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Assessing the Stability of Peppermint Oil Encapsulated in Hydrogel Beads
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Abstract
Essential oil mainly contains volatile constituents making it vulnerable upon exposure to the external environment. The encapsulation method is known to protect the bioac-tive components of the essential oil from damage, in which alginate was used as the hydrogel in this study. This work investigates the physicochemical stability of the peppermint oil encapsulated within alginate beads (1.5% and 2.0%) during its five weeks of storage. Peppermint oil (PO) was added at four different weight ratios to alginate, which were 1:3, 1:2, 1:1, and 2:1. The encapsulation technique involves mixing algi-nate and oil using a homogeniser. Constituents profiling was done weekly using UV-Vis spectrophotometer and Gas chromatography-mass spectroscopy (GC-MS). Inves-tigation revealed that 1.5% (w/w) alginate in a weight ratio of 1:1 has the highest encapsulation efficiency, which was 42.00%, while for 2.0% (w/w) alginate, the weight ratio of 1:2 gave a maximum encapsulation efficiency of 33.38%. Assessment of the beads' diameter with time showed little physical changes throughout storage time. The constituents profile of the oil indicates a decline in the chemical constituents between a pure sample and the encapsulated peppermint oil. This might be associated with the heat generated during mixing or exposure to the light during the preparation stage. Even so, the analysis of the encapsulated oil each week suggested no striking changes, indicating the stability of the peppermint oil encapsulated in the alginate beads.

Author Keywords
Alginate; Encapsulation; Essential oil; Hydrogels; Peppermint oil; Stability

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