PALM BLENDS FOR TEMPERATE CLIMATES

by: NOR AINI IDRIS; NOOR LIDA HABI MAT DIAN; AZMAN ISMAIL and HANIRAH HASSAN

383

MPOB INFORMATION SERIES • ISSN 1511-7871 • JUNE 2007

MPOB TT No. 369

Polyunsaturated oils present problems with regards to flavour and oxidative stability. Partial hydrogenation reduces the problems by removing some of the double bonds which are the sites of oxygen attack. However, hydrogenation is not desirable as it gives rise to formation of *trans*-fatty acids which are detrimental to health. Blending the unsaturated oils with palm olein is an alternative to partial hydrogenation.

Compared to other oils, palm oil and palm olein are excellent choices for food applications because they have good oxidative stability. However, their use in temperate countries as liquid oils is limited because they tend to crystallize and become cloudy at low temperature. Even palm superolein clouds during cold weather. There is nothing wrong with the oil, but consumers perceive a cloudy oil as a deteriorated product which they would not buy.

Palm diglycerides, particularly dipalmitin, have been reported to increase the crystallization rate in palm olein (Siew and Ng, 1996). Swe *et al*. (1994) reported that the crystals formed in palm olein during storage are high in diglycerides. To overcome the clouding problem, palm olein can be blended with other oils. Blending is one of the ways to modify oils and fats for a particular application. Palm olein is suitable to be blended with soft oils for use as salad oil. Blending has the effect of increasing the unsaturation (iodine value) of palm olein and, at the same time, improve the oxidative stability of the other oils.

PALM BLENDS

Ternary and binary blends of palm olein were prepared with other commercially available oils. The clarity and physico-chemical characteristics of the blends were determined. *Tables 1* and *2* show clarity of some of the blends at 10 °C, 15 °C and 20°C. There was a significant improvement in the clarity of palm olein after blending with soft oils. The ternary blends (*Table 1*) had better clarity than binary blends (*Table 2*). Blend A1 remained clear for <240 days at 10°C and >360 days at above 15°C. Blend B1 had better clarity than blends A1 and C1 at 10°C and remained clear for > 300 days at this temperature compared to the control (unblended palm olein) which remained clear for <4 hr at 10°C and <two days at 15°C (*Table 1*). At 20 °C, blends A1, B1 and C1 were clear after one year (*Figure 1*). On the other hand, the control remained clear for only 8-10 days.

Among the three binary blends (*Table 2*), A2 was the best, remaining clear for one month at 10°C compared to < 4 hr by the control. At 15°C, it stayed clear for nine months and at 20 °C, after one year.

Ternary blend B1 showed the lowest cloud point (-10.7°C) followed by ternary blend A1 (-8.0 °C), then binary blend A2 (-7.5 °C) (*Figure 2*). The cloud point of C2 (4.0 °C) was not much different from that of the control (5.0 °C).

Table 3 shows the benefit cost analyses of ternary (A1 and B1) and binary (A2) blends of palm olein.

In this analysis, the selling price and annual output of the three products (A1, B1 and A2) are RM 2500 t^{-1} and RM 20 000 t^{-1} respectively. Based on the viability parameters, all three are found viable. Due to different costs of production, the viability parameters show different outcomes. A2 is the most viable with the highest net present value (NPV) and benefit cost ratio (BCR) of RM 23 059 003 and 1.08 respectively.

BENEFITS

- Palm blends that remain clear in temperate countries, thus widening the market for palm products;
- Better fatty acid composition ratios; and
- Wider food applications in the the liquid oil sector.

ISSN 1511-7871

9 771511 787001

Malaysian Palm Oil Board, Ministry of Plantation Industries and Commodities, Malaysia
P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. *Tel:* 03-87694400 *Website:* http://mpob.gov.my *Telefax:* 03-89259446

MPOB

TABLES 1. RESISTANCE TO CRYSTALLIZATION OF PALM-BASED TERNARY BLENDS DURING STORAGE AT 10 °C, 15 °C AND 20°C

Ternary blends	10°C	15°C	20°C
A1	<240 days	>360 days	>360 days
B1	>300 days	>360 days	>360 days
C1	<20 days	>240 days	>360 days
Control	<4 hr	<2 days	> 8 days, <10 days

TABLES 2. RESISTANCE TO CRYSTALLIZATION OF PALM-BASED BINARY BLENDS DURING STORAGE AT 10 °C, 15 °C AND 20°C

Binary blends	10°C	15°C	20°C
A2	30 days	<270 days	>360 days
B2	1 day	<20 days	>210 days
C2	<5 hr	<2 days	90 days
Control	<4 hr	<2 days	>8 days, <10 days

Figure 1. Appearance of samples A1, B1, C1 and control sample at 20 °C after one year.

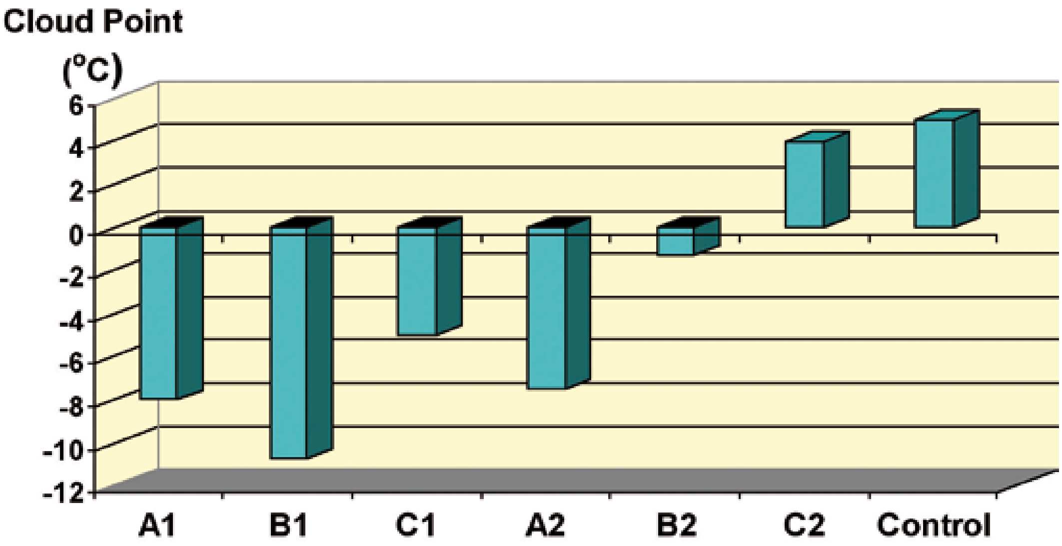

Figure 2. Cloud point of the ternary and binary blends.

TABLE 3. VIABILITY PARAMETER

Ternary/binary blends	Cost of production (RM t^{-1})	Discount rate at 10%	
		NPV (RM)	B:C
A1	2 263	6 499 395	1.02
B1	2 212	13 144 744	1.04
A2	2 135	23 059 003	1.08

REFERENCES

SIEW, W L and NG, W L (1996). Effect of diglycerides on the crystallization of palm oleins. *J. Sci. Food Agric., 71*: 496-500.

SWE, P Z; CHE MAN, Y B; GHAZALI, H M and WEI, L S (1994). Identification of major triglycerides causing the clouding of palm olein. *J. Amer. Oil Chem. Soc., Vol. 71*: 1141-1144.

For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur. Malaysia.
Tel: 03-87694400
Website: http://mpob.gov.my
Telefax: 03-89259446