

Impact on the Yield of Flavonoid and Total Phenolic Content from Pomegranate Fruit by Different Extraction Methods

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Abstract : Pomegranate fruits are used in cancer treatment in Ayurveda, Sri Lanka. Due to prevailing therapeutic effects of phytochemicals, this study was focus on anti-cancer properties of the constituents in the parts of Pomegranate fruit. Furthermore, the method of extraction, plays a crucial step of the phytochemical analysis. Therefore, this study was focus on different extraction methods. Five techniques were involved for the peel and the pericarp to evaluate the most effective extraction method; Boiling with electric burner (BL), Sonication (SN), Microwaving (MC), Heating in a 50°C water bath (WB) and Sonication followed by Microwaving (SN-MC). The presence of polyphenolic and flavonoid contents were evaluated to recognize the best extraction method for polyphenols. The total phenolic content was measured spectrophotometrically by Folin-Ciocalteu method and expressed as Gallic Acid Equivalents (w/w% GAE). Total flavonoid content was also determined spectrophotometrically with Aluminium chloride colourimetric assay and expressed as Quercetin Equivalents (w/w % QE). Pomegranate juice was taken as fermented juice (with *Saccharomyces bayanus*) and fresh juice. Powdered seeds were refluxed, filtered and freeze-dried. 2g of freeze-dried powder of each component was dissolved in 100ml of De-ionized water for extraction. For the comparison of antioxidant activity and total phenol content, the polyphenols were removed by the Polyvinylpolypyrrolidone (PVVP) column and fermented and fresh juice were tested for the 1, 1-diphenyl-2-picrylhydrazil (DPPH) radical scavenging activity, before and after the removal of polyphenols. For the peel samples of Pomegranate fruit, total phenol and flavonoid contents were high in Sonication (SN). In pericarp, total phenol and flavonoid contents were highly exhibited in method of Sonication (SN). A significant difference was observed ($P < 0.05$) in total phenol and flavonoid contents, between five extraction methods for both peel and pericarp samples. Fermented juice had a greatest polyphenolic and flavonoid contents comparative to fresh juice. After removing polyphenols of fermented juice and fresh juice using Polyvinyl polypyrrolidone (PVVP) column, low antioxidant activity was resulted for DPPH antioxidant activity assay. Seeds had a very low total phenol and flavonoid contents according to the results. Although, Pomegranate peel is the main waste component of the fruit, it has an excellent polyphenolic and flavonoid contents compared to other parts of the fruit, devoid of the method of extraction. Polyphenols play a major role for antioxidant activity.

Keywords : antioxidant activity, flavonoids, polyphenols, pomegranate

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