

Novi Puspitasari
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INTISARI

Blondo merupakan lapisan protein yang diperoleh dari hasil samping pengolahan *Virgin Coconut Oil* (VCO) yang berpotensi dimanfaatkan sebagai pengemulsi karena protein merupakan molekul amfifilik dan bermuatan. Sifat fungsional blondo yang dapat menggambarkan kemampuan emulsifikasi dan stabilitas emulsi adalah Indeks Aktivitas Emulsi (IAE) dan Indeks Stabilitas Emulsi (ISE), dimana nilainya masing-masing hanya $37.87 \pm 6.6 \text{ m}^2/\text{g}$ dan 11.26 ± 0.3 menit. Penelitian ini bertujuan untuk meningkatkan sifat fungsional blondo untuk mendapatkan kemampuan emulsifikasi lebih baik dibanding *native*-nya melalui reaksi asetilasi.

Penelitian terdiri dari 2 tahap, yaitu *screening design* pada konsentrasi asetat anhidrida dan waktu asetilasi dengan acuan parameter tingkat asetilasi tertinggi. Eksperimen dilakukan dengan rancangan acak lengkap (RAL) non-faktorial dan data yang diperoleh dianalisis dengan *one way ANOVA* menggunakan perangkat lunak *Minitab 16*. Tahap ke dua yaitu optimasi proses menggunakan *response surface method* (RSM), menggunakan rancangan *central composite design* (CCD). Respon yang diteliti adalah tingkat asetilasi, Indeks Aktivitas Emulsi (IAE), Indeks Stabilitas Emulsi (ISE), *Water Holding Capacity* (WHC), *Oil Holding Capacity* (OHC) dan nilai *Hydrophilic-Lipophilic Balance* (HLB). Data yang diperoleh dianalisa dengan perangkat lunak *Design Expert 11*.

Hasil prediksi kondisi asetilasi optimum rekomendasi terletak pada konsentrasi anhidrida 0.63 g/g protein dan waktu reaksi 60 menit, dimana prediksi respon yang dihasilkan adalah: tingkat asetilasi 72.50%; IAE $12.74 \text{ m}^2/\text{g}$; ISE 26.73 menit; WHC 4.37 g air/g protein; OHC 2.53 g minyak/g protein dan HLB 9.87. Hasil verifikasi titik optimum tersebut dihasilkan rerata tingkat asetilasi $72.03 \pm 0.29 \%$; IAE $13.78 \pm 0.09 \text{ m}^2/\text{g}$; ISE 27.14 ± 0.06 menit; WHC 4.44 ± 0.06 g air/ g protein; OHC 2.52 ± 0.02 g minyak/ g protein dan HLB 9.57 ± 0.31 , dimana dari hasil tersebut diketahui bahwa nilai tingkat asetilasi, WHC, OHC dan HLB sesuai dengan prediksi program, namun nilai IAE dan ISE lebih tinggi dari prediksi.

Kata kunci : Asetilasi, asetat anhidrida, blondo, emulsi, protein, sifat fungsional

Dosen Pembimbing Utama : Dr. Ir. Chusnul Hidayat
Dosen Pembimbing Pendamping I : Dr. Rini Yanti, STP., MP

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Abstract

Blondo is a protein layer obtained from Virgin Coconut Oil (VCO) processing byproduct. *Blondo* potentially utilized as an emulsifier because protein is an amphiphilic and charged molecule. Functional properties of blondo protein concentrate that depict its emulsion capacity and stability are Emulsion Activity Index (EAI) and Emulsion Stability Index (ESI), which in the native form, their value respectively were only $37.87 \pm 6.6 \text{ m}^2/\text{g}$ dan 11.26 ± 0.3 minutes. The aim of this research was to improve functional characteristics of blondo protein concentrate with better emulsifying capacity and stability compared to its native form through acetylation reaction.

The research was conducted over two steps, first screening design was performed to determine optimal range of acetic anhydride concentration and acetylation time using the highest extent of acetylation as a parameter. The data was analyzed with one way ANOVA using *Minitab 16* software. Second, optimization of acetylation conducted using Response Surface Method (RSM) with Central Composite Design (CCD). The extent of acetylation; Emulsion Activity Index (EAI); Emulsion Stability Index (ESI); Water Holding Capacity (WHC); Oil Holding Capacity (OHC) and Hydrophilic-Lipophilic Balance (HLB) value were observed as responses and analyzed using *Design Expert 11* software.

Predicted optimum acetylation condition was located on acetic anhydride concentration 0.63 g/g protein and acetylation time 60 minutes with predicted responses as follows: extent of acetylation 72.50%; EAI $12.74 \text{ m}^2/\text{g}$; ESI 26.73 minutes; WHC 4.37 g water/g protein; OHC 2.53 g oil/g protein and HLB 9.87. Verification of predicted acetylation condition showed responses $72.03\% \pm 0.29\%$ for extent of acetylation; $13.78 \pm 0.09 \text{ m}^2/\text{g}$ for EAI; 27.14 ± 0.06 minutes for ESI; $4.44 \pm 0.06 \text{ g water/g}$ protein for WHC; $2.52 \pm 0.02 \text{ g oil/g}$ protein for OHC and 9.57 ± 0.31 for HLB value, which from those results known that extent of acetylation, WHC, OHC and HLB value were fitted the predicted values, but EAI and ESI were higher than predicted.

Keywords : Acetylation, acetic anhydride, blondo. emulsion, protein, functional properties

Dosen Pembimbing Utama : Dr. Ir. Chusnul Hidayat
Dosen Pembimbing Pendamping I : Dr. Rini Yanti, STP., MP.