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Potential of peel extracts of *Punica granatum* and *Citrus aurantifolia* on alloxan-induced diabetic rats

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Abstract

Background: Peel is one of the major by-products in fruit processing industry. Fruit products (non-edible parts) are also considered as waste products and often discarded in the environment. Fruit peels are now serving as one of the primary sources for isolation and extraction of secondary metabolites in pharmaceutical industry. The present investigation was carried out to screen the phytochemical constituents and HPTLC analysis of peel extracts of *Punica granatum* and *Citrus aurantifolia* and their antidiabetic potential in alloxan-induced diabetic rats.

Results: Among the different solvent extracts, methanol solvent extract was found to possess more amounts of secondary metabolites. In addition, HPTLC analysis of the plant samples revealed the presence of 13 peaks in both the plants by using gallic acid as marker. Different biochemical parameters such as blood glucose, cholesterol, protein, urea, creatinine, and triglycerides level were subjected for estimation by collecting the blood samples from the treated diabetic rats after 21 days. A sharp decline in blood glucose, cholesterol, triglycerides, creatinine, and urea level was noticed when methanolic extracts of *Punica granatum* and *Citrus aurantifolia* were given to experimental animals when compared with negative control. However, protein and weight of the animal were found to be enhanced when treated with methanolic extracts of both the plants.

Conclusion: It can be concluded that fruit peels of both the plants exhibited antidiabetic potential on alloxan-induced diabetic rats which can be attributed to wide range of active pool of secondary metabolites. Further, screening and isolation of secondary metabolites along with their mode of action is required for effective use of plant-based drugs as antihyperglycemic agent.

Keywords: Fruit Peel, *Punica granatum*, *Citrus aurantifolia*, Antidiabetic activity, Gallic acid, HPTLC analysis

1 Background

Diabetes mellitus (DM) is a major chronic metabolic disorder and an extremely serious condition from both clinical and public health standpoints. It is recorded that every 5th Indian have diabetes by 2025, it may be assumed 40 million diabetics in India expected to be 70 million by 2025 [1]. Diabetes mellitus can directly affect serum lipid levels causing diabetic dyslipidemia which is

one of its complications [2]. Among the available therapeutic agents, insulin, metformin, sulfonylureas (SU), and thiazolidinediones (TZDs) are mostly used for the control of diabetes [3]. Plants are an excellent source of drugs, and many of the currently available drugs have been derived directly or indirectly from them [4]. It is obvious due to the richness and complexity of the compounds in plants. A multiple targeting is a double-edged sword in diabetes therapies. The multiple targets associated with antidiabetic herbal medicine could play a beneficial role in the control of diabetics.

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