

INTISARI

Blondo adalah limbah yang dihasilkan dari proses pembuatan minyak kelapa maupun *virgin coconut oil* (VCO). Konsentrat protein blondo VCO yang dibuat dengan metode fisik memiliki kadar protein $95,12 \pm 2,9\%$ db. Protein bersifat amfifilik yang menunjukkan potensi blondo untuk dimodifikasi menjadi emulsifier. Fosforilasi memungkinkan modifikasi sifat fungsional konsentrat protein menyisipkan gugus fosfat baik secara kimiawi maupun enzimatis pada molekul protein. Dalam penelitian ini gugus fosfat diperoleh dari Sodium Trimetafosfat (STMP). Tujuan dari penelitian ini adalah untuk mengetahui kondisi optimum dalam modifikasi konsentrat protein blondo dengan metode fosforilasi serta mengetahui karakteristik emulsi yang dihasilkan dari konsentrat protein blondo terfosforilasi.

Penelitian diawali dengan *screening design* menggunakan rancangan acak lengkap (RAL) non-faktorial dan dilanjutkan optimasi menggunakan desain Box-Behnken dengan 3 faktor, yakni: waktu reaksi fosforilasi (120, 150 dan 180 menit); konsentrasi STMP (9, 12 dan 15% terhadap konsentrat protein blondo); dan suhu reaksi fosforilasi (25, 35 dan 45 °C) dan analisis *respon surface methodology* (RSM) dengan respon utama indeks stabilitas emulsi (ISE), dan respon pendukung yakni indeks aktivitas emulsi (IAE), derajat fosforilasi, dan nilai *hydrophylic-lipophylic balance* (HLB).

Hasil penelitian menunjukkan bahwa konsentrat protein blondo sebelum dimodifikasi memiliki sifat: HLB 12,7%; IAE $13,70 \text{ m}^2/\text{g}$, ISE 34,3 menit; OHC 1,07 g minyak/g konsentrat protein, WHC 3,4 g air/g konsentrat protein. Hasil optimasi didapat kondisi optimum reaksi yakni waktu reaksi 148,1 menit, konsentrasi STMP 11,63% dan suhu reaksi 35 °C dengan *desirability* 0,854. Konsentrat protein blondo terfosforilasi optimum memiliki nilai ISE 215,4 menit, IAE $31,65 \text{ m}^2/\text{g}$, derajat fosforilasi 76,82%; HLB 15,35; WHC 3,55 g air/g konsentrat protein, OHC 1,38 g minyak/g konsentrat protein, ukuran droplet 0,47 μm dengan persebaran droplet 0,69; dan nilai zeta potensial 13,6 pada pH 9 dan 28,1 pada pH 8.

ABSTRACT

Blondo is a by-product from coconut oil and virgin coconut oil (VCO) production process. Blondo protein concentrate made from physic methode of VCO production has protein as much as $95,12 \pm 2,9\%$ db. Blondo protein is amphiphilic. This shows blondo potencies as emulsifier with modification. Phosphorylation is one of protein modification methode that allows emulsifying properties changes. In this study, sodium trimetaphosphate (STMP) was used during the phosphorylation because of its food grade characteristic. The aim of this study was to maintain optimum condition of blondo protein consenstrate with phosphorylation methode and to aknowledge its emulsifying properties after modification.

This study begin with screening design used non-factorial complete randomized design continued with optimation using Box-Behnken design with 3 factors: reaction time (120, 150 and 180 minutes); STMP concentration used (9, 12 and 15% from blondo protein concentrate used); and reaction temperature (25, 35, and 45 °C). Analysis using respon surface methodolgy (RSM) with emulsion stability index (ESI) as main respon and emulsion activity index (EAI), phosphorylation degree and hydrophylic-lypophylic balance (HLB) value as complementary respon.

Study shows that blondo protein concentrate before modification has characteristic as: HLB 12.7%; EAI $13.70 \text{ m}^2/\text{g}$ and ESI 34.3 minutes; OHC 1.07 g oil/g protein concentrate and WHC 3.4 g water/ g protein concentrate. After modification, phosphorylated blondo protein concentrate has properties as: ESI 215.4 minutes, EAI $31.65 \text{ m}^2/\text{g}$, phoshorylation degree 76.82%, HLB 15.35; WHC 3.55 g water/g protein concentrate, OHC 1.38 g oil/g protein concentrate, droplet size $0.47 \mu\text{m}$ with PdI 0.69, and zeta potential 13.6 in pH 9 and 28.1 in pH 8. Phosphorylation optimum condition reached as: reaction time 148.1 minutes, STMP concentration used 11.63% and reaction temperature 35 °C with desirability 0.854.