PALM-BASED *TRANS* FATTY ACID-FREE BISCUIT CREAM FAT

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478

MPOB INFORMATION SERIES • ISSN 1511-7871 • JUNE 2009 MPOB TT No. 436

Cream sandwich cookies and crackers are popular snack biscuits in many parts of the world. In this category of biscuits, two identical pieces contain a layer of sweet or savoury cream filling, as shown in *Figures 1* and *2*. A fat component is used in producing this biscuit cream and its content varies from 25% to 35% of the total cream.

Figure 1. Palm-based trans *fatty acid-free biscuit cream fat.*

Figure 2. Biscuit cream sandwiched between the biscuits shells.

The fat component affects the processing and the stability of the biscuit cream as well as the taste and eating quality of the biscuits. The most important factors determining the good qualities of the biscuit and the right type of fat to be used in the making of the biscuit cream are as follows:

- the fat type used in making the biscuit cream must be quick setting when placed between the shell biscuits. The cream must also resist misalignment, smearing and decapping during processing and storage.
- during storage and handling, the biscuit cream should be firm at ambient temperature to maintain product shape and not be squeezed out on handling or when bitten.
- the cream, although firm at ambient temperature, must have organoleptic properties allowing rapid melting in the mouth to release ingredients giving maximum flavour sensation without greasiness.

Partially hydrogenated fats were developed to replace the highly saturated solid animal fats, such as butter, tallow and lard, and were extensively used in the edible fat segment. Previously, the partially hydrogenated fats were thought to provide a healthier alternative to animal fats because they contain no cholesterol and have less cholesterol-raising saturated fatty acids. However, this opinion has changed with evidence from nutrition research indicating that *trans* fatty acids (TFA), formed during the hydrogenation process, raise blood cholesterol levels and promote arteriosclerosis to a greater extent than saturated fatty acids. In view of these findings, healthier palm-based TFA-free oil and fat blends are being increasingly used to replace the partially hydrogenated oils in the formulation of biscuit cream fat.

PALM-BASED TFA-FREE BISCUIT CREAM FAT

MPOB has undertaken extensive research and found that palm-based oils and fats can be blended to give the required application and functional qualities of biscuit cream fat. Palm-based raw materials that can be used for these fat blends are shown in *Table 1*. A palm-based TFA-free biscuit

ISSN 1511-7871
9 771511 787001

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TABLE 1. SUGGESTED OILS AND FATS FOR USE IN THE FORMULATION OF PALM-BASED *TRANS* FATTY ACID-FREE BISCUIT CREAM

Fraction	High melting point fraction	Medium melting point fraction	Moderator or modifier
Function	Promotes fast crystallization at temperatures below 30°C. Acts as the backbone structure.	Promotes texture and structure formation at temperatures below 30°C. Should melt down at temperatures above 35°C to avoid greasy or waxy after-taste.	Used for obtaining the desirable solid fat content profile to suit the requirements of the intended product.
Suitable palm products	Premium palm stearin (IV < 20).	Palm oil, palm kernel oil, palm kernel stearin, interesterified fats (palm oil and palm kernel oil-based).	Palm olein (IV 56-62), palm kernel olein, soyabean oil, sunflower oil, canola oil.
Suitable level in blend	10% to 15%	60% to 70%	15% to 20%

cream, BC 001, was formulated based on the solid fat profile (SFC) of the commercial product, as shown in *Figure 3*. The SFC at the processing/mixing temperature of 20ºC was maintained at 54% to facilitate the incorporation of sugar and other ingredients, and to retain the firmness of the cream. The sharp drop in SFC between 20ºC and 40ºC gives a quick meltdown of the cream that assists the flavour release from the cream, improving the organoleptic quality of the cream. The SFC at 40°C was reduced in BC001 to 3% as compared to the commercial product, Com 1, with 9% solids. The drop in the SFC at 40ºC improved the mouth-feel of the end-product as the greasiness was reduced. The final product was produced by processing the fat blend through the perfector plant, as shown in *Figure 4*.

Figure 4. BC 001 was processed through the MPOB perfector pilot plant.

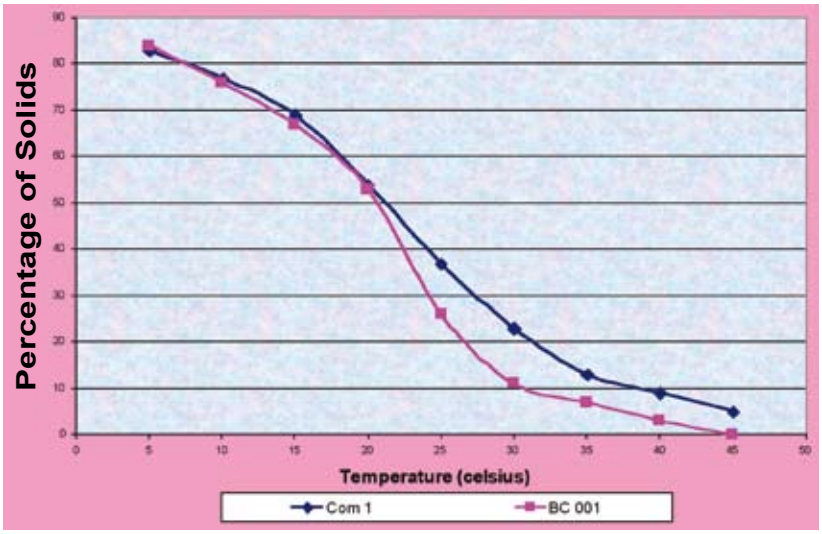

Figure 3. Solid fat content profile of commercial biscuit cream fat and BC 001.

BENEFITS AND ADVANTAGES OF PALM-BASED BISCUIT CREAM FAT

- A healthier replacement for partially hydrogenated fats, the palm-based fat blend is free of *trans* fatty acids.
- Natural fractions of palm-based oils and fats do not involve hydrogenation and/or interesterification.
- The blend is based on 100% vegetable fats; hence, the product is also cholesterol-free.
- The blend is formulated from specially selected fractions of palm-based oils to facilitate a higher crystallization rate that aids quick setting of the cream during processing.
- The product is firm yet melts in the mouth, and the product does not leave a waxy or greasy after-taste.
- It is suitable for vegetarians.
- It is *halal* and kosher.

CONCLUSION

Specially selected palm-based fractions can suitably replace partially hydrogenated fats in the formulation of sandwich biscuit cream fat. The biscuit cream based on these palm fractions fulfill the extensive functional qualities required during processing, handling, storage and transport, as well as the eating qualities of the biscuit.

REFERENCES

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