

PALM-BASED LOW CALORIE BAKERY MARGARINE

by: NOOR LIDA HABI MAT DIAN; MISKANDAR MAT SAHRI;
NORAINI IDRIS and KARIMAH AHMAD

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The role of different types of margarine in various baked products is subtly different. In cakes, margarine is an essential factor in incorporating finely dispersed air bubbles, which imparts fine crumb structure and delicate eating properties to the baked product. It helps increase the cake volume by shortening the strands of gluten, which in the absence of fat would form a tough mesh-like structure. In short pastry, a rather high fat content functions by preventing the hydration and subsequent toughening of the wheat protein. In puff pastry, the function of pastry margarine is to act as a barrier between the dough layers during rolling and prevent them from fusing together. This prevents the formation of three dimensional structure between the gluten protein in each thin dough layer during baking (Pederson, 1988), resulting in the characteristic light flaky texture.

Generally, bakery margarine can be classified into two major categories, i.e., (i) industrial/bakery and (ii) pastry. Bakery/industrial margarine, which is normally used for cakes and biscuits, generally needs to have a smooth consistency to facilitate mixing. This, could be achieved by ensuring that it solidifies in fine β' crystals. A further requirement for industrial/bakery margarine is that it should not melt too quickly during baking, so that the air bubbles that have been incorporated into the batter during mixing last until the cooking process has created structural materials from the other ingredients. Pastry margarine is characterized by a high degree of plasticity over a wide temperature range, sufficient plasticity for stretching and rolling in the dough preparation to ensure unbroken homogeneous thin layers of margarine in the dough, and the absence of softness or greasiness when worked (Alexanderson, 1985).

In most countries, the minimum fat content of a standard bakery margarine is 80%. Of current interest is a bakery margarine with less fat than the standard bakery margarine. Due to rising consumer demand for healthy products in the baking industry, food scientists are faced with the challenging task of producing bakery products that have all the inherent qualities of a good bakery



product, yet contain reduced amount of fat. One of the alternatives to reduce the caloric content in bakery products is by reducing the fat content of the bakery fat.

FORMULATION

General composition for low calorie bakery margarines is given below:

Water phase : water, stabilizer, preservative, salt
Fat phase : fat blend, emulsifier, carotene

As reduced calorie bakery margarine is regarded as being equal in quality to a standard margarine with 80% fat content, therefore, fat blend (Figure 1) with the same physical characteristics is generally used. Emulsifier and stabilizer are also vital, and normally, the percentage of emulsifier used is higher than ordinary bakery margarine.



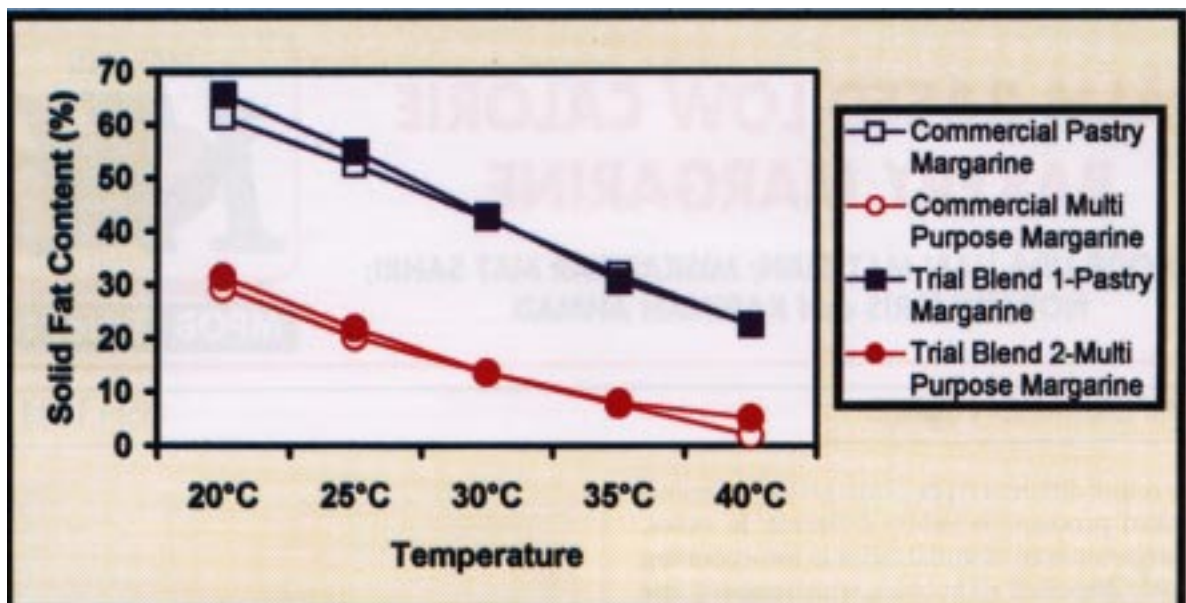


Figure 1. Solid fat content profile of oil extracted from commercial bakery margarines and trial blends.

PRODUCTION

Low calorie bakery margarine is produced as a water-in-oil (w/o) emulsion to obtain a long microbiological shelf life. For this, it is essential that the emulsion is stable and that the water droplets are finely dispersed. Crystallization and kneading are important to obtain the desired consistency and stability of the margarine.

Low calorie bakery margarine is produced by emulsifying a water phase into a fat phase, and subsequently crystallizing and kneading this emulsion in a tube chiller to the desired product consistency.

THE PRODUCT

Pilot scale trials in the MPOB pilot margarine plant showed bakery margarines with 60% fat content with good plasticity could be produced. The low calorie bakery margarines have satisfactory baking performances.

ECONOMIC FEASIBILITY

The low calorie bakery margarines are economically

feasible for manufacturers who already have a commercial margarine plant. No additional capital cost is required.

ADVANTAGES OF PALM-BASED LOW CALORIE BAKERY MARGARINES

- Lower calories;
- Free of *trans* fatty acids;
- Crystallize in β' polymorphic form; and
- Lower raw material costs (from manufacturer's point of view).

REFERENCES

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For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
Tel: 03-89259155, 89259775,
Homepage: <http://mpob.gov.my>
Telefax: 03-89259446