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Physicochemical characterization of the inclusion compounds of eugenol and β -caryophyllene in β -cyclodextrin

ABSTRACT. The present work was carried out to encapsulate the essential oil (EO) constituents (i.e., eugenol and β -caryophyllene) inside β -cyclodextrin. Encapsulates were subjected to physicochemical characterization. Absorption λ_{\max} for eugenol and β -caryophyllene were observed at 280 nm and 230 nm, respectively. Scanning electron microscopy (SEM) analysis of encapsulates revealed rough surfaces, cracks and sharp edges; the particles were in the micrometre size range and are, therefore, referred to as microparticles. Characteristic peaks of eugenol were recorded at 3516 cm^{-1} (OH), 2842–3000 cm^{-1} (C-H stretching) and 1511 cm^{-1} , 1611 cm^{-1} and 1638 cm^{-1} (C=C aromatic ring) via Fourier transform infrared (FTIR) spectroscopy. The FTIR spectrum of β -caryophyllene showed peculiar bands at 3067–2856 cm^{-1} and 1671–885 cm^{-1} . Thermogravimetric analysis (TGA) data showed complete weight loss for eugenol and β -caryophyllene in the range of 30–215 °C. In contrast, encapsulated eugenol and β -caryophyllene showed weight loss in the range of 300–580 °C.

Keywords: encapsulation, eugenol, β -caryophyllene, FTIR, SEM, TGA

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