



Evaluation of cytotoxic and apoptogenic effects of chlorogenic acid derivatives from *Berberis vulgaris* fruits on human breast adenocarcinoma cell line (MCF-7)

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Background and objectives: Because of the importance of breast cancer as a first cause of morbidity and mortality among females, also the limitation of chemotherapy and based on literature of the use of herbal medicines against cancer, the current study was aimed to determine the efficacy of *Berberis vulgaris* fruit ethanol extract against MCF-7 breast cancer cell line. **Methods:** The efficacy of the ethanol extract of *B. vulgaris* against MCF-7 cells was determined after IC₅₀ determination against 3T3 cell. Then, the fractions were obtained by methanol and aqueous solvents also by RP18. Then, IC₅₀ of fractions were determined against 3T3 cells and the efficacy of fractions against MCF-7 was evaluated by quantitative PCR. P53, Bax and BCL-2 expression levels were determined. Finally, by using HPLC and then NMR the active component was obtained. **Results:** The results demonstrated IC₅₀ value of 9 mg/mL of the crude extract for inhibiting the cancer cells. On the other hand, 25 µg/mL of fraction B inhibited breast cancer cells and this fraction was purified by HPLC and chlorogenic acid as a main component along with 5-caffeoyl quinic acid and 4-caffeoyl quinic acid were identified. The structures of components were determined by HSQC, HMBC and COSY. **Conclusion:** The current study showed the efficacy of *B. vulgaris* fruit ethanol extract against MCF-7 breast cancer cell line with no harm against normal cells.

Keywords: *Berberis vulgaris*, 4-caffeoyl quinic acid, 5-caffeoyl quinic acid, chlorogenic acid, MCF-7