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**Title:**

**Manufactuiry of active packaging using eucalyptus and  
Piperita entha L by electrospinning technique: study  
the characterization and antibacterial properties**

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## **Abstract**

*Lamiaceae* is one of the medicinal plants that has attracted the attention of researchers for a long time due to its numerous medicinal effects. *Lamiaceae* essential oil was investigated in concentrations of 0.5-2.5-10% and *Lamiaceae* was successfully loaded into zein-Eucalyptus nanofibers. The morphology and diameter of electrospun nanofibers were evaluated with the help of scanning electron microscopes and the diameter of nanofibers was evaluated using image j software. In order to check the crystal structure of the examined samples, XRD test was used and also to check the thermal properties of the samples, TGA test was used. The diameter of nanofibers obtained from electrospinning increased with increasing concentrations of *Lamiaceae* essential oil. The results of the FTIR test show that the stretching frequency of the amide group and the stretching frequency of the alcohol group have shifted towards weak fields, XRD test showed that essential oil is present in nanofibers in amorphous form. The results of TGA test showed that the high thermal stability of zein nanofibers containing peppermint essential oil is related to the interaction between gelatin and essential oil, which delays the thermal degradation of nanofibers. The diameter of the nanofibers obtained from electrospinning increased with increasing concentrations of oil. Finally, in this research, we were able to produce decorative nanofibers containing *eucalyptus* and *Lamiaceae* essence using electrospinning method.

**keywords:** Lamiaceae, electrospinning, Nano fibers, zein-Eucalyptus