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International Journal Of Pharma Research And Technology A Review On Pharmacognostic Study Of Pomegranate

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Abstract:

Pomegranate (PG) is generally known as Punica grantum. It is member of monogeneric family Punicaceae. It is mainly found in Iran. Pomegranate (Punica granatum L.), a nutrient-rich unique fruit. The main phenolic substances in pomegranate peel, including tannins, flavonoids, and phenolic acids. Dietary fiber and other bioactive substances such as alkaloids, minerals, and vitamins are also mentioned. It has been used for centuries for the prevention and treatment of various inflammation-driven diseases. The pomegranate peel, has been used worldwide for many years as a fruit with medicinal activity, mostly antioxidant properties. Pomegranate, similar to other fruits, has juice-extraction by-products. Pomegranate seed oil (PGO) is a non-traditional oil with health benefits, rich in bioactive components. Pomegranate and its chemical components possess various pharmacological and toxicological properties including antioxidant, anti-inflammatory, anti-cancer and anti-angiogenesis, anti-mutagenic etc.

Key words: Punica grantum, Antioxidant, Anti-angiogenesis, Anti-inflammatory

Introduction:

Punica granatum (Pomegranate) is a small tree which measures between five and eight meters tall and mainly found in Iran, the Himalayas in northern India, China, USA and throughout the Mediterranean region such as Turkey, Egypt, Tunisia, Spain, and Morocco [1]. Pomegranates (Pg) were colloquially called 'wine apples' or 'wine-apples' in Ireland, (Pg) have been collected during a germplasm collection and grown in the cities of Saveh and Yazd (Iran), all of which possess specific fruit characteristics including size, color, taste, time of ripening, and disease resistance [2][3]. Pg can be also divided into several anatomical compartments including seed, juice, peel, leaf, flower, bark, and root. They are widely cultivated in Iran, India, and the Mediterranean countries such as Turkey, Egypt, Tunisia, Spain, and Morocco [4]. The leaves are opposite, narrow, oblong with 3-7 cm long and 2 cm broad. It has bright red, orange, or pink flowers, which are 3 cm in diameter with four to five petals. Edible

fruit has a rounded hexagonal shape, with 5-12 cm in diameter and weighing 200 g. The thick skin surrounds around 600 arils, which encapsulates the seeds [5]. It including prevention and/or treatment of cardiovascular ailments, neurological disorders, oncologic diseases, dental problems, inflammation, ulcer, arthritis, obesity, diabetes, acquired immune deficiency syndrome and erectile dysfunction [6-11].

Plant Profile:

Name of Drug: Pomegranate (PG)

Synonym:

English: Pomegranate

Marathi: Dalimba

Hindi: Anar

Sanskrit: Dadimah

Kannada: Dalimbar hann

French: Grenade

Bengali: Dadim

Tamil: Madalai

Telugu: Danimma

Pharsi: Anar turs

Botanical Classification: [14]

Botanical name	Punica granatum
Kingdom	Plantae (Angiosperms)
Order	Myrtales
Family	Punicaceae
Genus	Punica
Species	P. granatum

Various varieties: Ganesh, Arakta, Muskat, Mrudula, Ruby, Jyoti, Dholka. [13]

Biological Species: [12]

1. Granatum punicum St.-Lag.
2. Punica florida Salisb.
3. Punica grandiflora hort. ex Steud.
4. Punica nana L.
5. Punica spinosa Lam.
6. Rhoea punica St.-Lag.

Morphology:

Shrub or small tree:[15]

5 to 10 m (16 to 33 ft) Height.

Leaves :[15]

opposite or subopposite, glossy, narrow oblong, entire, 3–7 cm long and 2 cm broad.

Flowers:[15]

bright red and 3 cm in diameter, with three to seven petals.

Fruit:[15]

Redish wine colour, reddish brown.

Husk :[15]

two parts: an outer, hard pericarp, and an inner, spongy mesocarp.

Fig. 1: - Morphology of Pomegranate

Chemical Constituents:

Juice: anthocyanins, glucose, ascorbic acid, ellagic acid, gallic acid, caffeic acid, catechin, minerals, amino acids, quercetin, rutin.[19]

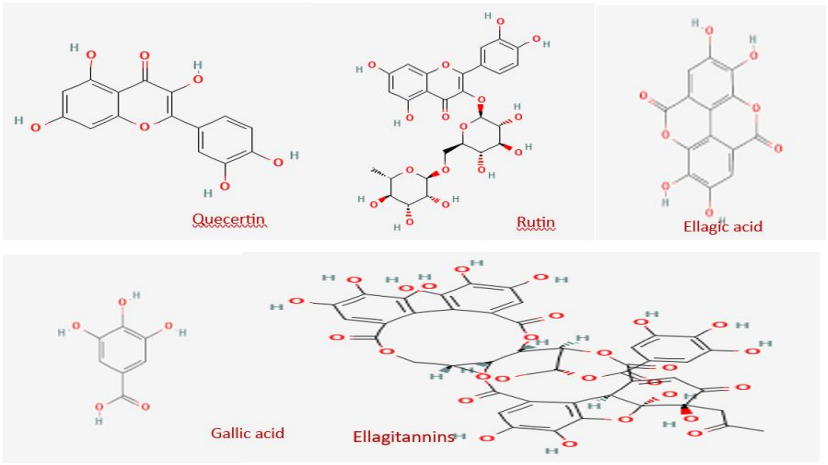
Seed Oil: 95% Punicic acid, ellagic acid, sterol [20,21]

Leaves: Tannins, flavone glycosides, luteolin, apegenin [16-18]

Flowers: gallic acid, urosolic acid, triterpenoids, including maslinic and asiatic acid [22-24]

Peel: ellagic acid, gallic acid, punicalin, punicalagin, caffeic acid, ellagitannins, pelletierin. [20,21]

Bark and Root: ellagitannins, punicalin, unicalagin, piperidine alkaloids. [20,21]



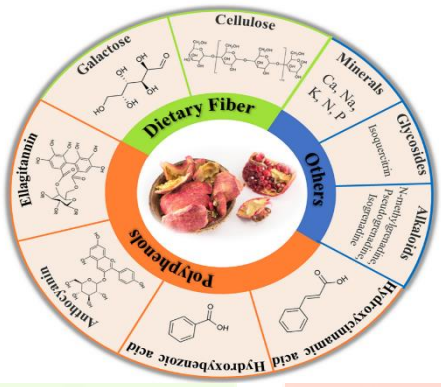


Fig.2 :- Chemical Constituents of Pomegranate

Uses: -

1) Antibacterial Activity

The polyphenolic compounds (flavonoids, tannins) obtained from the extracts of pomegranate peel and other wastes are a good source of antibacterial components that help in combating the bacterial growth responsible for foodborne diseases and food spoilage. [25,26]

The antibacterial efficacy of various pomegranate by-products (peels, pulp and other wastes) are demonstrated via in vitro studies using bacterial cultures with the help of agar gel diffusion assays or minimum inhibitory concentration assays.[27]

Similarly, tannins derived from the pomegranate extracts not only disrupt the cell– microbial adhesion, but also are reported to hinder the mineral consumption by the bacteria [28]. Even the biofilm production and mobility of Escherichia coli (especially uropathogenic and enterohaemorrhagic strains) are greatly reduced by the pomegranate peel extracts [29].

2) Antifungal Activity

The presence of antifungal compounds, especially with high concentrations of punicalagin, in hydroalcoholic crude extracts of pomegranate wastes have demonstrated potent antifungal activity against Trichophyton mentagrophytes, Trichophyton rubrum, Microsporum canis, and Microsporum gypseum [30]. Strong antifungal activity of pomegranate PPE has also been recorded in in vitro studies against Botrytis cinerea, Penicillium digitatum, and Penicillium. expansum [31].

Furthermore, pomegranate extract gels are also reported as effective against oral infections of fungal origin (like Candida spp.) [32]

3) Health Benefits

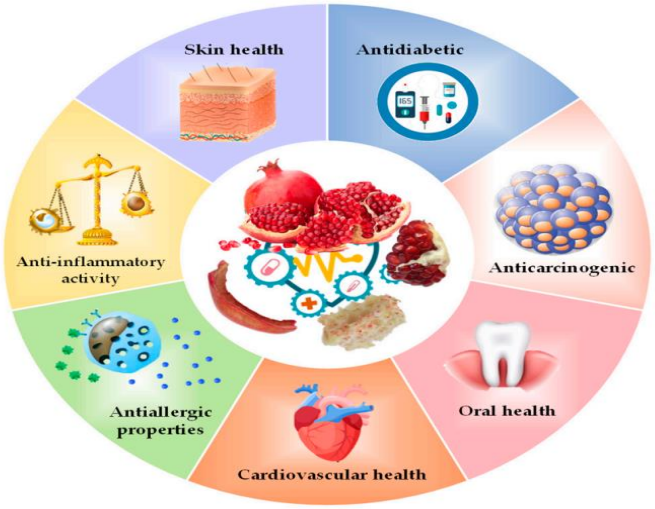


Fig. 3: - Health benefits associated with pomegranate by-products.

The consumption of its juice, obtained from arils, improves the antioxidant status in humans by increasing the glutathione levels (22.6%) in erythrocytes and decreasing lipid peroxidation (24.4% malondialdehyde) and protein oxidation (19.6% carbonyl) [33]. The bioactive compounds (phenolic compounds and organic acids) found in the testa, pericarp (peel), seeds, etc., not only act as antioxidative, antitumoral, and antihepatotoxic agents, but also have medicinal, nutritional, and pharmaceutical properties as well [34].

4) Osteoporosis

In this study, using a pomegranate peel extract rich in tannins, we hypothesized that the consumption of pomegranate peel extract as a dietary supplement could exert a beneficial effect on bone biology. [35,36] Antioxidant from pomegranates support bones by reducing oxidative stress, that can weaken the bones [37].

5) Carcinogenesis

Pg possesses inhibitory effects on different type of cancers such as prostate (38,39), breast (40), colon (4,42), and lung cancers (43). Some metabolites of pomegranates chemical components such as 3,8-dihydroxy 6H-dibenzo [b, d] pyran-6-one (urolithin A, UA) which is produced from Ellagitannins (ETs) may also possess anti-cancer effects (44). Treatment with (50-150 µg/mL) pomegranate fruit extract (PFE) for 72 h was found to result in a significant inhibition of lung cancer[43].

6) Antioxidants Activity

Oxidative stress (OS) produces toxic metabolites (45) which can initiate and promote cancers (46, 47). The presence of antioxidants has been reported in Pg juice (48). Pg contains some species of flavonoids and anthocyanidins (delphinidin, cyaniding and pelargonidin) in its seed oil and juice (49) and shows antioxidant activity three times greater than green tea extract (50). methanolic extracts from the peel of Pg has a broad spectrum of antioxidant activities which were evaluated by 1,1-diphenyl 2-picrylhydrazyl (DPPH) free radical scavenging, phosphomolybdenum, Ferric (Fe3+) Reducing Antioxidant Power (FRAP), and Cupric (Cu2+) Reducing Anti-oxidant Capacity (CUPRAC) assays (51, 52).

7) anti-angiogenesis

Angiogenesis is a possible target for cancer prevention strategy (53, 54). anti-angiogenic potential of Pg by measuring vascular endothelial growth factor (VEGF), IL-4, and migration inhibitory factor (MIF) in the conditioned media of estrogen sensitive (MCF-7) or estrogen resistant (MDA-MB-231) human breast cancer cells, and immortalized normal human breast epithelial cells (MCF-10A).

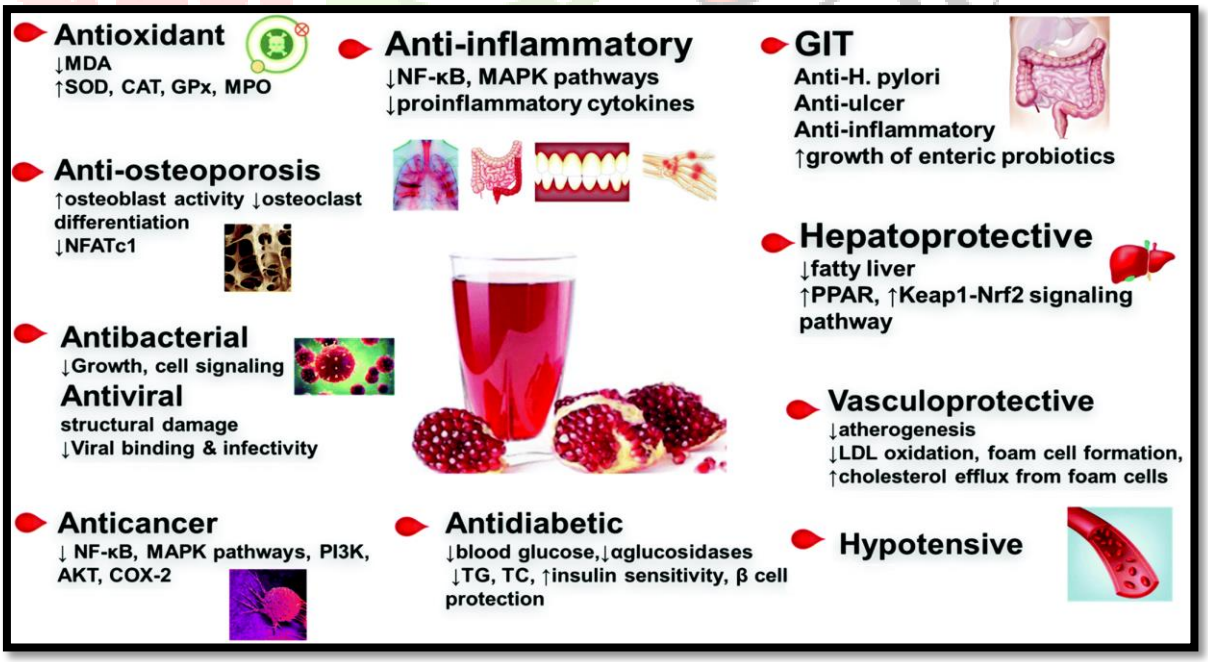


Fig. 3: Uses of Pomegranate

Conclusion :-

We compiled all of the studies that have been published on Pg for this review. This fruit contains antihypertensive, and anti-inflammatory qualities and is rich in flavonoids, anthocyanins, punicic acid, ellagitannins, alkaloids, fructose, sucrose, glucose, and other nutrients. The pomegranate peel's punicalagin and ellagic acid have some chemopreventive benefits against prostate cancer, breast cancer, and colon cancer. linked with the metabolite urolithin produced from ellagic acid. Many of these compounds have pharmacological and toxicological effects. Due to their effectiveness and safety in the prevention and/or treatment of a number of chronic diseases, the use of herbal products and medicinal plants is currently the subject of intensive research worldwide.

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