

## Phytochemical Characterization of Punica Granatum Peel and its Antimicrobial Potency

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Sudan is the worldwide country in Africa with a diverse flora. Most of the Sudanese people, rural areas, rely on traditional medicine for the treatment of many infection diseases. It has been determined that various natural substances are effective to act as antibacterial agents. Secondary metabolites such as alkaloids, flavonoids, tannins, terpenoids have been seen to have antimicrobial activities. *Punica granatum* L., (pomegranate) belongs to the family puniceae which include only one genus and two species. The pomegranate is one of the oldest known edible fruits. Its history dates to very ancient times. This fruit tree is one of the species mentioned in the Bible and Quran and it's often associated to fertility. It is native to Iran and northeast turkey and has been cultivated through the Middle East, Southern Asia and Mediterranean region for several millennia. It is known that plants synthesize a vast range of organic compounds that are traditionally classified as primary and secondary metabolites. Primary metabolites are the compounds that have vital roles linked to photosynthesis, respiration, and growth and development. Although ignored for long, their function in plants is now attracting attention as some appear to have a key role in protecting plants from herbivores and microbial infection, as attractants for pollinators and seed-dispersing animals, as allopathic agents, UV protectants and signal molecules in the formation of nitrogen-fixing root nodules in legumes. Alkaloids are the substances which are produced by microbes such as bacteria, fungi and also by plants and animals. They are well known for their pharmacological effects and therefore are used as medicines as recreational drugs. Saponins are bioactive compounds produced mainly by plants, but also by some marine organisms and insects. Chemically, they generally occur as glycosides of steroids or poly cyclic tri terpenes. Saponins have various benefits as they can be used as anti- tumor, anti-insect, anti-inflammatory effects. Tannins, mostly used in Asia, have natural healing aspects. They are mostly used as astringents for treating diarrhoea. The present study was designed to characterize the phytochemical and antibacterial activity of punica granatum peel extracts (Aqueous-Ethanol and Acetone) against standard bacteria strains Gram positive *Staphylococcus aureus* and Gram negative *Escherichia coli*, *Pseudomonas aeruginosa* using disc diffusion method. However, the objectives of this research involved are investigation of phytochemical characteristics of Punica granatum peel extracts, preparation of aqueous, acetone extracts and study of antimicrobial activity of the peel extracts against some gram positive and gram negative microbes.

Glycosides are the compounds which may be a terpene, a flavonoid, a coumarin or any other natural agent. Coumarins are the natural products which act as antioxidants enzyme inhibitors and precursors of toxic substances. They also work as plant growth regulators, control respiration, photosynthesis as well as act as anti-infection agents. They possess the properties of being anti-cancer, anti-HIV and antioxidants. There were three kinds of standard bacteria species used in this experiment. *Staphylococcus aureus* are gram positive bacteria with diameters of 0.5 -1.5 micrometres and characterized by individual cocci which divided in more than one plane to form grape-like clusters to date there are 32 species and eight subspecies in the genus *staphylococcus*. *Pseudomonas* is a bacteria which is omni present. It can be easily found in soil, water and in moist environment. Most of the species are resistant to many of the antibiotics. *Pseudomonas aeruginosa* is also known as a plant pathogen. *Escherichia coli* are generally good and present in human body. However, as a pathogenic agent it can also cause diarrhoea and cause infection in animals and humans. The material for the research, specifically the sample of Punica granatum peels which was semi dried was collected from the local market of Khartoum. The methodology involved various steps – Phytochemical screening which concluded test for alkaloids, identification of Tannins, test for Saponins, test for coumarins, test for glycoside, followed by checking biological activity which involved preparation of crude ethanol, acetone, aqueous fractions for biological study. The process was continued by preparation of the test organisms which concluded the preparation of bacterial suspensions, testing of antibacterial susceptibility by disc diffusion method. The results of phytochemical screening show that all extracts contain alkaloids, tannins, saponins and glycosides whereas coumarins are absent. Therefore, for all the present day medical complications these metabolites can act as an alternative source. The result of antimicrobial activity potency indicates that all extracts exhibit moderate activity against Standard bacterial strains. The good antibacterial potential of Punica granatum peels with the aqueous extract can be concluded. The research can be further continued. The future aspects of this research involve that the bioactive constituents of target species may be isolated and identified and then evaluated for antimicrobial activity. The crude extracts could be evaluated for other biological activities like anticancer- anti malarial can be accessed.