

In culinary arts, the word fondant can refer to one or two types of sugar-based pastes used in preparing and decorating cakes, pastries and confectioneries. There are two types of fondant: 1) poured fondant, and 2) rolled fondant. Poured fondant is a sweet, creamy paste that can be used as a filling or icing for pastries. Rolled fondant is almost like very sweet dough.

Not many scientific papers on rolled fondant are available. Most literatures are limited to recipe books.

Butter has been the established fat suggested in many recipe books for this sugar/fat mixture (Knott, 2013; Parrish, 2013; Deacon, 2003). Functionally, fat affects the melting point, viscosity and body, crystallinity and spreadability of many foods (ADA Reports, 2005). The same thing applies in rolled fondant. The amount of fat may influence the quality characteristics of the final product. In a sensory evaluation on cake frostings by Drewnowski and Schwart (1990), reported that the acceptability of cake frostings was a combined function of sucrose and fat levels.

Replacement of butter with non-hydrogenated palm-based fat has been successfully carried out by the Malaysian Palm Oil Board (MPOB). This rolled fondant has similar characteristics to the commercial rolled fondants. Non-hydrogenated palm-based fat is free from *trans* fatty acids and contains less saturated fatty acids compared to animal fat. At the same time, replacement of gelatin, the binding agent, which has been suggested in many recipe books for rolled fondant, was also conducted. The usage of gelatin which is of animal origin raises concerns on the halal status. Instead, plant-based binding agents were used to replace animal-based gelatin. The rolled fondant has the flexibility similar to commercial fondant and can be used in cake decoration as shown in Figure 1.



Figure 1. Palm-based rolled fondant for cake decoration.

## METHODOLOGY

Product development started with the design of experiment on the type of ingredients and its quantity. Two plant-based binding agents were identified and gelatin was used as control. For the fat, butter was used as control and two types of palm-based fats were evaluated. The amount of sugar, water and other ingredients were fixed. About 70% of the formulation was sugar.

A dough mixer was used to prepare the sugar-fat mixture. The final rolled fondant was packed in a plastic container at ambient temperature until evaluation. The crucial physical characteristics of rolled fondant are colour, firmness and organoleptic properties.

## PRODUCT PROPERTIES

The addition of 8.5% fat provided the optimum formulation. Total replacement of butter was also tested. The rolled fondant was stored in a chiller where it remained stable after six months. It was found that the type of fat and binding agent have significant effect on the firmness and colour of the rolled fondant (Figure 2).

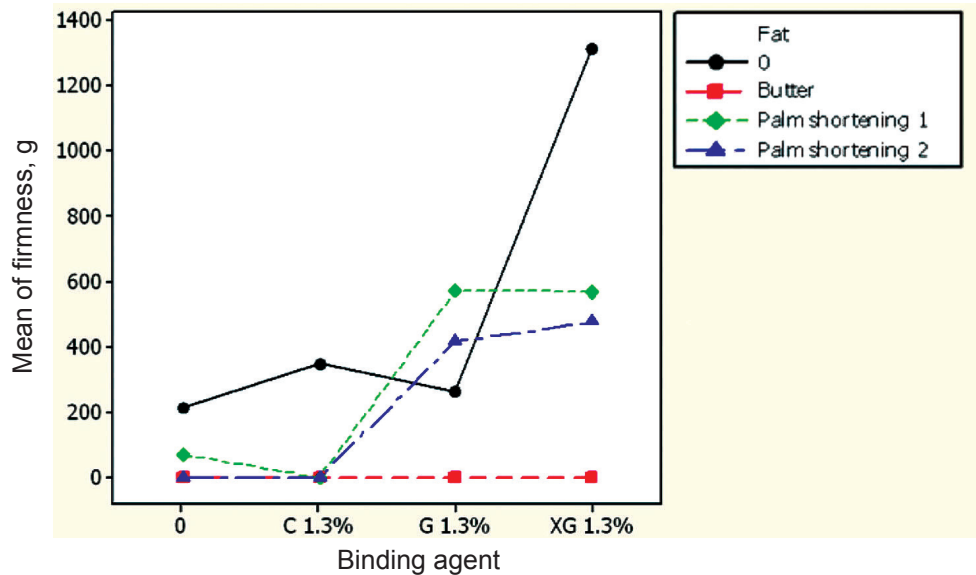


Figure 2. Plot of binding agent and fat for firmness of rolled fondant.

Modification and optimisation of the final formulation was carried out to achieve almost similar characteristics to that of the commercial samples (Figure 3). The sensory evaluation of the final product among 30 adults showed almost equal preference for palm-based rolled fondant compared to two commercial fondants as illustrated in Figure 4.

### NOVELTY OF PRODUCT

Palm-based rolled fondant is a healthy product; containing less saturated fatty acids compared to butter-based fondant. It contains no *trans* fats and no cholesterol. The formulation uses halal binding agent by replacing animal gelatin with plant-based binding agent. Palm-based rolled fondant has similar characteristics to that of the commercial products and it is cost-effective.

### ECONOMIC EVALUATION

The estimated expenditure and other economic evaluation are shown in Table 1.

This economic evaluation is based on the assumptions that the rolled fondant is sold at RM 8 kg<sup>-1</sup> and production capacity is 1 t per day for the first year with a gradual increment in sales over five years. Current prices of rolled fondant are RM 12 – RM 15 kg<sup>-1</sup>.

### TARGET MARKETS

Cake houses, bakeries and cake decorators are the consumer groups of the product. The product has market potentials for both domestic and international markets.

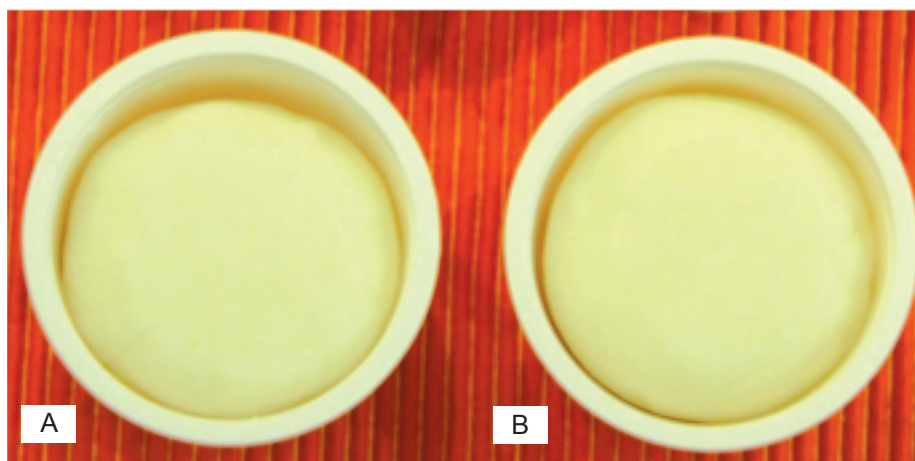


Figure 3. Appearance of plain palm-based rolled fondants made of two types of palm-based fat: A) palm shortening 1, and B) palm shortening 2.

TABLE 1. ECONOMIC VALUES

Cost (materials), RM kg <sup>-1</sup>	5.10
Capital expenditure, RM	288 000
Benefit to cost ratio	1: 1.21
Payback period, yr	2
Internal rate of return (IRR), %	88
Net present value (NPV), RM	1 085 850
Return on investment (ROI), %	182

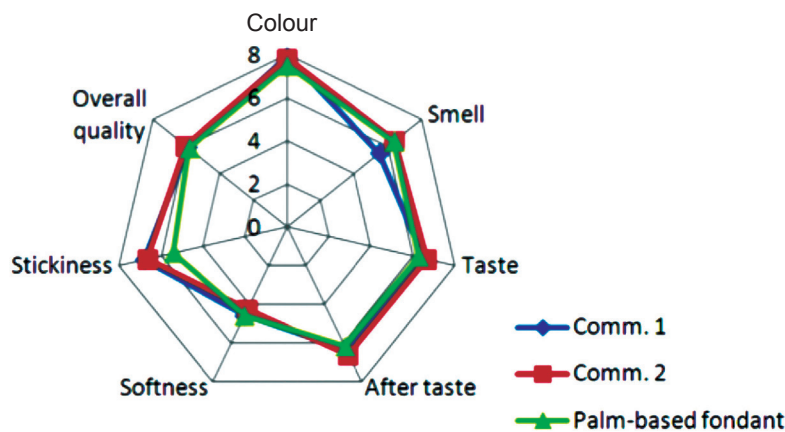


Figure 4. Sensory properties of rolled fondant.

## CONCLUSION

Palm-based rolled fondant is an alternative to butter and gelatin-based rolled fondant and has a great market potential.

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