عنوان مقاله:

Synergistic antibaterial activity of medicinal plants essential oils with biogenic silver nanoparticles

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خلاصه مقاله:

Objective(s): Development of a nanobiosystem by using plant essential oils with green synthesized silver nanoparticles that present synergistic antibacterial activity for overcoming antibiotic resistance in pathogenic bacteria. Material and Methods: Essential oils (EOs) of Kelussia odoratissima and Teucrium polium extracted by hydrodistillation were analyzed by gas chromatography-mass spectrometry (GC-MS). Then leaf aqueous extract of K. odoratissima prepared and used for green synthesise of silver nanoparticles (SNPs). The oils, and the colloidal preparations of silver nanoparticles, were then subjected to microdilution technique using ELISA reader to determine their minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) on Staphylococcus aureus, Bacillus cereus, Listeria monocytogenes, Escherichia coli O157: H7, Salmonella enterica and Pseudomonas aeruginosa. The type of interaction between EO and SNPs was also determined by calculating the fractional inhibitory concentration index and isibologram type. Results: GC-MS analysis of K. odoratissima EO showed (Z)-ligustilide, (Z)-3-butylidene-phthalide, limonene and β-phellandren as main constiuents, while T. polium EO has β-caryophylene, germacrene D, γ-cadinene, (Z)-nerolidol, camphor, β-pinene, α- camphene, linalool and α-humulene. T. polium EO has more potent antibacterial property at MIC of 0.16-1.25 mg/ml compared to K. odoratissima (MIC of 0.3-2.5 mg/ml). Silver nanoparticles showed a potent antibacterial property (MIC of 0.006-0.025 mg/ml), and its colloidal suspension with plant EOs revealed a pathogen-dependent synergistic and additive effect based on calculated (fractional inhibitory concentration index (FICi.

کلمات کلیدی:

Antibacterial activity, Biogenic Silver nanoparticles, Essential oils, Medicinal plamts