BLENDING OF PALM OLEIN TO IMPROVE ITS CLOUD POINT

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The choice of an oil or fat for a given application depends on its specific physico-chemical properties. The physico-chemical properties vary from one fat to another. Presently, with the aid of modern techniques, it is possible to modify the physico-chemical properties of an oil or fat to suit a particular application. Amongst the modification processes used are : blending, fractionation, hydrogenation; and interesterification.

The easiest way of preparing tailor-made fat is by blending. Blending of oils and/or fat essentially affects their physical properties rather than their chemical characteristics. However, it results in a change in the triglyceride composition. It is used in preparing fats with specific solid fat contents at a given temperature. Blending is widely applied in shortenings, margarines, industrial specialty fats and cooking oils. It could also be applied to salad oils.

Palm olein, the liquid fraction of palm oil, is widely used in cooking and frying. However, in temperate countries, it tends to crystallize during winter when temperature is low. Although the quality is not affected, from the user's or consumer's point of view, clear oil looks better than cloudy ones. It has been observed that blending palm olein with vegetables oils having higher degree of unsaturation, resulted in blends that are more stable (does not crystallize easily) at low temperatures. The blends stay clear for a longer period of time. It has been found that blending palm olein with certain oils resulted in a eutectic interaction *(see Figure 1)*. A previous study indicated that the cloud point of palm olein-groundnut oil blend was lowest when about 15% palm olein was present in the mixture.

In a cold stability study of single fractionated palm olein (iodine value of about 56 to 58), with other vegetable oils, it was found that only a small amount of palm olein (10 - 20%) could be incorporated for it to pass the cold test. Another similar study indicated that such a blend remained clear at 15°C for about three months. At a temperature of 20° C, a higher percentage of single fractionated palm olein (up to 50%) could be added.

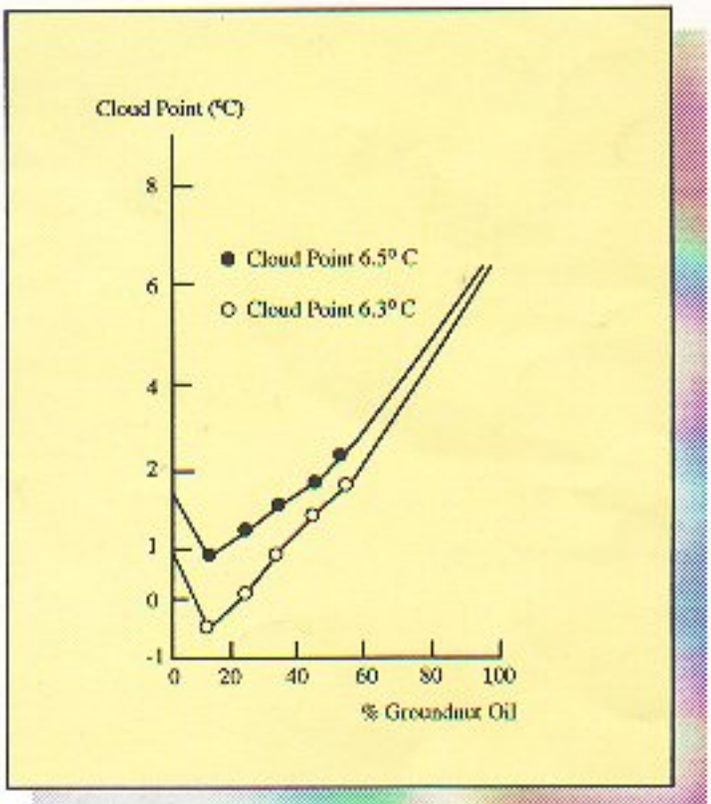

Figure 1 :
Eutectic behaviour of mixtures of groundnut oil with palm olein (two different samples with cloud points of 6.5°C and 6.3°C respectively) (Teah and Ahmad, 1991).

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A recent study on the stability of double fractionated palm olein (DfPOo) with other vegetable oils has indicated that up to 70% palm olein of 65 iodine value (IV) could be incorporated to give a completely clear product up to 90 days at 20°C. In blends of DfPOo (IV 65) with soya bean oil (SBO), those blends containing higher amount of DfPOo (70 - 100%) showed a few tiny crystals at the bottom; otherwise, the samples were practically clear *(Figure 2)*. At day 120, more or less similar observation was noted as at day 90 *(Figure 3)*, except that blend DfPOo (IV65):SBO 60:40 showed a few tiny crystals at the bottom. Blends of DfPOo (IV 60):SBO were practically clear at 20° C, at day 90 with the exception that a few tiny crystals were observed at the top and bottom of 80:20 and 90:10 blends. Hundred percent DfPOo (IV 60) showed crystals formation at the top, bottom and a small area at the middle of the plastic container. Blends containing up to 50% DfPOo (IV 60) were completely clear at day 120 *(Figure 4)*. A few crystals were present in blends of DfPOo (IV 60): SBO 60:40. However, more crystals were observed in blends of DfPOo (IV 60):SBO 70:30, 80:20 and 90:10.

On the other hand, at lower temperature of 10° C DfPOo (IV 65):SBO 70:30 blend formed sediments at the bottom of the container by day 75. Only up to 30% DfPO (IV 65) could be added in order to have a clear oil blend for a minimum period of 100 days. Meanwhile, work on stability of DfPOo with other vegetable oils such as corn, canola, cottonseed, safflower and sunflower oils is in progress. Results so far indicated that, at 20° C, blends of DfPOo with canola oil perform better than DfPOo:SBO blends.

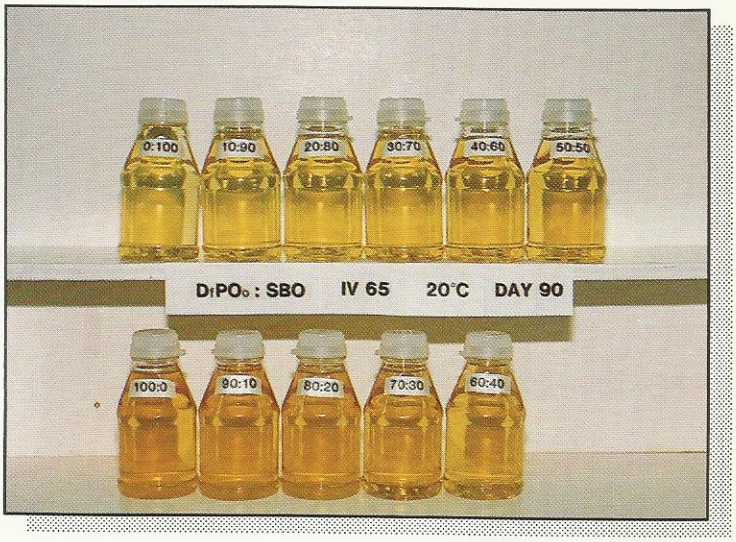

Figure 2.
Appearance of blends of double fractionated palm olein (DfPOo) IV 65 with soya bean oil (SBO) stored at 20°C at day 90

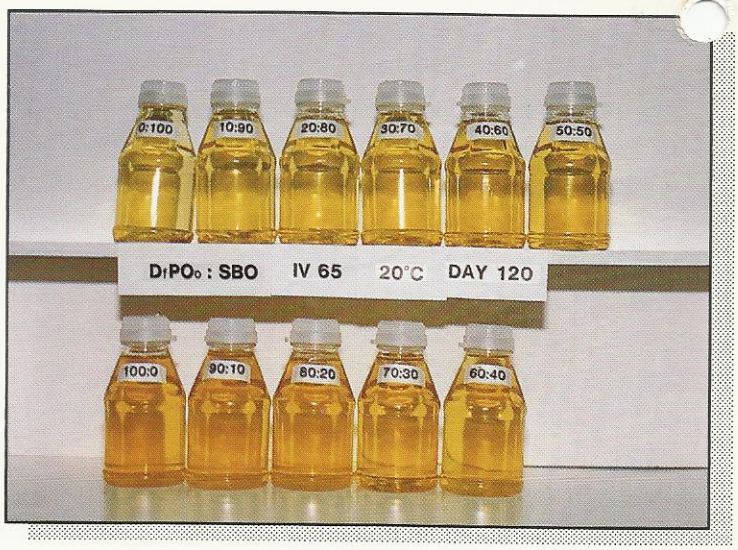

Figure 3.
Appearance of blends of double fractionated palm olein (IV 65) with soya bean oil stored at 20°C at day 120

CONCLUSIONS

Blending of palm olein with other vegetable oils improves its cold stability. It is possible to add up to 70% DfPOo (IV 65) to SBO to get a clear oil blend for a minimum of 120 days at 20° C. However, at lower temperature of 10° C, only up to 30% DfPOo (IV 65) could be added to SBO.

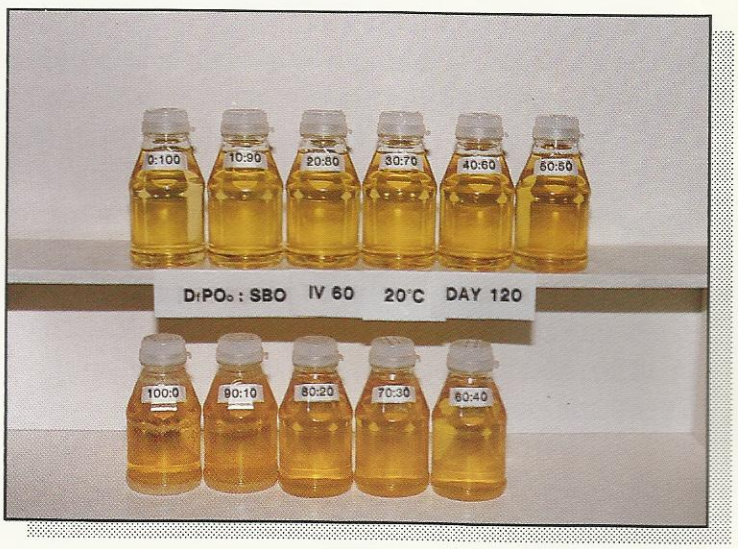

Figure 4.
Appearance of blends of double fractionated palm olein (IV 60) with soya bean oil stored at 20°C at day 120

REFERENCE

Teah Y.K. and Ahmad Ibrahim, 1991. Palm olein improves cooking oil blends. Palm Oil Developments No. 15. Palm Oil Research Institute of Malaysia.