

Título: DETERMINATION OF ANTIMICROBIAL ACTIVITY OF FREE AND NANOVESICLES ENCAPSULATED THYMOL

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Resumo:

Thymol is the mayor component from the thyme essential oil. This phenolic compound has a great potential to increase the shelf-life and the security of food products. However, its low solubility in water, strong scent and tendency to bond in hydrophobic compounds may difficult its use in food. To solve those problems, an alternative is the encapsulation in nanovesicles. The objective of this study was to encapsulate thymol in nanovesicles, characterize the product and determine its antimicrobial activity. For this, thymol was diluted in a 20% DMSO solution and encapsulated in nanovesicles by the thin-film hydration method, using soy phosphatidylcholine. The average particles size and polydispersity were evaluated by light scattering. The Zeta potential analysis was performed using Zetasizer Nano-ZS ZEN equipment. Then, it was determined the Minimum Bactericidal Concentration (MBC) for free and encapsulated thymol by dilution method against *Salmonella* Enteritidis SE86 (the major bacteria responsible for foodborne outbreaks in the State of Rio Grande do Sul, Brazil) and *Listeria monocytogenes* 55 (isolated from a foodborne outbreak). So, it was added a bacterial suspension with 10⁵ CFU/ml. From each dilution, it was inoculated 20 µl, by the drop technique, in BHI agar plates, incubated at 37 ± 2 °C for 24 ± 2 h, to determinate the presence or not of the colonies. The absence of growth indicated that the bacterium was not present in the respective dilution. The MCB was considered as the last dilution in which there was no bacteria present. It was done positive and negative controls. All experiments were performed in triplicate. The results showed that the medium size of the nanovesicles containing thymol was 173.1 ± 17.5 nm with low polydispersity level (0.259 ± 0.04), so all nanoparticles present in solution had similar size. The zeta potential, namely the nanovesicles' surface charge was high and positive (35.99 ± 1.12), an unexpected result, since soy phosphatidylcholine have neutral charge. Regarding *S. Enteritidis* SE 86 and *L. monocytogenes* 55, the MCB was 1.325 mg/ml for free thymol and 0.6625 mg/ml for encapsulated thymol for both. So, the encapsulation increase the thymol's bactericidal effect, being necessary more studies to apply this compound in food products.

Palavras-chaves: Essential oil, thymol, liposome, microbial activity, nanotechnology

Agência Fomento: CNPq e Fapergs