

# TRANS-FREE AND LOW SATURATED PALM-BASED PACKET MARGARINE FORMULATION

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A *trans*-free and low saturated palm-based packet margarine was formulated. The product was consistent, yet soft and spreadable on bread at refrigerator temperature (5°C-10°C). However, as with other soft margarines, it becomes soft and oily after being left at > 30°C for more than 1 hr.

Margarines containing < 33% total saturated fatty acids (SAFA) and zero *trans*-fatty acids (TFA) content are becoming the vogue with health conscious consumers. Although < 33% SAFA is not mandatory in many countries, the increasing consumer demand is forcing manufacturers to produce such products. The problem is that, reducing SAFA to < 33% will change the physical properties of the product. In margarine, SAFA contributes to the structure or body of the product by providing the solids content. Thus, reducing SAFA will weaken the structure. Soft margarines packed in tubs are not so affected by the reduction in total solids, but packet margarine will be greatly affected. Thus, the structure in the latter product should be provided instead by the crystal network developed during production of the margarine. The optimum processing conditions should therefore be used so that the product can be properly wrapped, yet, at the same time, maintain its softness for good spreadability.

The innovation by MPOB was to formulate a *trans*-free soft packet margarine with low SAFA using our novel processing method 845.

## PRODUCT NOVELTY

The margarine is like butter – in colour and shape - but spreadable straight from the refrigerator temperature (5°C-10°C). It is free from *trans*-fatty acids with < 33% SAFA (Table 1).

## PRODUCT CHARACTERISTICS

It has the normal crystallization behaviour of margarines during storage (Faur, 1996; Miskandar *et al.*, 2002a, b), and is unstable in the first week of storage at all temperatures from 10°C-25°C. However, the product stabilizes towards the fourth week. At 10°C and 15°C, the product hardness was at an average yield of 430 g cm<sup>-2</sup> (Figure 2). According to Teah *et al.* (1983), the yield of a good margarine with good spreadability should be 200-1000 g cm<sup>-2</sup>. Figure 2 shows stable development of the product with not much hardening after the second week of storage, supported by stable crystal development (Figure 3). The crystals were homogeneously distributed, indicating that our novel processing method had promoted effective nucleation so that the crystals remained at < 4 µm even after 25 days storage.

TABLE 1. FATTY ACID COMPOSITION OF COMMERCIAL AND MPOB MARGARINES

Fatty Acid Composition																				
	8:0	10:0	12:0	14:0	16:0	16:1	18:0	18:1t	18:1c	18:1i	18:2ct	18:2cc	18:3	20:0	oth	20:1	22:0	sat	trans	SAT+TR
Com. 74	0.7	0.7	9.1	4	28	0.2	9.1	0.3	20.9	0.6	0.2	23.2	2.1	0.4	0.1	0.1	0.3	52.3	0.5	52.8
Spl. A	0.8	0.6	8.4	2.9	11.9	0.2	6.6	-	21.8	0	0	46.1	0.2	0.3	0.2	0	0	31.5	0	31.5
Spl. B	0.6	0.5	6.2	2.2	10.5	0.1	5.9	-	24.6	0	0	48.8	0.2	0.3	0.1	0	0	26.2	0	26.2





Figure 1. Stick margarine produced by MPOB.

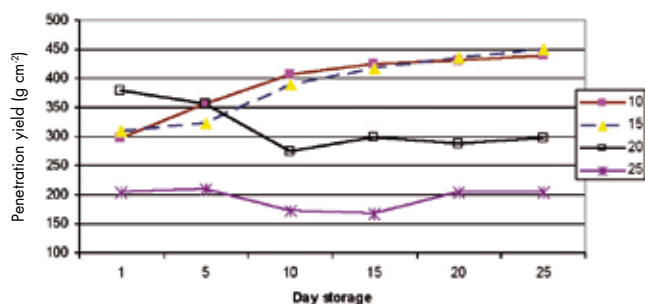


Figure 2. Penetration yield (g cm<sup>-2</sup>) at 10°C, 15°C, 20°C and 25°C over 25 days storage.

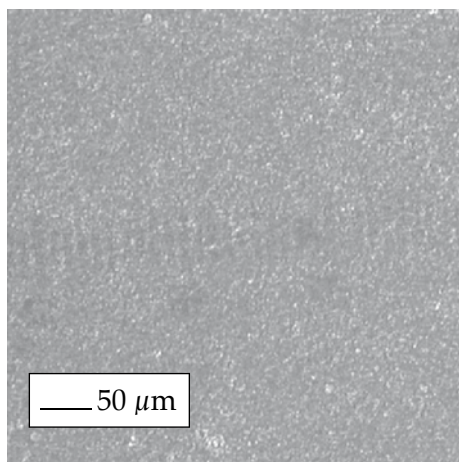


Figure 3. Photomicrograph of MPOB packet margarine at 15°C after 25 days storage.

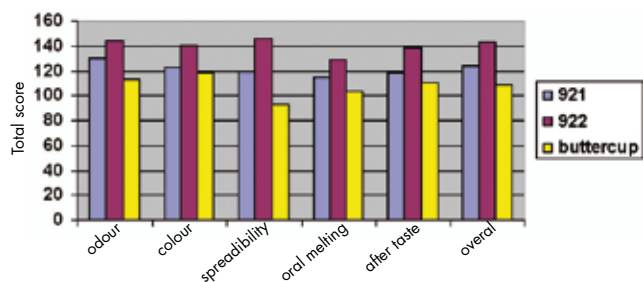


Figure 4. Sensory evaluation of MPOB and commercial packet margarines.

The product is spreadable from the refrigerator (5°C-10°C), and has a smooth texture with no oiling-off, making it highly acceptable by 20 sensory panellists (Figure 4). This showed the margarine to be comparable to a well-known commercial product marketed locally.

## INVESTMENT OPPORTUNITIES

Minimal capital investment is needed by an existing margarine producer. The product can be added to the product array with minimal investment (on short resting tube at the packaging line). The cost of production is RM 3202 per 1000 kg with an IRR of 22%.

## REFERENCES

FAUR, L (1996). Margarine technology. *Oils and Fats Manual* (Karleskind, A ed.). Vol. 2. Lavoisier Publishing, Paris. p. 951-962.

MISKANDAR, M S; Y B CHE MAN, M S A YUSOFF and R ABDUL RAHMAN (2002a). Effect of emulsion temperature on physical, properties of palm oil margarine. *J. Amer. Oil Chem. Soc.*, Vol. 79: 1163-1168.

MISKANDAR, M S; Y B CHE MAN; M S A YUSOFF and R ABDUL RAHMAN (2002b). Effect of scraped-surface tube cooler temperature on physical properties of palm oil margarine. *J. Amer. Oil Chem. Soc.*, Vol. 79: 931-936.

TEAH, Y K; M S A KHEIRI; K AHMAD and K G BERGER (1983). A survey of table margarine products. *Proc. of the 16<sup>th</sup> ISF Congress*. Budapest. p. 457-473.

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