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MICROENCAPSULATED ESSENTIAL OILS FROM TWO LAMIACEAE SPECIES FOR COMBAT AGAINST MULTI-RESISTANT *ACINETOBACTER BAUMANNII*

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Antimicrobial resistance (AMR) threatens to increase its mortality rate to 10 million deaths per year by 2050, and *Acinetobacter baumannii* stands out with its insensitivity to almost all available therapeutic options. The risk factors for the acquisition of *A. baumannii* infections have become more frequent during the coronavirus disease 2019 (COVID-19) pandemic, consequently leading to increased AMR. Potential solutions may be explored among naturally derived products, where essential oils (EOs) stand out with a broad spectrum of antimicrobial activity, complex chemical composition, and non-specific mechanisms of action postponing AMR development. However, their volatile nature may affect stability during shelf-life. Thus, we aimed to develop stable and effective microencapsulated systems of essential oils (EOs) derived from two species from Lamiaceae family, *Origanum heracleoticum* L. (oregano) and *Thymus vulgaris* L. (thyme). Microencapsulated complexes of oregano and thyme EOs (OEOC and TEOC) were prepared with hydroxypropyl-β-cyclodextrin as a carrier, and freeze-dried. Fourier-transform infrared spectroscopy verified the formation of inclusion complexes, while thermal stability was confirmed by differential scanning calorimetry. The microdilution broth assay revealed higher antimicrobial activity of the OEOC sample compared to TEOC against 64 *A. baumannii* isolates recovered from COVID-19 patients admitted to intensive care units (MIC values 0.4–1.6 mg/mL for OEOC, and ≥ 1.76 mg/mL for TEOC). Sub-inhibitory concentrations of microencapsulated EOs significantly decreased the biofilm formation of four *A. baumannii* isolates, representatives of a group of isolates based on the genetic pattern (Isolates 1, 2, 39, and 54). Concerning Isolate 2 (representing 60 of the total 64 isolates), the reduction was achieved for more than 50% by both samples. Contrary to antimicrobial potential, TEOC displayed slightly better antioxidant activity in the 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. These results highlight the potential of microencapsulated oregano and thyme EOs in the treatment of infections caused by *A. baumannii*.

KEYWORDS: *Acinetobacter baumannii*; oregano essential oil; thyme essential oil; microencapsulation; antibiofilm

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