

A Review Article on Phytochemistry and Pharmacological Profile of *Punicagranatum*

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Abstract: *Punicagranatum*, the pomegranate, is a fruit - bearing deciduous shrub or small treenative to the region from Persia to northern India and has been cultivated and naturalized over the whole Mediterranean region and the Caucasus since ancient times. Different varieties are identified among the ornamental variety, the double flower type wherein numerous stamens are modified into petals; some of these cultivars are fertile and set edible fruits while others are infertile. These infertile double flowers are used as medicine as they exhibit various pharmacological activities such as antidiabetic, antiatherosclerotic, wound healing, anti-inflammatory, anti oxidant activity etc.

Keywords: gulnar, pharmacological activities, phytochemistry

1. Introduction

Punicagranatum Linn. is a shrub that naturally tends to develop multiple trunks and has a bushy appearance. Different varieties are identified among the ornamental variety, the double flower type wherein numerous stamens are modified into petals; some of these cultivars are fertile and set edible fruits while others are infertile. These infertile double flowers are used as medicine.¹

Botanical classification

Kingdom	Plantae
Family	Lathyraceae
Genus	Punicaeae ^{2, 3, 4}

Botanical name *Punica granatum*

Part used Flowers, rind of fruit, fresh fruit juice, dried bark of stem and root, leaves, seeds^{5, 6}

Part Studied Flowers

Vernaculars:⁶

Arabic	Rumman
Bengali	Dalimgach
English	Pomegranate
French	Grenadier cultivate
Gujrati	Dadam
Hindi	Anardana, Anar
Malayalam	Matala
Persian	Gulnar, darakhteanar
Kannada	Dalimbay, Dalimbuhanu
Sindh	Anardana
Konkani	Dalimba
Telegu	Dadima, dalimba
Tamil	Madalai

Mahiyat

Gulnar are buds of a pomegranate tree which are infertile. Flowering is seen in every season more often in spring^{7, 8, 9}.¹⁰ Flowers are tubular,⁸ white and red and pink^{7, 8, 11}. Better quality is fresh farsi and bright red. It is of two varieties wild

(*jangli*) domestic (*bustani*); *jangli* is more potent and is used medicinally.^{9, 10}

Mizaj Cold and Dry in 2°^{7, 8, 9, 10, 11, 12, 13, 14}

Miqdarekhurak 7 gm^{7, 12}

Muzir Headache and obstruent to intestines^{7, 8, 9, 10, 12, 15}

Musleh *Kateera*^{7, 10, 12, 15},

Badal Chaleanaar and *juftebaloot*^{10, 13, 15}

Afaal

- 1) Qabiz^{7, 10, 11, 12, 13, 18},
- 2) Barid¹⁷
- 3) Habis^{10, 12}
- 4) Radi⁷
- 5) Muqawwi¹²
- 6) Mundammil e qurooh⁷
- 7) Mujaffii^{7, 12, 15, 18}
- 8) Jali⁷
- 9) Mutayyibe dehen^{7, 12}

Istemaal

- 1) Due to its astringent property, it is used in hemorrhage from any organs of body.^{7, 13, 14}
- 2) Its powder is used locally in menorrhagia.
- 3) Its decoction is used as sitz bath in leucorrhoea
- 4) It is used in stomatitis, hematemesis, and hemoptysis.
- 5) Its powder and decoction is useful in bleeding gums.^{7, 17, 8, 14}
- 6) It is used as decoction along with vinegar in halitosis.
- 7) It causes constipation.
- 8) It is mucilaginous and styptic thus produces sawda.^{7, 14}
- 9) It is used as purgative to remove morbid matters of stomach.^{7, 13, 14}
- 10) Paste of internal petals in the form of pessary or enema is used in piles and fistula.^{7, 14, 17}
- 11) It stops bilious stool.^{7, 13, 8, 14, 10}
- 12) Its paste with *sirka* and *geru* if applied around inflamed areas stops *insebab* of *madda*.^{7, 17, 13}
- 13) It provides *quwa* to *aza*.⁷
- 14) Its paste is useful in wound healing.^{7, 13, 17, 14}
- 15) Its extract with vinegar is used in *jumrah*.^{7, 17}

- 16) Due to its *raade* property, it is used to reduce inflammations.^{7, 8, 10, 15} It is used in pruritus and burning sensation.^{7, 13}
- 17) Its eye drops reduce inflammation
- 18) If a healthy person consumes *gulnar* buds for a week or 3 buds a day he will be prevented from conjunctivitis for a year
- 19) *Gulnar* with grapes leaves if applied on epigastrium relieves hyperemesis.^{7, 17}

Ethnobotanical description

Pomegranate is considered as an excellent tree or growing in arid zone. It is now widely cultivated in Mediterranean sea in tropical and subtropical areas. Under natural conditions it grows up to a height of 7 m and when domesticated it attains a height of 5 m. Bark smooth, dark grey; branchlets sometimes spinose; leaves 2.0 - 8.0 cm long, oblong or ovate, shining above; flowers usually scarlet red, sometimes yellow, 3.7 to 5.0 cm long and as much across, mostly solitary or 2 - 4 together; fruits globose, crowned by persistent calyx, with a coriaceous woody rind and an interior septate with membranous walls, containing numerous seeds; seeds angular with a fleshy septa which is red, pink or whitish¹⁸

Habitat and distribution

Punicagranatum, the pomegranate, is a fruit-bearing deciduous shrub or small tree native to the region from Persia to northern India and has been cultivated and naturalized over the whole Mediterranean region and the Caucasus since ancient times.¹⁹

Macroscopic characters

Colour Brilliant orange - red^{20, 21} scarlet red.¹⁸

Size 4 - 6 cm^{18, 21}

Shape Bell shape

Microscopic characters

Petal Thick middle, tapers at margin

Midrib 200 micron, thin, squarish adaxial epidermal cell

Sepal Thick in middle and gradually thin at margins

Mid part Imm thick, epidermal layer of small cylindrical, squarish cells

Ground tissue Homogeneous and parenchymatous.¹

Actions

- 1) Antibacterial.^{18, 3, 5}
- 2) Antibiotic.⁵
- 3) Astringent.²
- 4) Antidiabetic.^{4, 23}
- 5) Antifungal.^{2, 24}
- 6) Antiviral.²
- 7) Antitumour⁵
- 8) Anticarcinogenic.²⁸
- 9) Antiatherogenic^{23, 88}
- 10) Antihypertensive
- 11) Antioxidant^{3, 23}
- 12) Antiperoxidative⁵
- 13) Antidiarrhoeal
- 14) Antidysentric²¹
- 15) Antacid⁵

16) Hemostatic²²

17) Analgesic

18) Anti-inflammatory⁴

Uses

- 1) Flower buds powdered in 4 to 5 grains used in⁴ and in nasal haemorrhage as nasal snuff.⁶
- 2) Juice of flower with juice of *Cynodon dactylon* equal parts given to stop nose bleeding.
- 3) The flowers are styptic to the gums; check vomiting; useful in biliousness, sore eyes, ulcers, sore throat, applied to hydrocele.²⁷
- 4) Dried flowers are used in compound powder; composed of these dried flowers 1 drachm, gum arabic 1 drachm, dragons blood 2 drachm and opium 8 grains, this is useful in hematuria²⁸ hemorrhoidal flux, hemoptysis, dysentery⁴ e. t. c. Dose is 10 to 15 grains.
- 5) It is used in wide variety of diseases such as wound healing, peptic ulcer, worm infestation, epistaxis uterine and rectal ulcer.⁶
- 6) Fresh flowers mixed with cardamom seed, poppy seeds and mastiche and made into linctus used in chronic diarrhoea^{6, 29} and chronic dysentery^{20, 21, 29}
- 7) This flower was also used for the treatment of injuries from falling and greying of hair.²
- 8) Pomegranate flower extract reduces the factors that can result in cardiac impairing fibrosis in patient with type 2 diabetes⁵

Chemical constituents

The most therapeutically beneficial pomegranate constituents are Ellagic acid,² ellagitannins, punicalagin, punicic acid,²⁸ flavonoids,^{23, 28} anthocyanidins,²⁸ anthocyanins, estrogenic flavonols, flavones,²⁸ ursolic acid,³⁰ urolic acid,^{2, 88} gallic acid,^{2, 88, 30} maslinic acid,^{2, 88} daucosterol,² tannins²³, asiatic acid²⁶

Pharmacological activity

Anti-inflammatory activity

The phytochemical analysis of flower extract revealed that it contains flavonoids. Flavonoids are well known for their ability to inhibit pain perception. Inhibition of inflammation by pomegranate components involves inhibition of both COX and LOX enzymes and a decline in prostaglandin release from cells. Flavone, its methoxy derivatives exhibited significant dose dependent analgesic activity.⁴

Antidiabetic activity

Pomegranate flower extract (PFLE) improved insulin sensitivity and lowered glucose levels in rats as early as 30 minutes post-glucose loading.^{28, 26} PFLE also inhibited α -glucosidase *in vitro*, thereby decreasing the conversion of sucrose to glucose.²⁸

Anti-oxidant

The flower and peel extracts resulting from organic solvent extraction exhibited strong antioxidant activities which correlated with the high levels of total phenolics, flavonoids, and proanthocyanidins. Pomegranate flower extract had the most prominent flavonoid level followed by peel, leaf and stem. A study shows that flowers had the highest ferric reducing potential which was statistically different from the

activity of the other extracts ($p < 0.05$). All extracts showed dose - dependent iron (II) chelating activity. However, pomegranate flower exhibited the highest iron (II) cation chelating activity³

Antiatherosclerotic activity

Punicagranatum flower extracts more significantly affects atherosclerotic lesion size, lipid profiles and blood sugar levels than other extracts tested.²⁶

Wound healing activity

Punicagranatum flowers showed significant wound healing activity. The wound area measurement showed significant reduction in the wound size as compared to nitrofurazone ointment.²²

2. Discussion

Punicagranatum (Gulnar) is one of the prominent drug with multiple remedies. It has been described vastly in Unani literature. Present review states that the *gulnar* has so many pharmacological activity, thereby used extensively in various conditions

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