mahalle Istemal* (Therapeutic Uses) of Gulnar Farsi

Ishaal (Diarrhoea)[3,7,13,14,20,29]	Ainslei, 1984; Chopra *et al.*, 2006; Fazallullah,, 1918; Ghani, 2010; Nadkarni, 1954 ; Usmani, 2008
Ishaal Safrawi wa Damwi (Bilious and bloody diarrhoea)[7,12-14,]	Fazallullah,, 1918; Ghani, 2010; Hakeem, 2002; Ibn Baitar, 2000; Lubhaya, 1977; Kareem, 1888; Usmani, 2008
Ishaal Ratubi (Watery diarrhoea)[7,22]	Ghani, 2010; Hakeem, 2002
Jiryaan-e-Khoon (Haemorrhhage)[5,7,10,14,22]	Fazallullah, 1918; Ghani, 2010; Hakeem, 2002; Ibn Baitar, 2000; Nabi, 1958
Jiryaan-e-Mani (Spermatorrhoea)[13]	Usmani, 2008
Kasrat-e-Ahtalam (Night fall) [13]	Usmani, 2008
Surta-e-Inzaal (Premature ejaculation)[13]	Usmani, 2008
Kharish (Pruritis)[10,22]	Hakeem, 2002; Ibn Baitar, 2000
Sailanur Rahem (Leucorrhoea)[7,12,13,33]	Ghani, 2010; Lindley, 1981; Lubhaya, 1977; Usmani, 2008
Kasrat-e-Haiz (Menorrhagia)[12]	Lubhaya, 1977
Khuroj-e-Maqad (Rectal prolapse)[7,12]	Ghani, 2010; Lubhaya, 1977
Lissa-e-Damiya (Bleeding gums)[7,12.13,28]	Ghani, 2010; Kirtikar and Basu, 1987; Lubhaya, 1977; Usmani, 2008
Waram-e-Lissa (Gingivitis)[12,13]	Lubhaya, 1977; Usmani, 2008
Zakhm (Ulcers)[7,28,29]	Ghani, 2010; Kirtikar and Basu, 1987; Nadkarni, 1982
Qurooh-e-Lissa (Gingival ulcers)[7]	Ghani, 2010
Phode (Boils)[7]	Ghani, 2010
Zaheer (Dysentry)[3,7,29,33]	Chopra *et al.*, 2006; Lindley, 1981; Ghani, 2010; Nadkarni, 1982
Zaheer-e-Atfaal (Infantile Dysentry)[29]	Nadkarni, 1982
Jarab wa Hikka[11,23]	Hasan, 1887; Kareem, 1888
Nazfuddam (Epistaxis)[25,28,29]	Dymock *et al.*, 1891; Kirtikar and Basu, 1987; Nadkarni, 1982
Nafsuddam (Haeomptysis) [4,7,12,14,]	Fazallullah, 1918; Ghani, 2010; Kabeeruddin, YNM; Lubhaya,1977; Nadkarni,1982
Khashunat-e-Halaq (Sore throat)[28]	Kirtikar and Basu, 1987
Qurooh-e-Rahem (Uterine ulcers)[29]	Nadkarni, 1982
Qurooh-e-Maqad (Rectal ulcers)[29]	Nadkarni, 1982

***Murakkabat* (Compund formulation):**

Habbe Narkachu[2] (Anonymous, 1987)

Sufoof Aslussos[2, 13, 37] (Anonymous, 1987; Kabiruddin, 1967; Usmani, 2008)

Sufoof Kalan[2] (Anonymous, 1987)

Sufoof Ziabetus[12, 38] (Khan, 1921; Lubhaya, 1977)

Sufoof Sandal Ziabetuswala [12](Lubhaya, 1977)

Sunoon Zard[2,4, 12, 27, 38] (Anonymous, 1987; Lubhaya, 1977)

Qurse Ziabetus[2, 12, 27, 37, 38] (Anonymous, 1987; Farooq, 2005; Kabiruddin, 1967; Khan, 1921; Lubhaya, 1977)

Qurse Tabasheer[12, 37, 38] (Kabiruddin, 1967; Khan, 1921; Lubhaya, 1977)

Qurse Gulnar[2, 12, 27, 37](Anonymous, 1987; Farooq, 2005; Kabiruddin, 1967; Lubhaya, 1977)

Qurse Kahruba[2] (Anonymous, 1987)

Majoon-e-Busud[2] (Anonymous, 1987)

Majoon-e-Kalan[2, 27] (Anonymous, 1987; Farooq, 2005)

PHYTOCHEMISTRY:

The different parts of the *Punica granatum* Linn. have malvidin, pentose, ursolic acid, tannins, and glucoside etc. Stem of the plant provide carbohydrates, carotene, and D-mannitol[27].The flowers contain tannins and saponins[2]. *Punica granatum* Linn. Flowers contained a pigment pelagonidin 3, 5-diglucoside[2].

The petroleum ether and chloroform extracts of *Punica grantum* flowers reported to have sitosterol and ursolic acid apart from maslinic acid, asiatic acid and sitosterol-β-D-glucoside as the minor component[2, 31]. *Punica granatum* Linn. alcoholic extractgave D-manitol, ellagic acid and gallic acid[2].

It has been reported that Lucknow specimen of *Punica granatum* Linn. contain fluoride (0.2-0.3ppm), calcium (11.3), magnesium (3.6), phosphate (70.9) and vitamin c (3.8%)[2]. Wang *et al.*, reported a new polyphenol compound namely pomegranate that isolated from the ethanolic extract of the flowers of *Punica granatum* Linn., together with, ellagic acid, 3,3',4'-tri-O-methylellagic acid, urolic, maslinic acids, ethyl brevifolin carboxylate and daucosterol by column chromatography on silica gel[39]. And from methanolic extract of *Punica granatum* Linn. flowers reported the presence of reducing sugars, triterpenoids, steroids, sugars, alkaloids, flavonoids, phenolic compounds catechins, tannins, anthroquinons, amino acids and saponins[40].

Five alkaloids namely pelletieriene, isopelletierine, methylpelletierine, methylisopelletierine and pseudopelletierine contained by this herb[41].

By thin layer chromatography (T.L.C) over silica gel polyphenol compounds from flowers of *Punica granatum* Linn. was determined by Ali and Sharma and reported four new constituents namely, punicanyl benzoate (4'-hydroxy non-6'-en-y1 benzoate), granatumol (13-(15,19,19-trimethylcyclohex-16-en)-y1-6,10-dimethyl-tridec-10-en-3 beta, 4beta, 6alfa,13beta-tetrol) punicaflavone (3,7,8,4' -tetrahydroxy-3'-myrt-8-en-y1 flavone), grantumoside (beta-gluco-pyranosyl-(1-4')-b-glucopyranosyl-(1'-4'')-b-glucopyranosyl-(1-4''')-b 6' methoxyglucopyranosyl (1 - 4'' ')-rhamnopyranose)[42]. Bagri *et al.*, reported the two sterol esters: beta sitosterolaurate and beta-

sitosterolmyristate from *Punica granatum* Linn. flowers[43].

PHARMACOLOGICAL ACTIVITY:

Anti-Diabetic activity

Jafri *et al.*, reported that aqueous-ethanolic (50%, v:v) extract of *Punica granatum* Linn. flowers significantly lowered the level of blood glucose in normal glucose-fed hyperglycaemic and alloxan induced diabetic rats on oral administration[44].

400mg/kg extract of *Punica granatum* flower was given orally to diabetic animals and it significantly decreased plasma glucose level and increased the disturbed activities to almost normal pattern of carbohydrate metabolizing enzymes[45].

'Qurs Tabasheer' is an important compound formulation of Gulnar which is included in it as important ingredients of compound formulation showed hypoglycaemic effect in animal model with streptozocin induced diabetes[46].

500 mg/kg Pomegranate flower extract was given orally in Zucker diabetic obese rats for 6 weeks that improves diabetes and fatty liver due to obesity[47].

Punica granatum flowers significantly reduced the level of blood glucose of type II diabetes in animals by mRNA expression enhancement, increase in peripheral glucose utilization, and also by insulin receptor sensitivity improvement, etc[39].

250 and 500 mg/kg aqueous extract of flower was administrated orally for 21 days, resulted in a notable reduction in blood glucose (fasting), TG,TC, LDL-C,VLDL-C and Lipid peroxide levels in tissue accompanied with elevation of HDL-C, GSH and antioxidant enzymes in consideration with diabetic control group. In the end the result suggested that it can be used as a nutritional supplement, in the treatment and prevention of chronic disease characterized by impaired glucose metabolism, atherogenous lipoprotein profile, and aggravated antioxidant status[43].

Anti-inflammatory activity

Punica granatum petroleum ether, dichloromethane and methanol fractions (100mg/kg) were found to diminish significantly the formation of edema in a and showed inhibitions of edema volume at the end of 4 hours as its components inhibited both the COX and LOX enzymes and declined the prostaglandin release from cells[48].

Hepatoprotective Activity

Kaur *et al.*, carried out a study and were found that for a weak pretreatment with extract notably prevented Fe-NTA induced oxidative stress besides this also inhibited hepatic injury and the liver retained almost normal hepatic architecture with very less pathological changes[49].

Analgesic activity

Chakraborthy investigated the analgesic activity *Punica grantum* Linn. flower extract in mice using "hot plate" method and reaction time of animals in all the groups were noted at 30, 60 and 120 min after drug administration. Extract of the flowers in different solvents showed significant analgesic activity after drug administration at a dose 50 mg/kg body weight and the maximum analgesic activity were found at 60 min[50].

Obesity

Lei *et al.,* found that the flower extract of *Punica grantum* Linn. was given for five weeks to obese hyper lipidemic mice that result in notable reduction in, percentage of adipose pad, body weight, serum cholesterol, triglyceride, glucose and total cholesterol/HDL ratios. The study also showed decrease in appetite and intestinal fat absorption[51].

Antispasmodic Activity

Ahangarpour *et al.,* claimed the antispasmodic effect of hydroalcoholic and aqueous extract of *Punica granatum* flower on the uterus rats that are not pregnant. The results of this study support the clinical efficacy and use of *Punica granatum* flower in the treatment of painful periods and other uterine spasmodic disorder[52].

Antibacterial Activity

Al-Laham and Al-fadel carried out a study to investigate the antibacterial activity of the *Punica granatum* pericarp, leaves, flowers and seeds extracts against *Pasteurella haemolytica*. The result proposed that alcoholic extracts of pericarp, leaves, flowers and seeds possess high antibacterial activity. Extract prepared from pericarp showed the potent antibacterial activity whereas the petroleum ether extracts and aqueous have no antibacterial activity[53].

Antihistaminic activity

Barwal *et al.,* carried out a study on various extracts prepared from *Punica granatum* Linn. flower buds that showed antihistaminic activity in clonidine and haloperidol-induced catalepsy in a dose of 50 and 100 mg/kg, P.O in Swiss albino mice. Ethanol and aqueous extract inhibit the catalepsy induced by clonidine but this is not so in catalepsy induced by haloperidol. The cataleptic effect of clonidine is mediated by histamine release from mast cells in the mouse and the clonidine-induced catalepsy inhibited by ethanol extract is certainly due to their mast cell-stabilizing property and the plant does not have activity on dopaminergic transmission. Thus, from this study it can be come to this point that tannins from the flower buds of *Punica granatum* Linn. may be responsible for antihistaminic activity[54].

Antioxidant property

This study showed that improvement in impaired learning and memory performances by Diabetes Mellitus in rat improved by *Punica granatum* Linn. flower. The animals were divided into five groups as given below: control, Diabetes (STZ), STZ + PGF I (300 mg/kg/day), STZ + PGF II (400 mg/kg/day) and STZ + PGF III (500 mg/kg/day) with 12 animals in each group. The STZ group had impairments in learning and memory performances compared to the control group but PGF led to improvements in learning and memory performances of diabetic rats, while lipid peroxidation (LPO) was increased; glutathione (GSH) content was decreased in hippocampal tissue of STZ-induced diabetic rats when compared with control values. Supplementation of PGF restored the levels of LPO and GSH towards their control values. Daily PGF supplementation to diabetic rats reduced the increase in glial-fibrilar acidic protein (GFAP) contents induced by Diabetes in the hippocampus, which was significant in STZ + PGF III in comparison to STZ group. In conclusion, these observations suggest PGF supplementation decreases oxidative stress and PGF supplementation improves impairment in learning and memory performances in diabetic rats. Hence, it is suggested that PGF supplementation in coming time may be clinically use in treating neuronal deficit in diabetic patients[55].

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