

ESTIMATION OF ANTIMICROBIAL AND ANTICANCER PROPERTIES FROM POMEGRANATE LEAVES

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ABSTRACT

Punica granatum (Pomegranate) which belongs to the Punicaceae family mostly found in the tropical and subtropical areas and in the Mediterranean region [16], in ancient days it was found in Southeast Asia which is having therapeutic properties like anticancer, antimicrobial, and antioxidant, anti-inflammatory properties. The main aim of the review is to study the extraction of pomegranate leaves and to estimate their antimicrobial and anticancer properties. In recent days in silico method is also used to estimate the antimicrobial activities of pomegranate. The Pomegranate extract contains polyphenols contains antioxidant activity showing the benefits of cancer supplementation. The chemical composition that is present in the pomegranate is also used in the treatment of inflammation and cancer. Bioactive compounds of *P. granatum* are applied in the field of the food industry, medicine, cosmetics, and pharmacy. Pomegranate leaves are a good source of tannins, flavonoids, and phenolic acids. In future research, pomegranate has been used for drug discovery to treat various ailments.

Keywords: *Punica granatum*, Punicaceae, tannins, flavonoids, phenolic, antimicrobial, and anticancer properties.

1. INTRODUCTION

The word pomegranate is derived from the Latin word “*pomum granatum*” and it belongs to the family of Punicaceae [3]. It is an exotic plant. The pomegranate first originated in the central Asia region. The tree pomegranate can grow up to 10 to 12 feet approximately. The pomegranate is domestically and commercially available. It has adaptability for growth in a variety of soil and climatic conditions. The pomegranate leaf extract is highly used as a remedial source for many diseases since from traditional days due to its Anti activities against pathogens and cancer. Compare to the plain consumption of pomegranate juice the extracts of *P. granatum* are having more medicinal value. Enzymes like Proteolytic can be collected from pomegranate. The objective of this study is to collect the extracts from leaves of *P. granatum* and analyze the phytochemical activities of pomegranate and determine the antibacterial and anticancer activities from the leaf extraction by staining methods and assay techniques. The pomegranate extracts are used to treat the diseases like cancer, hyperlipidemia, atherosclerosis, and diabetes. It is used to reduce kidney stones. The pH of the pomegranate leaves is about 4.4. The presence of anthocyanins and ellagitannins exhibits the red pigmentation of the pomegranate. It triggers apoptosis and the pomegranate leaf tea is good for sleep to treat the insomnia

Characteristics of *Punica granatum* leaves.

The leaves of *Punica granatum* are very glossy in nature and can grow up to 3 cm. For several years pomegranate leaves are used for the treatment of many diseases. It is used for the management of cholesterol and body weight loss. The extract of pomegranate leaves is also used for hair growth.

Phytochemicals present in *P. granatum*.

The bark portion of the *Punica granatum* is rich in phytochemicals like flavonoids, sterols, polyphenols, saponins, and alkaloids. The plant also contains different types of amino acids, calcium, and iron [17].

Scavenging properties of Pomegranate.

Pomegranate leaves are rich in antioxidants which possess scavenging properties. *P. granatum* are having phenolic and flavonoid content which are considered the scavengers of the human body to treat free radicals. The common phenolic compound that is present in the leaves of pomegranate is tocopherols that act as an antioxidant, anti inflammatory, and Antipathogenic [10]. This study shows that pomegranate leaves show good radical scavenging activity.

Estimation of antimicrobial and anticancer properties from pomegranate leaves.

Leaves of pomegranate are oblong and glossy in nature that can be height 3 to 7 cm and wide by 2 cm [3]. The leaves of pomegranate are highly rich in anticancer and antimicrobial activities that can be used to remove bacteria that are present in the mouth. It is used to treat the conditions like insomnia, ulcer, and eczema.

2. METHODOLOGY

- Collection and authentication of pomegranate plant leaves.
- Soxhlet extraction of pomegranate leaves using hydro

- Qualitative phytochemical analysis of pomegranate hydro alcohol extract.
- Estimating the antibacterial activity of pomegranate extract against gram +ve and gram -ve pathogens.
- Estimating the antifungal properties of pomegranate extract against filamentous fungal pathogens.
- Preparation of the drug.
- Estimation of anticancer properties from leaves of pomegranate by using the MTT assay against Hela cells.
- Apoptotic and necrotic analysis of pomegranate extract by EtBr/Ao fluorescent staining method.
- Statistical analysis of results by graph pad prism software.

Collection of plant leaves.

Well-grown leaves should be collected from the pomegranate plant and the authentication of whether the leaves are suitable for the experiment.

Soxhlet extraction of leaves using hydro alcohol.

After collecting the leaf they undergo the Soxhlet extraction process using hydro alcohol. It is an extraction technique used to determine the bioactive compounds from the natural source. Hydro-alcohol is used widely it helps in determining antioxidant properties.

Qualitative analysis of pomegranate extract.

The extract obtained from the pomegranate leaves is used for the qualitative analysis of phytochemicals that are present in the pomegranate leaves. Gallo tannins-, and ellagitannins are the phytochemicals present in the extract of leaves.

Estimating the antimicrobial properties of pomegranate leaves.

The antibacterial and antifungal properties of leaf extract are estimated using the agar well diffusion method.

Estimating the anticancer properties of the pomegranate leaves.

Leaves extract containing the anticancer properties are estimated by using the MTT assay against Hela cells. MTT assay is the assay used in evaluating the anticancer properties of natural extracts.

Apoptotic and necrotic analysis of pomegranate leaves.

After estimating the Anti properties from the leaves of pomegranate EtBr/Ao fluorescent staining is used to determine the apoptotic characteristics.

Statistical analysis.

After estimating the antimicrobial and anticancer properties of leaves of pomegranate the statistical analysis can be done by using the graph pad prism software method.

Application of pomegranate leaves in cosmetics.

Pomegranate leaves are rich in vitamin c, tannins, and ellagic acid used to protect the skin from radical damage.[10]

Application of pomegranate leaves in medicine.

Used to treat obesity, Diabetics, Alzheimer's disease, Osteoporosis, and dental health.[10]

Significance.

- Leaves of *P. granatum* are highly rich in antimicrobial activity and used to treat many diseases that are caused by food-borne microbes, and respiratory problems. It is used to inhibit the growth of pathogens.[13]
- Pomegranate peel is also used to treat cancer and has good antioxidant properties to treat free radicals.[8]
- Insomnia, cardiovascular disease, diabetes, and atherosclerosis are also treated by pomegranate extract.[11]
- Pomegranate leaves are used to treat stomach pain and diarrhea.
- Highly nutrient-rich content of pomegranate leaves is used for the digestion process.
- leaves are rich in vitamin c helps to boost the immunity.
- The seeds of pomegranate are used to treat the heart diseases, obesity and improve the male fertility.

3. CONCLUSION

The pomegranate has become the inexhaustible source used in many ways possessing the various properties like antioxidant, anti-inflammatory and antimicrobial not only fight against the pathogens but also used in food industry, Cosmetics, pharmacy. This review shows that as like other medicinal plants various parts of pomegranate are helpful in industry purposes and medical purposes.

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