

ENCAPSULATION OF EUGENOL AND THYME ESSENTIAL OIL IN STARCH SODIUM OCTENYLSUCCINATE

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Essential oils are derived from plants and are denoted by antibacterial, antioxidant, anti-cancer and anti-inflammatory properties. However, they are chemically unstable and sensitive to degradation. Encapsulation is an effective tool to prepare oil-based high-quality and beneficial products in various industries in order to enhance their chemical, oxidative, and thermal stability [1].

The aim of this study is the preservation of the active properties of essential oils by encapsulation them in starch sodium octenylsuccinate (OSA). Several encapsulation techniques were chosen for eugenol (EU) and thyme essential oil (TH) encapsulation: emulsions containing OSA and EU or TH were prepared; nano spray drying of emulsions was performed. Firstly, six emulsions containing 20% of OSA and 2%, 2.5%, 10% of EU or TH were obtained by using high-shear homogenisator. Afterwards, EU or TH were encapsulated in OSA by using nano spray dryer. The obtained OSA-EU and OSA-TH capsules were characterized by scanning electron microscopy (SEM), Fourier transform infrared spectroscopy and thermogravimetric analysis (TA). According to SEM and TA, the diameter of obtained capsules was 0.5 to 1 μm and the thermal stability of capsules containing eugenol was higher, respectively. The release studies of EU and TH from capsules into ethanol were performed (Fig. 1, A) and the antioxidant activity of capsules was determined (Fig. 2, B).

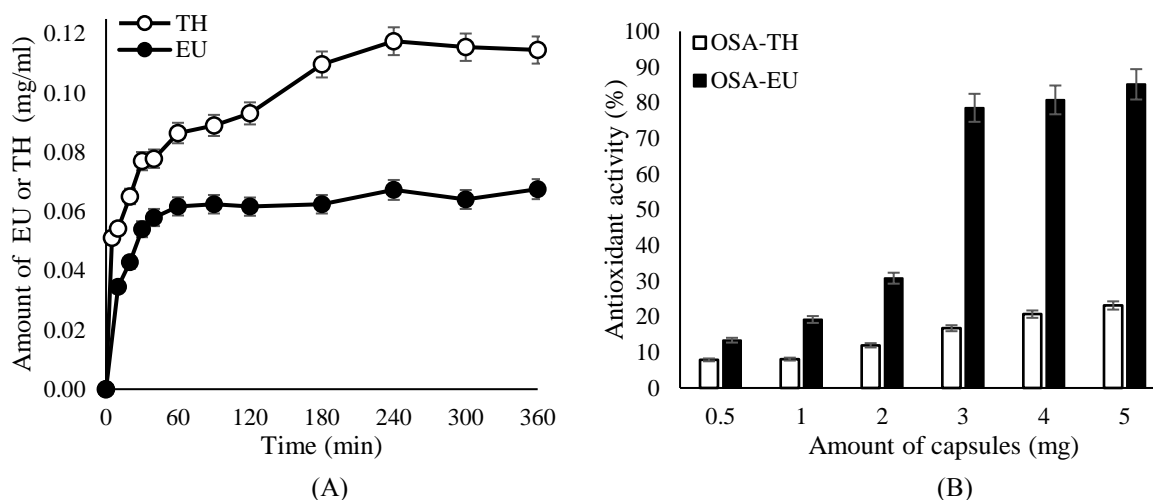


Fig. 1. The released amount of EU and TH depending on time (A) and the antioxidant activity of OSA-EU and OSA-TH capsules (B)

It has been found that encapsulated EU and TH maintain its antioxidant activity and active compounds could be released into ethanol. The study showed that 70 % of EU and 96 % of TH amount were released into ethanol medium over 360 minutes. The antioxidant activity of capsules containing EU was significantly higher than TH. Depending on active compounds concentration in capsules, the antioxidant activity of OSA-EU and OSA-TH was varied from 13 to 85 % and from 8 to 23 %, respectively.

References

1. A. M. Bakry, et al. *Compr. Rev. Food Sci. F.* **15** (2016) 143.