

## INTRODUCTION

**P**alm-pressed fibre oil (PPFO) is unique as it contains high amount of  $\beta$ -carotene (pro-vitamin A), vitamin E (tocotrienols & tocopherols), squalene and sterols as compared to crude palm oil (CPO). Currently, the crude PPFO is not refined and is sold at a discount to CPO due to its low DOBI value and high free fatty acid content. The actual value of PPFO based on its nutritional attributes has yet to be uncovered. This technology focuses on solvent fractionation and refining of crude mesocarp fibre oil for the production of red palm fibre olein fraction. Phytonutrient-rich PPFO has a wide range of applications in pharmaceutical, nutraceutical, food and cosmetics industries. The refined red fibre olein is a rich source of carotenoids supplement for vitamin A deficiency. The red palm fibre olein can be further treated to obtain a carotenoids concentrate. Hence the PPFO has potential to generate additional income for palm oil millers.

## THE TECHNOLOGY

The process flow diagram of the solvent fractionation technology is shown in *Figure 1*. The process uses crude PPFO as feed and subjected to solvent fractionation to produce red palm olein and stearin fractions enriched with carotenoids and other phytonutrients (*Figure 2*).

The crude PPFO is subjected to solvent fractionation process with variable oil to solvent ratio from 1:1 to 1:10 and to achieve final crystallisation temperature of 0°C, 5°C, 10°C and 15°C with cooling period between 3 and 6 hr. The red palm olein and stearin fractions were then further refined to produce high quality oils enriched with carotenes content and vitamin E.

Pilot plant study has been conducted to produce sample for market testing.

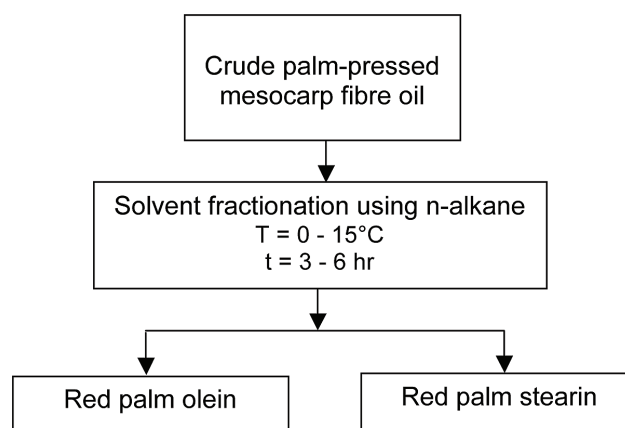


Figure 1. Flowchart of solvent fractionation process.



(a)



(b)

Figure 2. Products from solvent fractionation process (a) red palm olein and (b) red palm stearin.

## NOVELTY OF THE TECHNOLOGY

This technology provides method of producing carotenoids rich palm fibre olein and stearin by integrating refining with solvent fractionation technology. The processes simultaneously extract and fractionate PPFO.

## ECONOMIC ANALYSIS/ COMMERCIALISATION POTENTIAL

Red palm fibre olein contains 3 to 4 times more carotenoids as compared to traditional red palm

oil. It could be sold between RM 5 to RM 10 per kg depending on the concentration of carotenoids content.

### INTELLECTUAL PROPERTY (IP)

Malaysian Patent Application No. PI 2016000602 (6 April 2016). IP – 100% owned by Malaysian Palm Oil Board.

### CONCLUSION

MPOB offers solutions to upgrade and enhance the quality of solvent extracted crude PPFO. The respective red palm fibre olein and stearin fractions can be used in nutraceutical, supplementation and health/functional food applications.

### REFERENCES

CHOO, Y M; BONG, S C; MA, A N and CHUAH, C H (2004). Phospholipids from palm-pressed fibre. *Journal of the American Oil Chemist's Society*, 81: 471-475.

CHOO, Y M; YAP, S C; OOI, C K; MA, A N; GOH, S H and ONG, A S H (1996). Recovered oil from palm-pressed fibre: A good source of natural carotenoids, vitamin E and sterols. *Journal of the American Oil Chemist's Society*, 73: 599-602.

CHOO, Y M; HARRISON LAU, L N; NG, M H; MA, A N and YUSOF, B (2003). Value-added products from palm-pressed fibre. *MPOB Information Series No. 193*.

KEAT, O C; CHOO, Y M and ONG, A S H (1991). Recovery of carotenoids. Patent No. U.S. 5,019,668.

HARRISON LAU, L N; CHOO, Y M; MA, A N and CHUAH, C H (2008). Selective extraction of palm carotene and vitamin E from fresh palm-pressed mesocarp fiber (*Elaeis guineensis*) using supercritical CO<sub>2</sub>. *Journal of Food Engineering*, 84: 289-296.

HARRISON LAU, L N; CHOO, Y M; MA, A N and CHUAH, C H (2007). Extraction and identification of water-soluble compounds in palm-pressed fiber by SC-CO<sub>2</sub> and GC-MS. *American Journal of Environmental Sciences*, 3: 54-59.

MAY, C Y; HARRISON LAU, L N; PUAH, C W; NGAN, M A and BASIRON, Y (2005). Recovery of palm phytonutrients. Patent No. US 2005/0250953 A1.

NEOH, B K; THANG, Y M; ZAIN, M Z M and JUNAIDI, A (2011). Palm pressed fibre oil: A new opportunity for premium hardstock. *International Food Research Journal*, 18: 769-773.

RUSNANI, A M; ABDUL, W M and CHOO, Y M (2012). Properties of residual palm pressed fibre oil. *J. Oil Palm Res. Vol. 24*: 1310-1317.

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