

**OPTIMASI NANOENKAPSULASI EKSTRAK KASAR DAUN KAKAO  
(*Theobroma cacao L.*) MENGGUNAKAN METODE NANOPRESIPITASI**

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**ABSTRAK**

Daun kakao (*Theobroma cacao L.*) merupakan hasil samping dari budidaya tanaman kakao. Ekstrak kasar daun kakao berpotensi dimanfaatkan sebagai sumber antioksidan alami. Untuk melindungi senyawa tersebut dari kerusakan selama penyimpanan, dilakukan enkapsulasi. Salah satu teknik/metode nanoenkapsulasi yaitu nanopresipitasi. Metode nanopresipitasi merupakan metode yang mudah dan cepat dibandingkan metode lain. Efisiensi enkapsulasi yang tinggi sebagai penentu keberhasilan dari nanopresipitasi dipengaruhi oleh beberapa faktor diantaranya konsentrasi ekstrak yang ditambahkan dan konsentrasi gelatin. Penelitian ini bertujuan untuk mendapatkan kondisi optimal proses nanopresipitasi dengan mengoptimasi konsentrasi ekstrak yang ditambahkan (300 ppm, 400 ppm, 500 ppm, 600 ppm dan 700 ppm) dan konsentrasi gelatin (1% ; 1,25% ; 1,5% ; 1,75% dan 2%) dilihat dari parameter efisiensi enkapsulasi menggunakan metode *Central Composite Design (CCD) Response Surface Methodology (RSM)*. Analisis lain yang dilakukan yaitu kelarutan, kadar air, efisiensi enkapsulasi, persen recovery, distribusi ukuran partikel dan pengamatan optilab. Dari analisis RSM, konsentrasi ekstrak 500 ppm dan konsentrasi gelatin 1,5% memberikan hasil yang terbaik dengan efisiensi enkapsulasi nanokapsul sebesar 77,36%. Kondisi optimum nanokapsul juga memberikan hasil kadar air 5,28%, kelarutan 85,29%, efisiensi enkapsulasi 77,16% dan persen recovery 0,12%. Ukuran nanokapsul berada dalam kisaran nanometer yaitu sebesar 178,9 nm dan pesebaran nanokapsul merata karena indeks polidispersitas bernilai kurang dari 1 yaitu 0,716. Sedangkan pengamatan optilab diperoleh nanokapsul berbentuk bulat dan berwarna merah kecoklatan, hal tersebut menandakan bahwa ekstrak kasar daun kakao telah terkapsul. Identifikasi gugus fungsional pada nanokapsul optimum diantaranya terdapat gugus O-H, C-H, C=C, dan C-O sedangkan profil morfologi menunjukkan bahwa nanokapsul berbentuk bulat dan utuh.

Kata kunci : Nanoenkapsulasi, Nanopresipitasi, Ekstrak Kasar Daun Kakao, Gelatin, Optimasi

**OPTIMIZATION OF COCOA LEAVES CRUDE EXTRACT  
NANOENCAPSULATION (*Theobroma cacao* L.) USING  
NANOPRECIPITATION METHOD**

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**ABSTRACT**

Cocoa (*Theobroma cacao* L) leaf is a secondary product of cocoa plantation. Cocoa leaves crude extract has the potential to be used as a source of natural antioxidants. To protect the compound from damage during storage, encapsulation is carried out. One of the nanoencapsulation techniques / methods is nanoprecipitation. Nanoprecipitation method is an easy and fast method compared to other methods. High encapsulation efficiency as a factor of the nanoprecipitation prosperity is influenced by several factors including the concentration of the added extract and gelatin. This research conducted to obtain the optimal condition of the nanoprecipitation method by optimizing the concentration of added extract (300 ppm, 400 ppm, 500 ppm, 600 ppm and 700 ppm) and gelatin concentration (1%; 1.25%; 1.5%; 1, 75% and 2%) seen from the encapsulation efficiency parameters using the Central Composite Design (CCD) Response Surface Methodology (RSM) method. Other analysis carried out are involving moisture content, solubility, encapsulation efficiency, percent of recovery, particle size distribution and observation using optilab. The RSM analysis shows that by 500 ppm of added extract and 1.5% of gelatin concentration gives the best results with encapsulation efficiency of nanocapsule 77.36%. Optimum nanocapsule was produced with 5.28% moisture content, 85.29% solubility, with encapsulation efficiency as much as 77.16% and percent of recovery is 0.12%. The size of nanocapsules is in the nanometer range which is equal to 178.9 nm and distribution of nanocapsules is homogen because the polydispersity index is less than 1 (0.716 in precises). While observation using optilab were obtained nanocapsule in round form and brown reddish color, this phenomenon indicated that the crude extract of cocoa leaves had been encapsulated. Identification of functional groups at optimum nanocapsules includes O-H, C-H, C=C, and C-O groups while morphological profiles shown the nanocapsules are round and intact.

Keywords : Nanoencapsulation, Nanoprecipitation, Cocoa Leaves Crude Extract, Gelatin, Optimization