

Encapsulation of Ajowan essential oil by electrospinning: characterization and study of antibacterial effects.

Abstract:

The Ajwain plant is one of the medicinal species that has many therapeutic properties including anti-flatulence, anti-nausea, and sputum and has antimicrobial properties and antimicrobial activity of nanofibers was investigated in vitro for control of *Staphylococcus aureus* and *Escherichia coli*. For this purpose, Zein nanofibers containing 0, 2.5, 5 and 10% concentrations of essential oils were prepared. The morphology and diameter of the electrospun nanofibers were measured by scanning electron microscopy and the diameter of the nanofibers was measured using Image J software. Disk diffusion method was used to determine the antimicrobial activity of control and essential oil carrier nanofibers on *Staphylococcus aureus* and *Escherichia coli*. SEM results showed that all nanofibers produced were non-spherical and uniform and increased with increasing essential oil concentration. This increase in diameter was due to the decrease in the electrical conductivity of the solutions. The results of microbial culture of electrospun samples of non-essential oils and containing essential oils showed that the produced nanofibers had antimicrobial activity and increased with increasing the essential oil concentration. According to the results, nanofibers containing ajwain essential oils can be used to control microbial agents for various purposes. After formation of nanofibers using Fourier transform infrared spectroscopy, differential scanning thermal analysis, X-ray diffraction analysis, atomic force microscopy, gas chromatography-spectroscopy, activity of charge essential oil and loading Nano-fibers were investigated.

Key words: Ajowan essential oil, Encapsulation, Medicinal plants, Nano fibers



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