UNIVERSITI TEKNOLOGI MARA

5th I-CReST 2025

INTERNATIONAL CONFERENCE ON RESEARCH AND PRACTICES IN SCIENCE, TECHNOLOGY AND SOCIAL SCIENCES

SYNERGY FOR FUTURE SUSTAINABILITY:
BRIDGING SCIENCE, TECHNOLOGY AND HUMANITIES

Abstract Book

UNIVERSITI TEKNOLOGI MARA
CAWANGAN SELANGOR, KAMPUS DENGKIL
MALAYSIA

13th SEPTEMBER 2025

ORGANISED BY: Centre of Foundation Studies

STRATEGIC PARTNER: UiTM Global

IN COLLABORATION WITH: UTM

I-CReST 2025: 037-014 – Effect of Oil Concentration and Dripping Distance on the Flaxseed-Ginger Oil Alginate Beads' Properties

[1]Nur Najiha Zainuddin, [2]Muhammad Salahuddin Haris, *[1]Shaiqah Mohd Rus

[1]Department of Pharmaceutical Technology, Faculty of Pharmacy and Health Sciences, Royal College of Medicine Perak, Universiti Kuala Lumpur, 30450 Ipoh, Perak, Malaysia.

[2]Department of Pharmacy, Faculty of Pharmacy and Health Sciences, Royal College of Medicine Perak, Universiti Kuala Lumpur, 30450 Ipoh, Perak, Malaysia.

*Emel: shaiqah.rus@unikl.edu.my

ABSTRACT

This study focuses on the development and characterization of alginate beads for encapsulating flaxseed oil (FO) and ginger oil (GO), with the aim of enhancing their appearance to potentially improve consumer palatability. FO, rich in omega-3 fatty acids, was combined with GO, known for its antioxidant and digestive properties. The oils were encapsulated using the extrusion dripping method with a 2.5% (w/v) sodium alginate solution. The effects of oil concentration and the nozzle-to-gelation bath distance on bead properties specifically size and sphericity were evaluated. Emulsions were prepared with different oil concentrations [FOGO 10%, FOGO 5%, FO 5%, and GO 5% (w/v)] using 1% Tween 80, followed by sonication. Beads were extruded at four distances (10 cm, 15 cm, 20 cm, and 25 cm) into a 2% calcium chloride solution. Rheological parameters, including viscosity and shear rate, were measured using a rheometer. Bead size and sphericity were analyzed using ImageJ software and a sphericity factor formula, respectively. Results showed that a 5% (w/v) FOGO emulsion and a 25 cm dropping distance yielded the most uniformly spherical beads, with an average diameter of 2.04±0.15 mm and a sphericity factor of 0.01±0.022. The findings demonstrate that both oil concentration and extrusion distance significantly influence the physical characteristics of the alginate beads. These findings support the use of optimized alginate bead formulation to improve the appearance and potential palatability of functional oils, paving the way for more consumer-friendly delivery systems in nutraceutical and food applications.

Keywords: Alginate; Encapsulation; Flaxseed oil; Ginger oil