عنوان مقاله:

Comparing of Effects of Hydro-alcoholic, Ethanolic, and Methanolic Extracts of the Frangula alnus: Chemical Composition, Antimicrobial, and Synergism

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خلاصه مقاله:

This study was conducted to evaluate the effect of different extraction solvents, including hydro-alcoholic (H-A), ethanolic (Et-OH), and methanolic (Me-OH), on chemical composition and synergistic antibacterial activity of Frangula alnus extract against Staphylococcus aureus and Escherichia coli. The chemical composition of the F. alnus bark extract was evaluated using FTIR, UV-Vis spectroscopy, and GC/MS analysis. The synergistic antimicrobial effect of the extracts with Ciprofloxacin (CIP) and Erythromycin (ERY) was evaluated using minimum inhibitory concentrations, combined disc, and checkerboard titration method. F. alnus contained alkanes, alkenes, phenols, alcohols, esters, terpenes, fatty acid, tetrazole, halo-alkane, anthraquinone as well aromatic, and plasticizer compounds in the ethanolic, methanolic, and hydro-alcoholic extracts. Total phenolic compounds for ethanolic, hydro-alcoholic and methanolic extracts were recorded 110.92±0.01, 95.27±0.01 and 126.6±0.02 g/L Gallic acid, respectively. Et-OH and H-A extracts in both combined and synergistic forms significantly inhibited bacterial growth. Concerning the antibacterial activity of the extracts, it was assumed that the compounds present in the plant extracts would destroy the bacterial cell membranes and consequently cause leakage of intracellular contents. Therefore these antibiotics in combination with the extracts would be able to affect their target sites (CIP; DNA gyrase and ERY; 50S subunit) more effectively. According to the results, H-A, Me-OH, and Et-OH extract efficiently in the synergistic state with erythromycin and ciprofloxacin can be a promising candidate to be used against bacterial pathogens.

کلمات کلیدی:

Hydro-alcoholic, Erythromycin, Chemical composition, Ciprofloxacin, Gallic acid