

PENGARUH SUHU *SPRAY DRYING* TERHADAP KARAKTERISTIK
MIKROKAPSUL KAROTENOID DARI *Spirulina platensis* DENGAN
ENKAPSULAN SODIUM KASEINAT DAN GUM ARAB

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Intisari

Tujuan penelitian ini adalah mengetahui pengaruh suhu *inlet-outlet spray drying* terhadap karakteristik mikrokapsul *Spirulina platensis* dengan enkapsulan sodium kaseinat dan gum arab serta mendapatkan produk mikrokapsul yang memiliki karakteristik yang baik yaitu dengan retensi dan efisiensi enkapsulasi yang tinggi. Mikroenkapsulasi terdiri dari fraksi air dan fraksi minyak (9:1) dengan kadar ekstrak 0,45% dari volume total (b/v). Pembuatan fraksi air dilakukan dengan melarutkan bahan enkapsulan yang terdiri dari sodium kaseinat dan gum arab (1:2) dalam 90 ml akuades. Pembuatan fraksi minyak dilakukan dengan melarutkan ekstrak karotenoid dalam 10 ml Virgin Coconut Oil (VCO). Fraksi air dan fraksi minyak kemudian dicampur menggunakan homogenizer dengan kecepatan 24.000 rpm selama 1 menit dan *ultrasonic homogenizer* dengan amplitude 55 selama 2 menit. Emulsi dikeringkan menggunakan *spray dryer* dengan variasi suhu *inlet-outlet* 105-60°C, 120-65°C, 135-70°C, 150-75°C, 165-80°C. Penelitian ini dilakukan dengan Rancangan Acak Lengkap dengan 3 ulangan. Variabel yang diukur adalah viskositas, rendemen, kadar air, aktivitas air, karotenoid total, karotenoid permukaan, efisiensi enkapsulasi, retensi karotenoid, kelarutan, warna, ukuran partikel dan morfologi partikel. Variasi suhu *inlet-outlet spray drying* berpengaruh nyata ($p < 0,05$) terhadap viskositas, rendemen, kelarutan bubuk, kadar air, aktivitas air, karotenoid total, karotenoid permukaan, efisiensi enkapsulasi dan retensi karotenoid dan ukuran partikel serbuk. Perlakuan terbaik adalah suhu *inlet-outlet* 135-70°C dengan nilai viskositas 92,2 cP, rendemen 14,09%, kelarutan bubuk 67,18%, kadar air 4,73%, aktivitas air 0,33, karotenoid total 49,76 µg/mg, karotenoid permukaan 13,17 µg/mg, efisiensi enkapsulasi 73,46%, retensi karotenoid 74,55%, dan ukuran partikel 1,229 µm.

Kata kunci : *inlet-outlet*, karotenoid, mikroenkapsulasi, *Spirulina platensis*

THE EFFECT OF *SPRAY DRYING* TEMPERATURE ON THE CHARACTERISTICS OF THE MICOCAPSULE *Spirulina platensis* WITH SODIUM CASEINATE AND GUM ARAB

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Abstract

*The aim of this study were to determine the effect of inlet-outlet temperature of spray drying to characteristic *Spirulina platensis* microcapsules with arabic gum and sodium caseinate as encapsulating materials and got a carotenoid microcapsules which had high retention and efficiency. Microcapsules were obtained by water and oil fractions (9:1) with concentration of carotenoid extracts were 0.45% of the total volume (w/v). Water fractions were prepared by dissolving arabic gum : sodium caseinate (2:1) as encapsulating materials, up to total volume of 90 ml. Oil fractions were obtained by dissolving carotenoid extracts into Virgin Coconut Oil (VCO) up to volume of 10 ml. The oil and water fractions were homogenized with high speed homogenizer of 24,000 rpm for 1 minute and ultrasonic homogenizer with 55 amplitude for 2 minutes. The emulsion was dried using spray dryer with different inlet-outlet temperature that were 105-60°C, 120-65°C, 135-70°C, 150-75°C, 165-80°C. This research was conducted by Completely Randomized Design in three replications. The microcapsules were measured on viscosity, yield, moisture content, water activity, total carotenoids, surface carotenoids, encapsulating efficiency, carotenoids retention, solubility, color, particle size and particle morphology. The carotenoid extract concentrations had the significant effect ($p < 0.05$) to viscosity, yield, solubility, moisture content, water activity, total carotene, surface carotene encapsulating efficiency and carotenoids retention. The best treatment was at the inlet-outlet temperature 135-70°C. It had 92,2 cP viscosity, 14.09% yield, 67,18% solubility, 4.73% moisture content, 0.33 water activity, 49,76 ug/mg total carotenoids, 13,17 ug/mg surface carotenoids, 73,46% encapsulating efficiency, 74,55% carotenoids retention, and 1.229 μm particle size.*

Keywords: *carotenoid, inlet-outlet, microencapsulation, *Spirulina platensis**