

Characterization of zein particles and fibers obtained by electrospinning aiming at applications in slow-release fertilizers.

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In order to meet the food demand caused by the population growth, approaches able to increase food production with low environmental impact are highly needed. The proposal is to achieve prolonged soil productivity by encapsulating fertilizer nanoparticles using polymer matrices that enable the control of solubility. In this way, the fertilizer nanoparticles can be slowly released in the environment, avoiding agglomeration and fertilizer loss by leaching. Zein is one of the polymers that can be used for encapsulating fertilizers, which is a protein found in maize, easy to process and has bactericidal properties. In addition, zein has also shown potential to be used as a substrate for capsules and fibers¹ used to encapsulate nanoparticles of biological materials.

Electrospinning is an interesting process for producing various functional non-woven fibers with average diameters in the range of micro to nanometers. Electrospun materials find applications as tissue scaffolds, supports for enzymes and catalysts, filtration media, optical, electronic devices, sensors and slow release of some compounds. In this preliminary work, we determined the experimental parameters to produce electrospun particles and fibers of zein, in order to use them as encapsulating agent for slow release of the fertilizer. The morphological and size characterization of the particles and fibers was carried out using scanning electron microscopy (SEM) while other physical-chemical parameters are under investigation.

1. Moomand, K. and L.-T. Lim, *Oxidative stability of encapsulated fish oil in electrospun zein fibres*. Food Research International, 2014. **62**: p. 523-532.