

TETRAHYDROCURCUMIN ENCAPSULATED IN MODIFIED STARCH BY SPRAY-DRYING FOR MICROBIOLOGICAL APPLICATIONS

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The pathogenic fungus *Fusarium graminearum* is responsible for the disease Gibberella Ear Rot in maize and Fusarium Head Blight in wheat. The diseases caused by *Fusarium* not only severely decrease grain yield, but also result in contaminated grains with an unacceptable levels of mycotoxins, which are toxic secondary metabolites. Hence, such fungal strains can drive the outbreaks of mycotoxicosis in humans and animals.

In constant search for bio-sourced and non-toxic efficient compounds to deal with pathogenic fungi, our lab is currently working with tetrahydrocurcumin (THC, Fig. 1). This colorless curcumin derivative possess anti-oxidant, anti-fungal [1-2] and anti-carcinogenic properties [3]. THC is unfortunately a scarcely water-soluble molecule. However we need an acceptable solubility in water to add this phenolic compound in an aqueous formulation of bio-fungicide. That is the reason why we chose to encapsulate the molecule to enhance its apparent solubility.

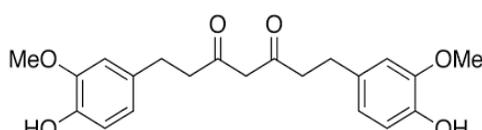


Fig. 1 Structure of tetrahydrocurcumin (THC)

Spray-drying was chosen as encapsulation technique, as it is widely used in industry due to high flexibility and the possibility to work in continuous process [3-4]. Before spraying, THC is trapped in vegetable oil in water emulsion stabilized with octenyl succinic acid modified-starch. The size of the droplets was optimized and visual control of emulsion stability was performed. After spray-drying, particles were characterized with scanning electron microscopy (SEM), nuclear magnetic resonance, UV-spectrophotometry and differential scanning calorimetry. One can observe emulsion used for spraying in Fig. 2 (a). SEM views confirmed that no free THC was visible in synthesized THC-loaded particles (Fig. 2 (b) and (c)). Microbiological assays were then performed on *F. graminearum*.

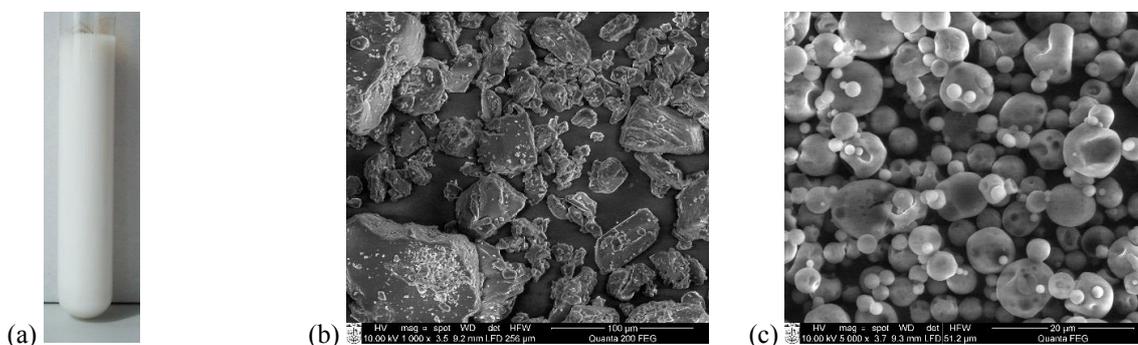


Fig. 2 (a) Emulsion before spraying (b) SEM view of THC (c) SEM view of THC-loaded particles obtained from spray-drying

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