



University of Zabol  
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**Thesis for master's degree in the field of food industry  
engineering**

**Modeling the release of polyphenolic  
compounds from olive leaves coated  
with electrospun nanofibers of sweet  
almond gum/gelatin**

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## **Abstract:**

Easy degradation against environmental stresses, low bioavailability and bitter taste of phenolic compounds are the main limitations of its use. Therefore, encapsulation is one of the effective solutions to increase stability and reduce bitter taste. This research was done with the aim of encapsulating olive leaf polyphenol in electrospun nanofibers of almond gum and gelatin and then modeling the release of polyphenol from nanofibers in the digestive system. For this purpose, polyphenolic extract concentrations (0,5,10,20%) was loaded in in gelatin and almond gum nanofibers and electrospun. Characterization of electrospun nanofibers of almond gum and gelatin containing olive leaf polyphenol extract by infrared spectroscopy (FTIR), X-ray diffraction spectroscopy (XRD), scanning electron microscopy (SEM), atomic force microscopy (AFM), analytical analysis thermal (TGA) and rheometry were determined. Modeling of the release of encapsulated polyphenol compounds was done under digestive system pH conditions (6.8, 2.5, 7). SEM study showed that the diameter of electrospun nanofibers were increased with the increase of olive leaf polyphenol concentration. AFM study showed that the morphology of the nanofibers is rod-shaped and without disorder. FTIR results of polyphenol extract did not change the structure of gum and gelatin. TGA results showed that polyphenol degradation is done in the third step. The rheometric results showed that polyphenols behave like Newtonian fluids and the viscosity increases with the increase of polyphenol concentration. The results of the release test showed that with the increase in the percentage of polyphenol used, the release percentage also increases. This research showed that electrospun nanofibers of sweet almond gum and gelatin loaded with olive leaf polyphenol can be used in food and medicine.

**Keywords:** Phenolic compounds, Electrospinning, Release modeling , Sweet almond gum, Gelatin