

MARGARINE WITH REDUCED SATURATED FATTY ACIDS, TEXTURED WITH PALM OIL-BASED STRUCTURAL FAT

SIVARUBY KANAGARATNAM; NOOR LIDA HABI MAT DIAN; RAFIDAH ABDUL HAMID; NORAZURA AILA MOHD HASSIM; WAN ROSNANI AWANG ISA and NUR HAQIM ISMAIL

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MPOB INFORMATION SERIES • ISSN 1511-7871 • JULY 2019

MPOB TT No. 666

Margarine requires a certain amount of solid fats in the formulation to provide the required texture and structure, which facilitates the firmness and flexibility to be spreadable (Pande and Akoh, 2013). This margarine has a reduced saturated fatty acids (SAFA) content, which is a product of the successful application of palm oil-based structural fat (POSF). This margarine blend engages the exclusive use of POSF which has superior structuring ability. POSF is obtained from specific and selective fractionation process of palm oil-based fractions. This effective structuring ability of POSF has efficiently reduced the amount of SAFA in this margarine blend to below 20% as lesser solid fats are required to achieve the required texture and structure of spreadable margarine.

TECHNOLOGY

This margarine, which contains reduced SAFA is textured with POSF, which principally contributed to the firmness required by margarine to form a spreadable paste. The POSF's effective oil entrapment ability and the robust formation of oil crystal matrix contributed to the firmness and consistent texture of this margarine product. The minimum use of POSF of below 10%, eliminating the need for a higher percentage of hard stock fats, thus facilitating the reduction of saturated fats. This margarine's fat blend is neither hydrogenated nor interesterified to achieve the required consistency.

Table 1 shows the level of SAFA detected in refrigerated retail margarines in Malaysia which varied from 24.13% to 35.45%. MPOB01 margarine, is able to provide an amazing reduction of 5% to 10% of SAFA from the percentage detected in the current retail products, by achieving the reduced level of 19% SAFA.



MPOB01 margarine is applicable for spreading from the temperature of 5°C to 25°C. The POSF is able to assemble the crystal matrix which could retain the firmness and structure required by the margarine product between the temperatures of 5°C and 25°C. The solid fat content of the blend for MPOB01 margarine is 13% at 5°C, which is within the range of 10% to 19% detected in retail margarines, as shown in Figure 1. Hence this denotes that MPOB01 margarine is soft and spreadable at 5°C.

The structural stability of MPOB01 margarine at 25°C is determined by Stability Analyser LUMifuge's. The Stability Analyser LUMifuge applies centrifugal force with an inbuilt near infrared (NIR) detector to measure the amount of free oil released from the fat. Figure 2 represents the graphical transmission profile of the MPOB01 margarine, zones of concentrated fat will scatter and absorb light, hence lowering transmission. In contrast, clear liquid will raise the transmission levels (Kuentz and Rothlisberger, 2003; Libster *et al.*, 2009; Mende *et al.*, 2007; Klein *et al.*, 2010; Sivaruby *et al.*, 2013). The transmission profile of the MPOB01 margarine showed a stable solid structure, indicating the structure of this margarine is stable at 25°C, without any indication of oil release.

TABLE 1. THE PERCENTAGE OF SATURATED FATTY ACIDS, MONOUNSATURATED FATTY ACIDS AND POLYUNSATURATED FATTY ACIDS IN REFRIGERATED COMMERCIAL RETAIL MARGARINE AND MARGARINE WITH REDUCED SATURATED FATTY ACIDS MPOB01

| Margarine | Origin | SAFA | MUFA | PUFA |
|-----------|-----------|-------|-------|--------|
| CRM 01 | Australia | 25.45 | 34.15 | 39.91 |
| CRM 02 | Australia | 25.62 | 51.80 | 22.54 |
| CRM 03 | Australia | 28.32 | 46.94 | 24.56 |
| CRM 04 | Australia | 25.72 | 43.91 | 30.11 |
| CRM 05 | Local | 24.13 | 44.08 | 31.105 |
| CRM 06 | Local | 35.45 | 45.34 | 18.74 |
| CRM 07 | Local | 26.12 | 57.81 | 15.62 |
| MPOB 01 | - | 18.83 | 38.90 | 42.27 |

Note: CRM: commercial retail margarine, SAFA: saturated fatty acids, MUFA: monounsaturated fatty acids, and PUFA: polyunsaturated fatty acids.

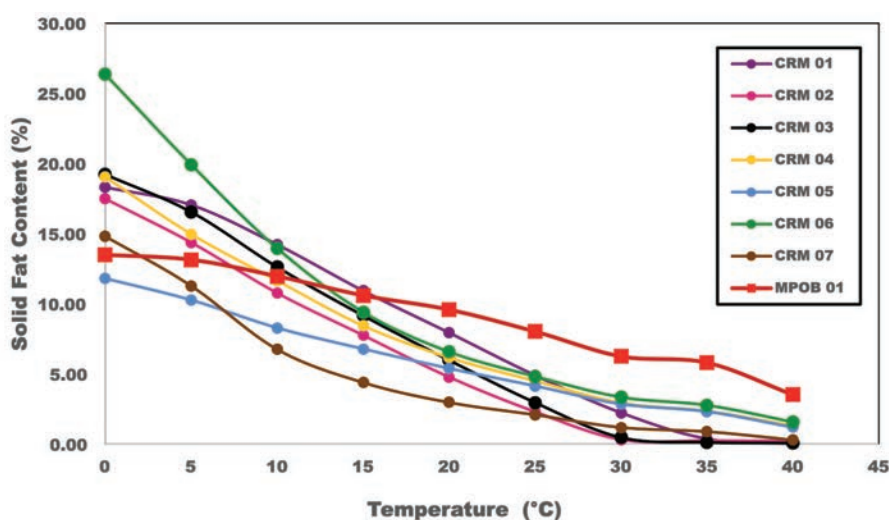


Figure 1. Solid fat content profile of commercial refrigerated margarine (CRM) and margarine with reduced saturated fatty acids MPOB01.

NOVELTY OF THE PRODUCT

Margarine textured with POSE, effectively forming firm and robust crystal matrices that successfully reduces SAFA to below 20%. This product is in line with consumer demands and retail market trend towards the reduction of SAFA.

BENEFITS

- The SAFA of margarine is lower than that of current commercial retail margarine.
- Creates and promotes a new segment of usage of palm oil-based solid fats in fat-based food products with reduced SAFA.
- Facilitates consumer demands for reduction of SAFA.

TARGET MARKET

Manufacturer of commercial and retail margarines and spreads. Consumers who prefer high poly and monounsaturated fatty acids.

ECONOMIC EVALUATION

This product should be taken up by existing margarine manufacturers as an additional value added product. The production of this margarine does not require additional equipment and facilities. A basic margarine plant with tempering room of 25°C will be the main requirement. This margarine should be positioned and marketed in the premium sector of the retail margarine segment. The oil blend cost is RM 4.50 per kg.

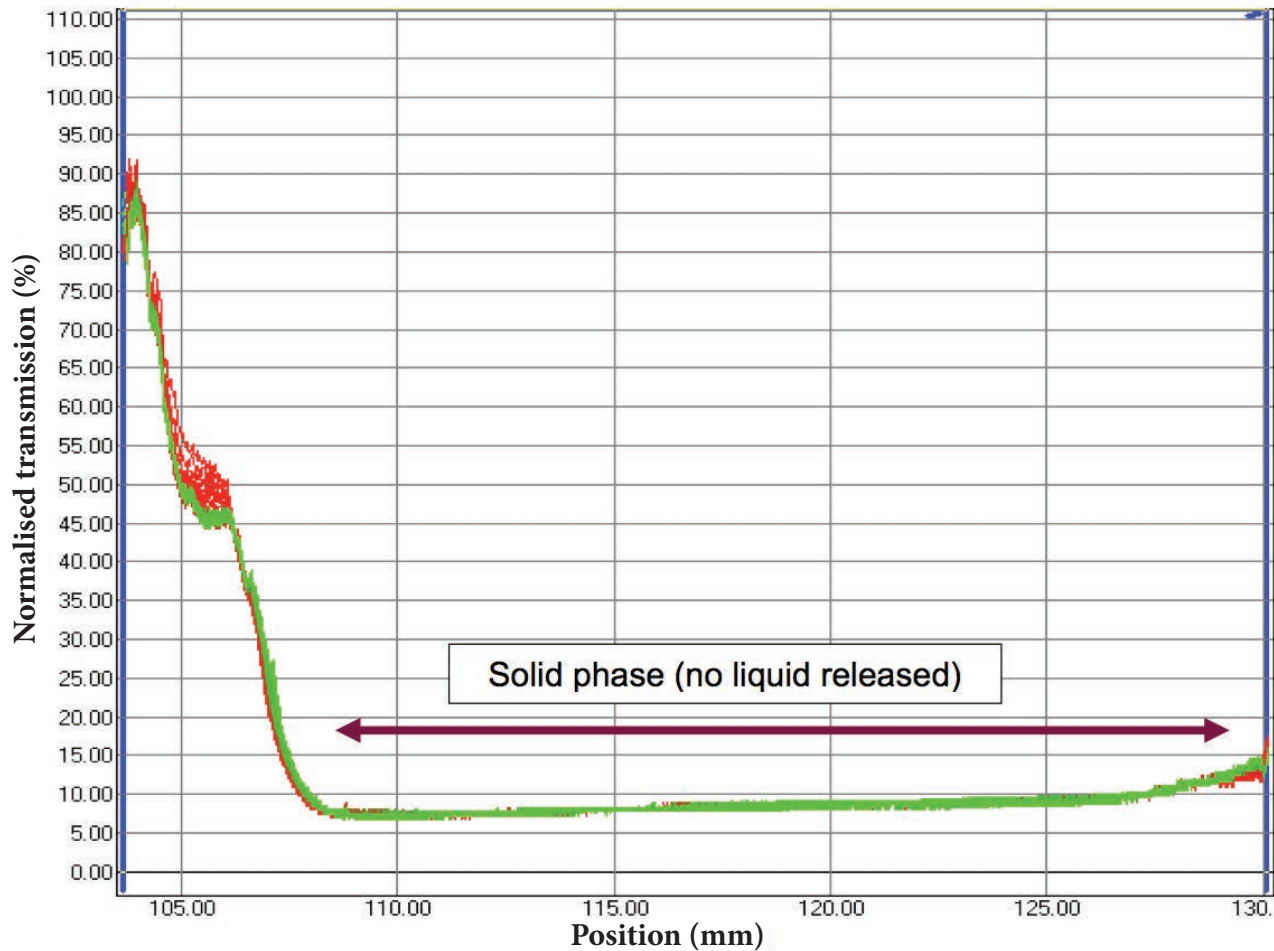


Figure 2. Near infrared transmission profiles of margarine with reduced saturated fatty acids, MPOB01, by Stability Analyser LUMifuge.

Note: Transmission is absent in zones with solid fat as light is scattered and absorbed. Zones with liquid oil allows light through hence elevating the transmission levels.

CONCLUSION

Margarine textured with POSF had successfully reduced SAFA to below 20%.

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For more information, kindly contact:

**Head of Corporate Implementation
and Consultancy Unit, MPOB
6, Persiaran Institusi,
Bandar Baru Bangi,
43000 Kajang, Selangor, Malaysia
Tel: 03-8769 4574
Fax: 03-8926 1337
E-mail: tot@mpob.gov.my
www.mpob.gov.my**