

PENGARUH PERLAKUAN *PREHEATING* DAN ULTRASONIKASI TERHADAP STABILITAS EMULSI PADA SUSU REKONSTITUSI YANG DIFORTIFIKASI DENGAN MINYAK SAWIT MERAH

INTISARI

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Susu merupakan produk dengan kandungan protein yang tinggi. Protein dalam susu terdiri dari kasein dan *whey protein*. Kedua protein tersebut sering dimanfaatkan sebagai emulsifier alami dalam pengolahan produk pangan. Pada pembuatan susu rekonstitusi dengan fortifikasi menggunakan minyak sawit merah, protein susu yang terkandung dalam bahan utama akan dimaksimalkan sifat emulsifikasinya untuk meningkatkan stabilitas emulsi dari produk yang dihasilkan. Perlakuan *preheating* pada variasi suhu 65, 70, 80, dan 90°C, selama 1 dan 5 menit diberikan untuk meningkatkan sifat emulsifikasi dari protein susu. Kemudian dilakukan pula ultrasonikasi untuk memaksimalkan stabilitas emulsi dari susu rekonstitusi. Hasil dari perlakuan *preheating* tersebut menunjukkan bahwa ada peningkatan presentase protein teradsorpsi dan nilai Indeks Aktivitas Emulsi (IAE) pada susu rekonstitusi jika dibandingkan dengan produk tanpa perlakuan *preheating*. Selain itu, perlakuan *preheating* juga dapat meningkatkan viskositas produk, dimana nantinya akan berakibat pada laju indeks *creaming* yang semakin lambat. Selanjutnya, perlakuan ultrasonikasi menunjukkan hasil persebaran droplet yang merata jika dibandingkan tanpa ultrasonikasi sehingga terjadinya flokulasi dan koalesensi dapat diminimalisir. Secara keseluruhan, hasil menunjukkan bahwa perlakuan *preheating* dengan suhu 90°C selama 1 menit, diikuti ultrasonikasi memberikan susu rekonstitusi dengan stabilitas paling baik. Pada kondisi tersebut presentase protein teradsorpsi yang dihasilkan sebesar 66,10±1,66%, nilai IAE sebesar 44,99±0,71 m²/g, viskositas sebesar 4,16±0,28 cP, kenampakan droplet yang seragam dan merata, serta penurunan presentase indeks *creaming* yang lambat selama kurun waktu 14 hari.

Kata Kunci: protein susu, *preheating*, ultrasonikasi, stabilitas emulsi, susu rekonstitusi

THE EFFECT OF PREHEATING AND ULTRASONIC TREATMENT ON EMULSION STABILITY IN MAKING OF RECONSTITUTION MILK FORTIFIED WITH RED PALM OIL

ABSTRACT

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Milk is a product with high protein content. The protein in milk consists of casein and whey protein. Both of these proteins are often used as natural emulsifiers in food products. In making reconstituted milk fortified with red palm oil, the milk protein content will be maximized by its emulsification properties to improve the emulsion stability of the products. Preheating treatments in temperature variations of 65, 70, 80 and 90°C, for 1 and 5 minutes were given to improve the emulsification properties of milk protein. Then the ultrasonic process also performed to maximize the stability of the emulsion from the reconstituted milk. The results of the preheating treatment showed that there was an increase in the percentage of adsorbed protein and the Emulsion Activity Index (IAE) value when compared to products without preheating treatment. Besides, the preheating treatment can also increase product viscosity, which can result in slower creaming index rates. Furthermore, the ultrasonic process shows droplets that are evenly distributed when compared without the ultrasonic process. Because of that, the occurrence of flocculation and coalescence can be minimized. Overall, the results showed that the treatment of preheating with a temperature of 90°C for 1 minute, followed by an ultrasonic process gave reconstituted milk with good stability. Under these conditions the percentage of adsorbed protein was $66.10 \pm 1.66\%$, the IAE value was $44.99 \pm 0.71 \text{ m}^2 / \text{g}$, the viscosity was $4.16 \pm 0.28 \text{ cP}$, with visually homogeneous droplet and the percentage of creaming index was slow for 14 days.

Keywords: milk protein, preheating, ultrasonic process, emulsion stability, reconstituted milk