

OP 22 – In vitro antiproliferative activity and Induction of Apoptosis by Sri Lankan *Punica granatum* L. Aqueous fruit extracts on the human breast (MCF-7) cancer cells compared to different extraction methods

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Introduction: Pomegranate has been considered as a polyphenol-rich fruit with anticancer effect. Cell cycle arrest is considered as a turning point of drug discovery. This study aimed to evaluate the effectiveness of pomegranate fruit extracts on breast cancer (MCF-7) cells with the modulation of the apoptotic signaling pathway.

Methods: Aqueous extracts of peel and pericarp were prepared by Boiling, Sonication, Microwave, sonication followed by microwave, heating in a water bath, and antiproliferative activity was assayed for MCF-7 and VERO cells by MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) reduction after 24h, 48h, and 72h of treatment. The total protein content, Lactate dehydrogenase (LDH) activity, and Caspase-3 activity were assessed, after confirming the antiproliferative activity. RT-qPCR was performed with RNA to explore the apoptotic pathway and gene expression.

Results: Pomegranate peel and pericarp extracts exhibited antiproliferative activity in a concentration-dependent manner. Peel extracts showed the highest antiproliferative activity against MCF-7 cells with all modes of extractions and more effective with sonication. The IC₅₀ value of 130±4.5µg/mL was observed with sonicated peel extract (SPL) against MCF-7, while VERO (healthy) cells exerted, values >1000 µg/mL. SPL extract indicated high protein content, LDH leakage. No activation was found in the caspase-3 signaling pathway. The expression of p21 and p53 genes were up-regulated by 10.4 fold and 7.3 fold respectively.

Conclusion: Sonication was identified as a more effective method of extraction with antiproliferative activity. The findings highlighted the promising therapeutic potential of SPL as a potential source of anticancer compounds and progression to modulate the caspase-3 independent and, p53, p21 dependent pathway in MCF-7 cells.

Keywords: Cytotoxicity, Pomegranate, Apoptosis, p21 and p53, MCF-7, VERO

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