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OC36 How do extraction methodologies influence the biological properties of pomegranate leaves?

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One of the oldest known plants is the pomegranate tree (*Punica granatum* L.), native to the Mediterranean region. This plant's edible and non-edible portions have been shown to provide several health advantages. It has long been recognized as a source of bioactive chemicals, such as phenolic acids, flavonoids, tannins, alkaloids and amino acids. Large amounts of industrial waste are generated during the industrial processing of pomegranates, and 40 to 50% of the whole fruit is typically discarded ¹. In this context, the present work was conducted to determine the chemical composition and bioactive properties of pomegranate leaves to support their potential utilisation as functional ingredients. Three extraction methodologies were evaluated: maceration, microwave and ultrasound-assisted extractions. The chemical composition of the different extracts was determined using HPLC-DAD-ESI/MS. The antioxidant potential was assessed using two cell-based assays: TBARS and CAA. Sulforhodamine B colourimetric assay was used to assess the antiproliferative capacity using several tumour cell lines and the primary culture of non-tumour cells (PLP2). The anti-inflammatory activity was measured through the extract's capacity to inhibit nitric oxide production. Finally, antimicrobial activity was evaluated using the microdilution method. The results showed that the main phenolic compounds found in the three extracts were gallic and caffeic acid derivatives, and flavonoids such as luteolin, apigenin, quercetin, and kaempferol derivatives. All the extracts exhibited capacity to inhibit tumor cell lines proliferation (GI₅₀ of 19 - 76 µg/mL). Gastric adenocarcinoma (AGS) showed a higher sensitivity to all three leaf extraction methodologies. All three extracts presented lower IC₅₀ values in the TBARS antioxidant assay (0.83 - 1.70 µg/mL) than the positive control Trolox (IC₅₀ = 9.1 ± 0.3 µg/mL). The extracts presented a broad-spectrum antimicrobial inhibition with *K. pneumoniae* showing the highest susceptibility to the extracts, (MIC values 0.6 mg/mL). These results suggest that pomegranate leaves can be sustainably exploited as a source of health-promoting biomolecules, to be used as functional ingredients in some biobased applications.

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