

Narin Charoenphun 2009: Formulation and Shelf-life Studies of Spreads from Coconut Protein. Master of Science (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Sukoncheun Sringam, Ph.D. 108 pages.

The objective of this research was to develop spread products from virgin coconut oil (VCO) by-products; protein and fiber meal. The rheological properties of eleven formulas of semi solid emulsion (SSE) composed of water, coconut oil and coconut protein were studied by using Mixture Design experiment. The content ranges of water, oil and protein were 40-50%, 15-25% and 25-45%, respectively. It was found that surface oil increased with increasing oil content, while hardness decreased and water separation increased with increasing water content. Fully hydrogenated palm oil (FHPO) was added to the SSE with the most surface oil at 0-20% to observe the effect of hard fat in preventing oil separation. FHPO at 20% could eliminate surface oil, but the product was too hard, that FHPO was thus not recommended. Emulsifying salts; disodium phosphate, trisodium citrate and sodium tripoly phosphate were then tried at 0-0.6%. The results showed that disodium phosphate at 0.2% was the most efficient in surface oil decreasing. To solve water separation, 0-1.2% guar gum and xanthan gum were added to SSE with the most water separation. The results showed that xanthan gum at 0.8% was the most efficient. Disodium phosphate at 0.1-0.2% with xanthan gum at 0.4-0.8% were tried again in the potential formula of SSE. It was found that the SSE with 0.1% disodium phosphate and 0.6% xanthan gum had a smooth, spreadable texture without oil and water separation, suitable for using as a base ingredient in spread product. Three kinds of cocoa flavored spread products were developed. The salted spread product contained 1% salt, sweetened spread product contained 0.5% salt and 15% sugar, while the high fiber spread product was the sweetened one with 5% fiber meal. The high fiber spread product had coarse texture and hard spreadable than the other two. Sensory evaluation by 24 untrained panel with 9 point hedonic test showed that salted and sweetened spread products received non significantly different ( $p \leq 0.05$ ) scores in spreadability likeness (7.3 and 7.3) and overall likeness (7.3 and 7.0) and higher than the high fiber one (6.0 and 6.4). The spread products were kept at 4 °C for 16 weeks. The chemical-physical, microbiological and sensory qualities were followed. The results showed that the salted spread product had the highest TBA value change, sweetened spread product had the highest color change and high fiber spread product had the highest microbial contents change and received lowest score in overall likeness. Predicted shelf-life by using the overall likeness score of salted, sweetened, and high fiber spread product was 77, 49 and 42 days, respectively.

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Thesis Advisor's signature