

## THE EFFECT OF PROCESSING PARAMETERS ON MORPHOLOGY OF ELECTROSPUN ZEIN NANOFIBER

O. Çayır, G. Ak, E. Atay, A. Altan\*

Mersin University, Faculty of Engineering,  
Dept of Food Engineering, Mersin, Turkey

Electrospinning is an encapsulation method aiming to provide protection, stabilization and controlled release of food components. Electrospinning technique uses an electric field to create charged jets of polymer solution. The aim of this study was to investigate the influences of the voltage (14, 15 and 17 kV) and polymer concentration of shell zein solution (28 and 36% w/v) on morphological properties of zein fibers during coaxial electrospinning. The distance between the tip and the collector was 10 cm. The flow rates of shell and core were 0.8 and 0.3 mL/h. Carvacrol concentration for the core was 15% (v/v). The morphology of electrospun zein fibers was examined by a field emission scanning electron microscope at 5 kV. In order to determine the average fiber diameter, 100 fibers were analyzed using image analysis software. It was noticed that increasing the voltages with constant flow rate and distance led to a significant increase in nanofiber diameters. Fiber diameter changed from 117.4 to 143.8 nm with increasing voltage. Higher zein concentration increased the average fiber diameter. Fiber diameter was obtained in the range of 81.3 to 173.5 nm for 28 and 36% zein concentrations. Beaded fiber was seen at 28% zein concentration. However, bead-free and uniform nanofiber was obtained at 36% zein concentration. Nanofibers with added functionalities may find uses for the incorporation of bioactive agents within the nanofibers with added functionalities for food applications.

Keywords: Electrospinning, encapsulation, zein, carvacrol

---

\* Corresponding author: aylinaltan@yahoo.com