



University of Zabol  
Graduate School  
Faculty of Agriculture  
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The Thesis Submitted for the Degree of Master of Science  
(In the field of Horticultural Sciences)

**Title**

Encapsulation of Eucalyptus essential oil by zein nanofibers and study of  
antibacterial effects.

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### **Encapsulation of Eucalyptus essential oil by zein nanofibers and study of antibacterial effects.**

#### **Abstract:**

The Eucalyptus 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, the essential oil of extract was first extracted and the solution of zein and acetic acid was prepared and then the nanofibers were produced by electrospinning of the solutions. After formation of nanofibers using scanning electron microscopy tests, 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. The resulting nanofibers containing the essential oils of both females used had inhibitory properties. The nanofibers produced were uniform and single-handed and had an amorphous state, and the fibers containing the essential oil had no additional peaks, indicating compatibility between the essential oil and the zein polymer.

**Key words:** Eucalyptus essential oil, Encapsulation, Medicinal plants, Nano fibers