

Investigation of mixing time on CarrageenanCellulose Nanocrystals (CNC) hard capsule for drug delivery carrier

Mohd Aiman Hamdan^a; Fatmawati Adam^b; Khairatun Najwa Mohd Amin^a

^a Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang, Malaysia

^b Centre of Excellence for Advanced Research in Fluid Flow (CARIFF), Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Kuantan, Pahang, Malaysia.

ABSTRACT

Present global market demands for plant based capsule to replace the animal based product. However, plant capsule produces a lower mechanical strength in comparison to gelatin based capsule. In this work, at constant 65 °C mixing temperature, the solution mixing time was varied to investigate the final carrageenan-CNC hard capsule mechanical properties, moisture content and chemical properties. The mixing time increased the solution viscosity and mechanical strength of hard capsule, while reduced the moisture content of the product. High tensile strength was obtained at higher mixing time might indicates uniform dispersion of CNC and increment of hydroxyl bonding in the carrageenan matrix. The disintegration time of hard capsule starts to rupture also increased as the mixing time increased but still disintegrated in less than 15 minutes.

KEYWORDS:

Carrageenan; Cellulose Nanocrystals; Capsule Loop Strength; Breaking Force; Ultrasonication.