

SCI LECTURE PAPERS SERIES

USE OF PALM STEARIN AS A COMPONENT OF INTERESTERIFIED BLENDS

JM deMan

University of Guelph, Guelph, ON, Canada

Email: jdeman@uoguelph.ca

© 2000 Society of Chemical Industry. All rights reserved

ISSN 1353-114X

LPS 119/2000

Key words *palm stearin, physical properties, palm kernel oil, polymorphism, hardstock, interesterification*

There are several advantages for using palm stearin as a component for making interesterified fats. It is a low price source of natural vegetable hard fat, and it provides the chain length diversity of fatty acids necessary to produce β' stable hard fat for margarines and shortenings. The composition of palm stearin is not constant but depends on the level of pressure applied during separation of the crystals from the olein. Because the solids in palm stearin consist mainly of tripalmitin, it is a strong β crystal promoter. Triacylglycerols with 48 and 54 carbon atoms are β formers, those with 50 and 52 carbon are β' formers. Palm oil is generally a β' crystal form, but when diluted with liquid oils the β forming tendency increases. The presence of high levels of liquid oils in soft margarines promotes the formation of β crystals. This explains why palm stearin by itself is not a good hard stock for margarines. However, interesterification with other oils and fats may result in desirable hard fats. This is especially important for the production of soft margarines. A very large proportion of North American soft margarines we have analyzed are in a mixture of β' and β crystal form.

In Malaysia, non-hydrogenated soft margarines had high levels of saturates and were mostly in the β form. Stick margarines (non-hydrogenated) had blends of palm oil and palm kernel oil making for a good β' stability, but not the right textural properties.

In the United States there is still a great reluctance to use palm oil or so-called tropical oils. They use almost exclusively soybean oil and hydrogenated soybean oil. Canadian margarines are partly of this same type, but many of the soft and stick margarines are made with palm stearin and palm kernel oil and are described as modified.

Intesterification of palm stearin with liquid vegetable oils may yield a good hard stock. Palm stearin and palm kernel olein are both by-products of fractionation and are good components for interesterified fats. With the range of palm stearin composition available there is a possibility of many combinations for interesterification. An interesterified blend of 60% palm kernel olein and

40% of palm stearin has suitable physical properties for margarine. Interesterification of 30% of fully hydrogenated palm oil and 70% of palm kernel oil yields a steep SFC curve.

Interesterification of fat containing shorter chain acids with one containing long chain fatty acids gives a steeper SFC curve than using oils of only long chain fatty acids.

Examples will be given of an experimental soft margarine formulation made with a hardstock of an interesterified blend of 60% palm stearin and 40% palm kernel olein and a number of commercial formulations that contain hardstocks of palm oil or palm olein and palm kernel oil. Palm stearin can be used for interesterification with liquid oils to produce suitable hardstocks for stick and soft margarines as described by Petrauskaite *et al* (1998).

References

Chemical composition and physical properties of soft (tub) margarines sold in Malaysia
Nor Aini Idris, Leny deMan T.S. Tang and C.L. Chong. J. Am. Oil Chem Soc. 73:995-1001 (1996).

Chemical and physical properties of plastic fat products sold in Malaysia. Nor Aini Idris, L. deMan T.S. Tang and C.L. Chong. J. Food Lipids 4: 145-164 (1997).

Formulations of no-trans and low-trans margarines and shortenings. John deMan and Leny deMan. Oils-Fats-Lipids. 1995 Proceedings of the 21st World Congress of the International Society for Fat Research (ISF) The Hague. Vol 3, pp 561-563. Publ. PJ Barnes & Associates. Bridgwater, TA7OYZ, UK

Physical and chemical properties of *trans*-free fats produced by chemical interesterification of vegetable oil blends. V. Petrauskaite, W. de Greyt, M Kellens, A Huyghebaert, J. Am Oil Chem Soc 75: 489-493 (1998).

Identity characteristics of Malaysian palm oil products: fatty acid and triglyceride composition and solid fat content. Siew W.L., Tang T.S., Flingoh C.H., Chong C.L. Tan, Y. A. Elaeis 5: No 1 38-46 (1993).

Identity characteristics of Malaysian palm oil products. Siew, W. L., Chong C.L., Tan, Y.A., Tang T.S., Oh, C.H. Elaeis 4: No 2, (1992).