

TRANS-FREE PALM-BASED CHOCOLATE SPREAD

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Chocolate spread is a sweet spread which is very popular amongst children especially when applied on slices of bread. It is a water in oil emulsion containing less than 40% fat in combination with other ingredients such as sugars, cocoa powder, skim milk powder and stabilizer. Chocolate spreads of different varieties are commonly available. These include pure chocolate spread, chocolate milk spread and chocolate nut paste spread.

At ambient temperature, the ideal spread should have a creamy light consistency. There should be no oil separation throughout its shelf life of 6-12 months. Since the products contain fat as the continuous phase, the characteristics of the fat influence greatly the properties of final products. The melting profile of the fats used for the production of chocolate spread is shown in *Figure 1*. A typical fat used in these applications is partially hydrogenated soyabean oil. Partially

hydrogenated oils containing *trans* fatty acids are viewed as unhealthy. *Trans* fatty acids in commercial chocolate products including chocolate spread ranges between 0.7%-11.1%. Since chocolate spread is consumed by children in a reasonable quantity, they can be a major source of undesirable *trans* fatty acids. The availability of specially tailor-made fats from palm oil, which are virtually free of *trans* fatty acids, can be viewed as a healthy alternative (*Figure 2*).

PRODUCTS

Compositions of the Products

The principal ingredients of chocolate spread are fats and oils, food stabilizers, skim milk powder, sugars (sucrose, fructose and dextrose), water and cocoa powder for flavouring. Additional flavour such as hazelnut or peanut paste may be added to give different varieties of chocolate spreads.

The fat content in the product ranges between 16%–30%. The fats are contributed by blends of palm and other liquid vegetable oils. The selected fat should enable the formation of a semi-solid product at 5°C–10°C. The amount of water in the product is between 20%–23%. It is important that a water-soluble stabilizer be used in the product. This is essential to provide the required stability. Protein material is desired for nutritional reasons and also contributes to good flavour and physical properties of the products. The protein source can be dairy or non-dairy base.

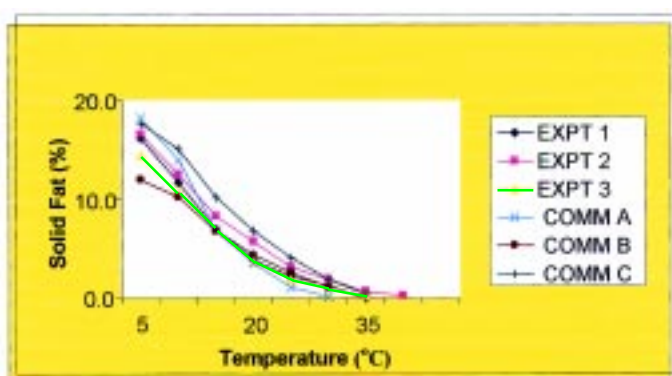


Figure 1. Melting properties of experimental and commercial fats for chocolate spread.
EXPT = experiment, COMM= commercial.

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Product Characteristics

Chocolate spread requires a fat system that contains low levels of solids at room temperature. Oil separation is a typical problem in chocolate spread as it contains low levels of solids at room temperature and high liquid oil. Therefore a suitable type of oil or fat is important for the production of chocolate spread. The right type of fat would give good spreadability, appearance, stability against rancidity and melts quickly in the mouth resulting in good flavour release.

The experimental oil used in this chocolate spread was *trans*-free and contained no lauric

acid. The product is soft and spreadable over a wide range of temperature from refrigeration to room temperatures. It is stable with no oil separation even at 30°C, smooth, creamy and has good taste. The sensory score by a trained panel is shown in *Figure 3*. The spreadability of the product is comparable to commercial sample as shown in *Figure 4*.

PRODUCTION OF PALM CHOCOLATE SPREAD

The flowchart for chocolate spread processing is shown in *Figure 5*. The oil, water, emulsifier, stabilizer and water-soluble materials are mixed in the cooker. The mixture is heated up,



Figure 2.

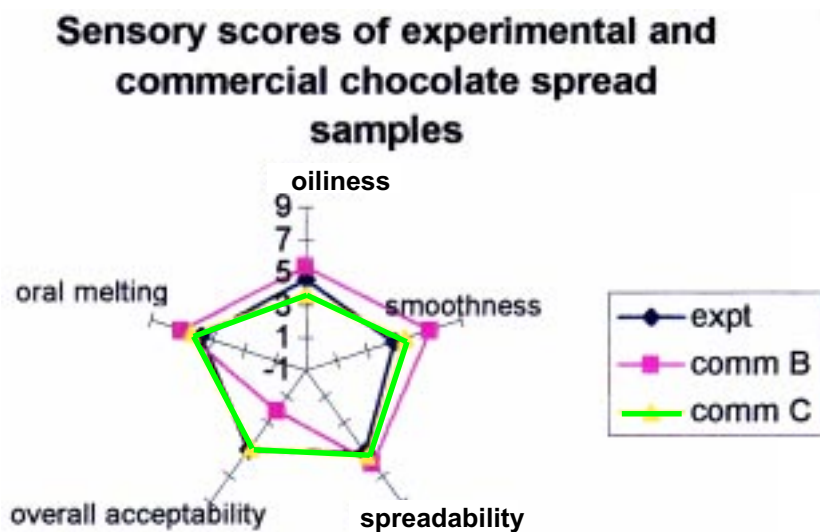


Figure 3. Results of sensory evaluation of experimental and commercial samples.

- Notes:
- oiliness: 1=very oily, 9=very dry
 - smoothness: 1=very grainy, 9=very smooth
 - spreadability: 1=very hard to spread, 9= very easy to spread
 - oral melting: 1=very slow, 9= very fast
 - overall acceptability: 1=like extremely, 9=dislike extremely

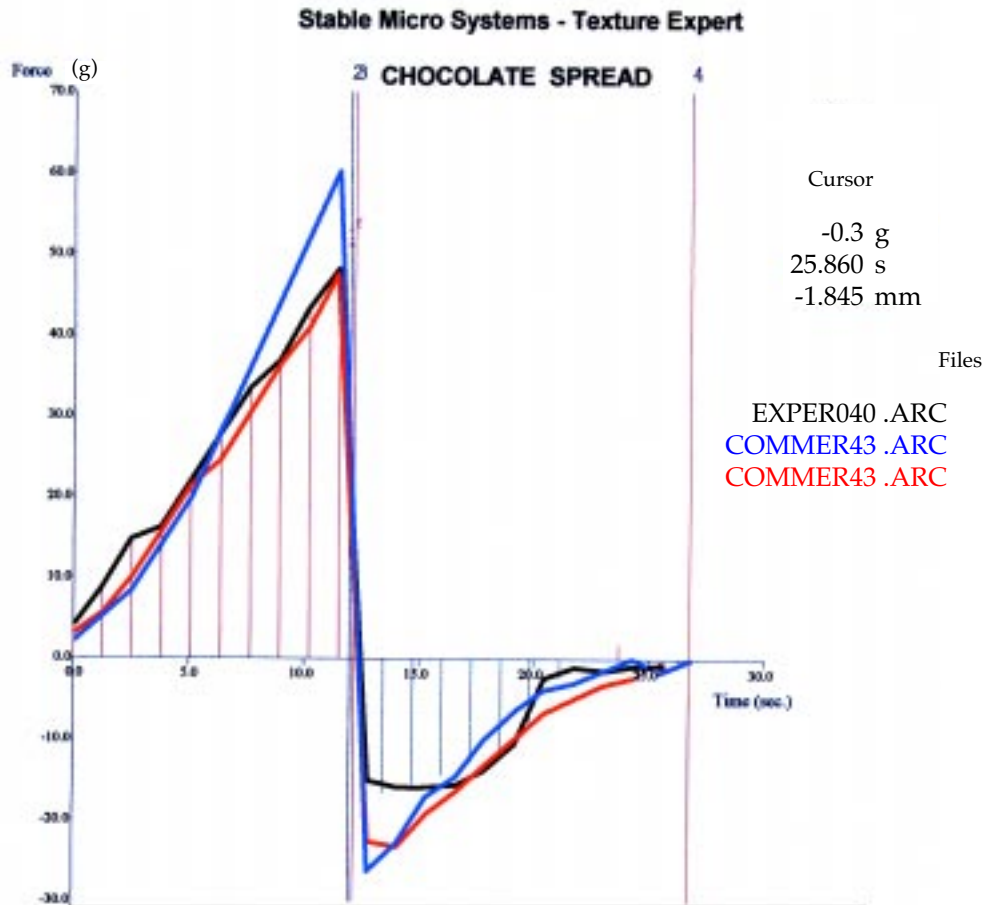


Figure 4. Spreadability of experimental and commercial chocolate spread as measured by texture analyser.

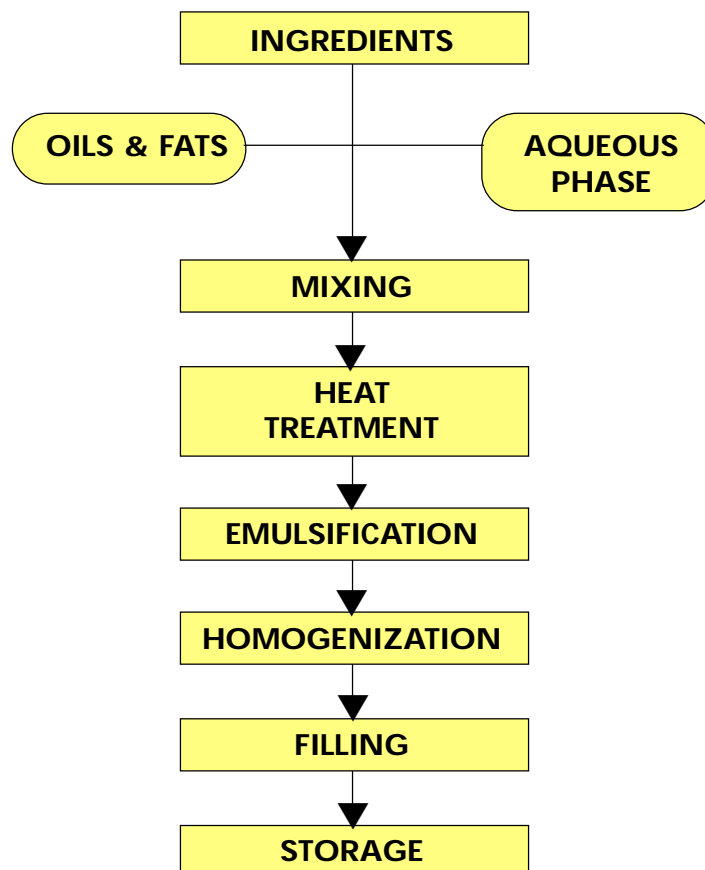


Figure 5. Flowchart of chocolate spread processing.

emulsified at high speed mixing and homogenized to produce a smooth and stable chocolate spread.

MARKET POTENTIAL

The technology for producing chocolate spread does not involve complicated procedures. The most important is a good and efficient type of mass cooker which can withstand high speed emulsification. This equipment is commercially available.

The product is popular internationally and in Malaysia, the demand is increasing as it is popular amongst children. With increasing

awareness on the negative effect of *trans* fatty acids, *trans*-free palm-based chocolate spread which is a healthier product promises to have a greater market potential.

Return of investment:

Initial investment: RM 1 million.

Estimated plant capacity: 1500 kg day⁻¹

NPV is RM 732 447.

IRR over a 10-year of life expectancy of the plant is 25%

Price cost ratio is 1.24.

Estimated payback period is four years.

For more information kindly contact:

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