MPOB MODIFIED FRACTIONATION PROGRAMME FOR INCREASED OLEIN YIELD

CHONG CHIEW LET and YEOH CHEE BENG

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It is a well-known fact that palm oil, being a semi-solid oil at ambient, can be fractionated to produce palm olein and palm stearin. Palm olein is used as cooking oil, while palm stearin finds uses in many edible applications which require a solid fat.

BACKGROUND

Over the last 10 years, substantial fundamental research has been carried out in MPOB on crystallisation of palm oil products (Chong *et al*., 2007; Chen *et al*., 2004; Zaliha *et al*., 2005; Norizzah *et al*., 2012), which can be applied to the fractionation of palm oil. From an understanding of the crystallisation process, it was realised that the fractionation process could be better controlled by the incorporation of additional steps midway during fractionation. This will produce a smaller mean diameter crystals compared to the conventional cooling profile used, but the crystal size is more homogeneous. This is equivalent to a forced Ostwald ripening of the slurry crystals. The consequence would be easier filtration with less olein entrainment. Experiments in the laboratory showed that an increase in olein yield of 3% is feasible. The same programme when applied to the laboratory fractionations of crude palm oil showed that the olein yields obtained were similar to the yields of refined, bleached and deodorised (RBD) oleins obtained commercially, *i.e.* a very significant increase compared to yields obtained from commercial fractionation of crude palm oil.

In March 2013, two process patents were filed, one for crude palm oil and the other for RBD palm oil fractionation where the additional steps were incorporated. These are termed MPOB modified fractionation programmes for crude palm oil and RBD palm oil fractionation respectively.

PLANT TRIAL

A plant trial was carried out to evaluate the effectiveness of the modified fractionation programme for RBD oil fractionation as compared to the normal programme used by the refinery to produce olein with iodine value of 59.5 Wijs and a cloud point of 6°C.

CONCLUSION

1. Results showed that the modified fractionation profile patented by MPOB is effective in increasing olein yield as compared to the normal cooling profile used by the refinery.

TABLE 1. PLANT TRIAL RESULT

Tank No.	Refinery cooling recipe		MPOB patented modified cooling recipe	
	Olein yield (%)	Stearin yield (%)	Olein yield (%)	Stearin yield (%)
001	69.7	30.3	73.0	27.0
004	68.0	32.0	72.2	27.8
015	59.0	41.0	-	-
014	-	-	65.9	34.1

Note: Physico-chemical properties of oleins obtained are the same in all cases as measured by the refinery laboratory. All data are measured by the refinery.

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Malaysian Palm Oil Board, Ministry of Plantation Industries and Commodities, Malaysia
P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. Tel: 03-8769 4400 Fax: 03-8925 9446 Website: www.mpob.gov.my

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Figure 1. Slurry using refinery recipe. Note the less uniform crystal size with a larger mean crystal size.

Figure 2. Slurry using MPOB modified recipe. Note the more uniform crystal size with a smaller mean size.

2. Crystal size in the slurry is more homogeneous.

3. The increase in olein yield was observed to be between 4%-5% without compromising the physico-chemical properties of the olein.

4. The olein entrainment in the stearin is reduced.

5. The quantum of olein yield increase could be further increased with optimisation of the process.

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For more information, kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
Tel: 03-8769 4400
Fax: 03-8925 9446
www.mpob.gov.my