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Screening of Anti-Ulcer Phytochemicals from Leaves of *Punica granatum* (L) Decoction



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ABSTRACT

World is rich in medical lore. Plants are the basis of life on earth and are central to people's livelihoods. The use of plants in religious ceremonies as well as for magic and medicinal purposes is very common place and widespread. Plants and phytoconstituents are better choice to treat diseases than the allopathic drugs. The nature has provided us various medicinal plants which became the store house of remedies to cure all ailments of mankind. In modern era many plant-derived compounds have been used as drugs, either in their original or semi-synthetic form. The aim of the present research was to Screening of anti-ulcer phytochemicals from leaves of *Punica granatum* (L) decoction. From this study we conclude that this plant revealed the presence of various components like carbohydrate, glycoside, flavonoid, alkaloid, tannin, saponins and steroids. The leaves of pomegranate significantly containing medicinally important phytoconstituents such as tannins flavonoids and saponins to posses antioxidant activity of decoction of leaves on *Punica granatum* (L) and it has been shown to offer protection against the peptic ulcer.



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INTRODUCTION

The plant *Punica granatum* (L) is belongs to the family, *Punicaceae*¹. The pomegranate is shrub or small tree that can grow to 20 or 30 ft. It is has 3–7 cm long and 2 cm broad glossy, leathery, lance-shaped leaves and 3 cm in diameter bright red flowers with 3 to 7 petals. 2 to 5 inch wide round fruit is crowned at the base by the prominent calyx. High temperatures are essential during the fruiting period to get the best flavor. The native of this plant from Iran to the Himalayas in Northern India and has been cultivated since ancient times throughout the Mediterranean region of Asia, Africa and Europe². The plant locally known as Madalai^{3,4}.

The pomegranate whole plant including leaves, stem, and root is used as traditional medicine. The nutritionally important compounds like phenolic, flavonoids, alkaloid, sterols, terpenoids, glycosides and many other metabolites have been isolated from different parts of *Punica granatum* (L). Traditionally pomegranate juice as a remedy for inflammation, intestinal worms, persistent coughs, diarrhoea. It has been used to arresting chronic mucous discharges, passive hemorrhages, night sweats and diarrhoea. It has also been prescribed to strengthen the human capillary system and prevent atherosclerosis, asthma, tonsillitis and bronchitis^{5,6}. Pomegranate possess various pharmacological activities includes anti-candidal, anti-genotoxicity, anti-inflammatory, antibacterial, anxiolytic, antiemetic, hepatoprotective, estrogenic, anti-viral activity antioxidant, anti-diabetic, anticonvulsant. It also improve reproduction and wound healing property⁷⁻¹⁸. Hence, this study has been taken with an aim to screening of anti-ulcer phytochemicals from leaves of *Punica granatum* (L) decoction.

MATERIALS AND METHODS

Plant collection

The Leaves on *Punica granatum* (L) was collected from their natural habitats in Pavalathampatti, Mecheri, Salem District, Tamil Nadu.

Preparation of plant decoction¹⁹

50gm of leaf powder was mixed with 400 ml of water and boiled until total volume became one fourth of previous. After boiling the mixture was cooled and filtered. Filtrate was taken to screening of anti-ulcer phytochemicals from leaves of *Punica granatum* (L) decoction.

Table.1: Formulation composition of leaves on *Punica granatum* (L) decoction

S.no	Name of the ingredient	Quantity
1.	<i>Punica granatum</i> (L.) leaves	50gm
2.	Distilled water	400 ml

Qualitative phytochemical analysis of leaves on *Punica granatum* (L) decoction²⁰⁻²²

Test for alkaloids

A small portion of the decoction was stirred with few drops of dilute hydrochloric acid and filtered. The filtrate was tested carefully with various alkaloidal reagents such as **Mayer's reagent** (cream precipitate), **Dragendroff's reagent**(orange brown precipitate), **Hager's reagent** (yellow precipitate), and **Wagner's reagent**(reddish brown precipitate).

Test for flavonoids

NaOH test: A small amount of decoction was treated with aqueous NaOH and HCl, observed for the formation of yellow orange colour indicated presence of flavonoids.

H₂SO₄ test: A fraction of decoction. was treated with concentrated H₂SO₄ and observed for the formation of orange colour indicated presence of flavonoids.

Lead acetate test: A small amount of decoction. was treated with lead acetate and observed for the formation of white precipitate indicated presence of flavonoids.

Test for tannins

Few ml of decoction was treated with 10% alcoholic ferric chloride solution and observed for formation of blue or greenish colour solution indicated presence of tannins.

Test for phenols

Ferric chloride test: The fraction of decoction was treated with 5 % ferric chloride and observed for formation of deep blue or black colour indicated presence of phenols.

Test for terpenoids

Liebermann – Burchard test: Decoction.(1ml) was treated with chloroform, acetic anhydride and drops of H₂SO₄ was added and observed for the formation of dark green colour indicated presence of terpenoids.

Test for anthraquinones

Borntrager's test: About 50 mg of powdered extract was heated with 10% ferric chloride solution and 1ml concentrated HCl. The extract was cooled, filtered and the filtrate was shaken with diethyl ether. The ether extract was further extracted with strong ammonia; pink or deep red colourations of aqueous layer indicate the presence of anthraquinone.

Test for anthocyanin

NaOH test: A small amount of decoction was treated with 2M NaOH and observed for the formation of blue green colour indicated presence of anthocyanin.

Test for proteins

Biuret test: The decoction is treated with an equal volume of 1% strong sodium hydroxide followed by a few drops of copper (II) sulphate, formation of purple colour indicated the presence of protein.

Million's test: To the decoction million's reagent is added, a white precipitate is produced, while heating it turns brick red colour indicated the presence of protein.

Test for sterols

Liebermann-Burchard test: Decoction (1ml) was treated with chloroform, acetic anhydride and drops of H₂SO₄ was added and observed for the formation of dark pink or red colour indicated presence of sterols.

Test for saponins

Foam test: The decoction was diluted with 5ml distilled water. The suspension was shaken in graduated cylinder for 15min. A 2cm layer foam indicated the presence of saponins.

Test for mucilage

The decoction is treated with aqueous potassium hydroxide. Swelling indicated the presence of mucilage.

Test for carbohydrates

Molish's test: To the decoction few drops of α -naphthol solution in alcohol, con.H₂SO₄ is added at the side of test tube, formation of violet ring at the junction of two liquids indicated the presence of carbohydrates.

RESULT AND DISCUSSION

Qualitative phytochemical analysis of leaves on *Punica granatum* (L) decoction

Decoction of Leaves on *Punica granatum* (L) was subjected to various chemical tests for detection of phytoconstituents and results obtained are illustrated in **Table.2**.

Table.2: Qualitative phytochemical analysis of leaves on *Punica granatum* (L) decoction

S.no	Phytochemical Test	Decoction of leaves on <i>Punica granatum</i> (L)
1.	Alkaloids	+
2.	Flavonoids	+
3.	Tannins	+
4.	Phenols	+
5.	Terpenoids	+
6.	Anthraquinones	+
7.	Anthocyanin	-
8.	Proteins	-
9.	Sterols	+
10	Saponins	+
11.	Mucilage	-
12.	Carbohydrates	+

NOTE: (+) Present (-) Absent

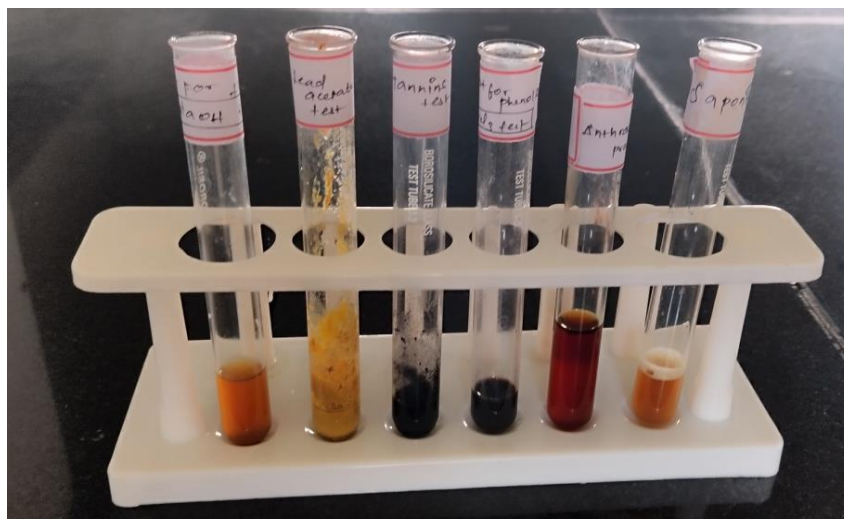


Fig.1: Phytochemical analysis of decoction of *Punica granatum* (L) leaves

Preliminary phytochemical analysis of decoction of leaves on *Punica granatum* (L) revealed the presence of various components like carbohydrate, glycoside, flavonoid, alkaloid, tannin, saponins and steroids (**Table.2 and Figure.1**). Pomegranate leaves contains phenolic compound, tannin and their monomers ellagotannins, gallic acid and ellagic acid⁵. Principles of unani for the treatment of gastric ulcer to say that usage of astringent drugs for binding effect of ulcers²³. Tannins are largely employed in medicine for their astringent effects. These characteristics result from tannins' interactions with the tissue proteins they come into contact with. By developing greater resistance to chemical, mechanical harm or irritation and the action of proteolytic enzymes, this tannin-protein complex layer protects the stomach in cases of gastric ulcers. Tannins have been demonstrated to have antioxidant action to encourage tissue regeneration and have effects against *Helicobacter pylori* and play a role in the processes that reduce inflammation in the gastrointestinal²⁴. The leaves of pomegranate also contain flavonoids and saponins. The flavonoids possess to increases mucosal prostaglandin content, decreases histamine secretion from mast cells by inhibiting histidine decarboxylase, inhibits *H. pylori* growth, scavenges free radicals. The Saponins have a surfactant property, inhibits gastric acid secretion and activates mucous membrane protective factors²⁵. This phytoconstituents are playing an important role in the human body's antioxidant defence

system. The antioxidant activity of decoction of leaves on *Punica granatum*(L) has been shown to offer protection against the peptic ulcer.

CONCLUSION

The anti-ulcer activity may be attributed to the presence of different phytoconstituents present in the decoction of leaves on *Punica granatum* (L) especially tannin, flavonoids and Saponin. This phytoconstituents possess the antioxidant property to reduce the development of ulcer. We conclude that isolation of phytoconstituents from this plant to use future to preventive and curative treatment of ulcer.

REFERENCES

1. <https://plants.usda.gov/home/plantProfile?symbol=PUGR2>
2. Morton.J. F. Pomegranate. Fruits of warm climates. 1987: 352–355.
3. <http://www.theplantlist.org/tpl/record/tro-26700001>
4. <https://en.wikipedia.org/wiki/Pomegranate>
5. Archana Kumari, Jyotsna Dora, Anil Kumar and Ashok Kumar. Pomegranate (*Punica granatum*)-Overview. International Journal of Pharmaceutical and Chemical Sciences. 2012;1(4):1218-1222.
6. <https://www.sciencedirect.com/science/article/abs/pii/S2212429222006800>
7. Rathish Nair & Sumitra Chanda. Anticandidal Activity of *Punica granatum*. Exhibited in Different Solvents. Pharmaceutical Biology. 2005; 43(1): 21–25.
8. M. Velayutham Dassprakash, Renganathan Arun, Suresh K. Abraham & Kumpati Premkumar. In vitro and in vivo evaluation of antioxidant and antigenotoxic potential of *Punica granatum* leaf extract. Pharmaceutical Biology. 2012; 50(12): 1523 -1530.
9. Elisa Colombo, Enrico Sangiovanni. A Review on the Anti-Inflammatory Activity of Pomegranate in the Gastrointestinal Tract. *Evidence-Based Complementary and Alternative Medicine*. 2013:1-11.
10. Wasim Sajjad, Mohammad Sohail, Barkat Ali *et al.* Antibacterial activity of *Punica granatum* peel extract. Mycopath. 2015; 13(2): 105-111.
11. Cheurfa M, Achouche M, Azouzi A, Abdalbasit MA. Antioxidant and anti-diabetic activity of pomegranate (*Punica granatum* L.) leaves extracts. Foods and Raw Materials. 2020;8(2):329-336.
12. Swarnamoni Das, Phulen Sarma. A study on the anticonvulsant and antianxiety activity of ethanolic extract of *Punica granatum* Linn. International Journal of Pharmacy and Pharmaceutical Sciences. 2014; 6(2):389-392
13. Jainendra Kumar Battineni, Narender Boggula, Vasudha Bakshi. Phytochemical Screening and Evaluation of Anti Emetic Activity of *Punica Granatum* Leaves. European Journal of Pharmaceutical and Medical Research. 2017; 4(4): 526-532.
14. Swaha Satpathy, Arjun Patra, Ajit P Purohit. Estrogenic activity of *Punica granatum* L. peel extract. Asian Pacific Journal of Reproduction. 2013;2(1):19-24.
15. Annalisa Tito, Antonio Colantuono, Luciano Pirone, Emilia Pedone. Pomegranate Peel Extract as an Inhibitor of SARS-CoV-2 Spike Binding to Human ACE2 Receptor (*in vitro*): A Promising Source of Novel Antiviral Drugs. Frontiers in chemistry. 2021; 9: 1-21.
16. Morteza Sheikh, Sayid Mahdi Mirghazanfari, Masumeh Dadpay, Ehsan Nassireslami. Evaluation of wound healing activities of pomegranate (*Punica granatum* -Lythraceae) peel and pulp. Journal of Research in Medical and Dental Science. 2018; 6(3):230-236.

17. Karina Paola Leiva ,Julio Rubio, Frank Peralta, Gustavo F Gonzales, Effect of Punica granatum (pomegranate) on sperm production in male rats treated with lead acetate, Epub. 2011.
18. Mohd Amir, Mohd Nasar Mallick, Niyaz Ahmad, *et al.* Hepatoprotective effects of punica granatum fruit against d-galactosamine induced hepatotoxicity in rats: in vitro and in vivo studies, International Journal of Pharmacy and Pharmaceutical Sciences. 2017; 9(8):1-5.
19. R.S.A. Sorna Kumar, R. Rajeswari, S. Rajeswari, C. V. Jemima Romola. Formulation of simple syrup from Acorus calamus and Ocimum kilimandscharicum based on their antioxidant and antimicrobial activity. Scholars Research Library. 2016; 8 (20):75-78.
20. Beckett AH, Stenlake JB. Practical Pharmaceutical Chemistry. 2nded. New Delhi: CBS Publishers; 2001. page no: 115-126.
21. Harborne JB. Phytochemical Methods- A Guide to Modern Techniques of Plant Analysis. 2nd ed. London, New York: Edn, Chapman and Hall; 1973. page no: 49-188.
22. Kokate CK, Purohit AP and Gokhale SB. Pharmacognosy. Pune: Nirali prakashan; 2007. Page no: 108-109
23. Amtul Mukheet ,Dr. Mohammed Ashfaq Hussain² , S.K Syed Hussain¹ , Dr.Ghousia Tabassum³ , Dr. Shaik Mohammed Aliuddin⁴. Anti-Ulcer Activity of Medicinal Plants: A Review. International Journal of Pharmaceutical Sciences Review and Research. 2019; 54(1): 96-102.
24. Neyres Zinia Taveira de Jesus, Heloína de Souza Falcao, Isis Fernandes Gomes, Thiago Jose de Almeida Leite, Gedson Rodrigues de Moraes Lima, Jose Maria Barbosa-Filho *et al* Peptic Ulcers and Related Mechanisms. *International Journal of Molecular Sciences*. 2012; 13(3): 3203–3228.
25. Papiya Mitra Mazumder, D Sasmal and R Arivudai Nambi. Antiulcerogenic and antioxidant effects of *Cocciniagrandis* (Linn.) Voigt leaves on aspirin-induced gastric ulcer in rats. Natural Product Radiance. 2008; 7(1):15-18.

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