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Poster Presentations

P-25

Anti-cancer properties of ethanol extracts of grey mangrove leaves on a breast cancer cell line

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Background: The breast cancer, as the most incident cancer in women, is rising up the concerns of women mortality worldwide. Herbal medicine showed to be effective in treatment of oncological disorders. Mangrove includes several kinds of phytochemical compounds including terpenoids, alkaloids, flavonoids, saponins, and glycosides which some of them shown to have anti-cancer effects.

Objective: In the current study, the anti-cancer effects of ethanolic (EtOH) extract of the grey mangrove (*Avicennia marina*) leaves of the Persian Gulf on a breast cancer cell line was evaluated.

Materials and Methods: The leaves of *A. marina* were collected from Asaluyeh mangrove forest, shores of the Persian Gulf, Iran. The EtOH extract of *A. marina* leaves were provided according to standard procedures. The phytochemically analysis including total phenolic and flavonoid contents were measured. In addition, the extracts were analyzed by gas chromatography-mass spectroscopy (GC-MS) and their compounds were analyzed. The extracts were used for in-vitro study. MTT analysis, population doubling time assay, and western blot analysis were

performed on MCF-7 breast cancer cell line and Vero cell line. IBM SPSS Statistics 26 and GraphPad prism were used for statistical analysis. The mean differences between groups were analyzed by one-way ANOVA and post hoc Tukey test.

Results: The GC-MS analysis showed that there was 12 potent anti-cancer, anti-proliferation, and anti-oxidant compounds in EtOH extract. Four of these compounds including levoglucosan, 2,4-Di-Tert-Butylphenol, Pentadecanoic acid, and linoleic acid showed to have anti-cancer effects on MCF-7 cell line in previous studies. The MTT proliferation assay showed that the 120 and 160 µg/mL concentrations of EtOH extract had lower value than the control group ($p < 0.05$). Moreover, this result in Vero cell line was only seen in 160 µg/mL concentration ($p < 0.05$). In contrast with other concentrations, total cell counts of the 120 and 160 µg/mL concentrations was significantly lower than control group in all 7 days ($p < 0.01$). Furthermore, in Vero cell line, the 120 µg/mL concentration at day 3, 4, 5 and 7, and the 160 µg/mL concentration at day 4 to 7 had lower value than the control group ($p < 0.01$). However, at the MCF-7 cell line, the cell viability rate of 160 µg/mL concentration was only different from control group at day 2 ($p < 0.01$). Moreover, at the Vero cell line, the 120 and 160 µg/mL concentrations had lower value than the control group at day 5 ($p < 0.001$ and $p = 0.041$, respectively). Additionally, the western blot analysis of the EtOH extract showed that the Bax, Cleaved-caspase-1, Cleaved-caspase-3 and Cleaved-caspase-7 proteins' expression were significantly higher than the control group; represented that *A. marina* EtOH extract induced apoptosis in MCF-7 cell line.

Conclusion: The anti-cancer effects of EtOH extract of *A. marina* leaves at the concentrations of 120 and 160 µg/mL was shown through anti-proliferation and apoptosis of MCF-7 breast cancer cell line.

Key words: Mangrove, *Avicennia*, Anti-cancer, Apoptosis, Ethanol.