DEVELOPMENT OF PALM MID FRACTION (PMF) BASED *TRANS* FREE CHOCOLATE COATING FOR DRY CAKE

NIU YUETING; OOI CHENG KEAT; INSYIRAH MOHAMAD SHAH and NIK AZNIZAN NIK IBRAHIM

792

MPOB INFORMATION SERIES • ISSN 1511-7871 • JULY 2018 MPOB TT No. 644

A chocolate coating for cake using PMF and palm kernel oil products was successfully developed. PMF-based *trans*-free chocolate coating achieves the quality that matches the commercial products in terms of palatability and physical appearance, with even better stability. This PMF-based chocolate coating will not only bring down the cost of the product but also reduce the content of *trans* fat in the final product.

TECHNOLOGY OFFERED

The technology offered is a PMF-based fats formulation and its application in chocolate coating for dry cake. In theory, a chocolate coated product at 30°C is firm enough, thus making it stable during handling, transportation, storage and display for sales. The presence of solid fats at above 35°C is very important for performance evaluation of the chocolate coating as it is approaching the human body temperature. It is supposed to melt sharply at around 37°C to have good melting properties in the mouth where it would completely melt so that there is a cooling sensation and no waxy aftertaste.

The desired fat was achieved by direct blending of PMF with hydrogenated palm kernel olein (HPKOL). The blending (*Figure 1*) is the most cost effective to tailor the formulation to suit the physicochemical requirement for chocolate coating.

INGREDIENT AND PROCESSING

The chocolate coating was formulated using 33% of the special PMF-based blend. The main non-fat solids of chocolate coating are sugar, cocoa powder and milk powder. The process flow of chocolate coating for dry cake is shown in *Figure 2*. In the process, the dry cake temperature should be controlled at between 24°C to 27°C, and the temperature of chocolate coating is maintained at about 43°C.

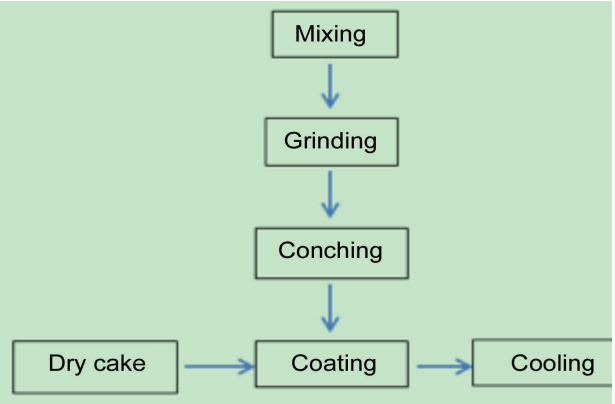

Figure 2. Process flow of PMF-based chocolate coating for dry cake.

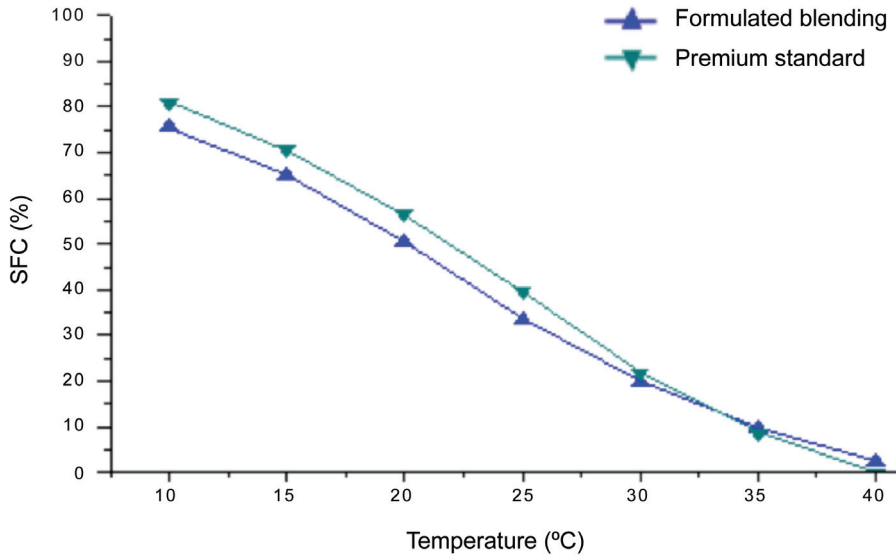

Figure 1. Solid Fat Content (SFC) of PMF-based blending and commercial fats for chocolate coating.

ISSN 1511-7871
9 771511 787001

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

PRODUCT CHARACTERISTICS

The chocolate coatings made from developed blended oils have uniform, glossy appearance and smooth surface. The taste of the chocolate coating is acceptable with good chocolaty flavour and without greasiness as well as waxy after-taste in the mouth.

NOVELTY

- Creating high value added product from by-product of fractionation.
- Formulation by blending PMFs and HPKOL.

Figure 3. PMF-based chocolate coating for dry cake.

BENEFITS

Cost effective ingredient. Free from *trans*-fatty acids and high value-added product.

MARKET POTENTIAL

A wide variety of chocolate-related products are currently available in the market, for instance, chocolate coated nuts, wafers, cakes, pastries and biscuits. In 2016, the sales of chocolate in China reached about 0.12 million tonnes, most of which were chocolate coated products (China Leading Institute of Industry Research, 2017). China's chocolate per capita consumption is only 0.7 kg a year as compared with Japan's average consumption of 3.0 kg annually, while in Korea, it has reached 1.4 kg per year. With the vibrant economic growth and the increase in income, the chocolate market is projected to grow by 10% annually in the next few decades (Billion State Power Network, 2016).

TABLE 1. ESTIMATED EXPENDITURE AND ECONOMIC VALUES

Item	Value
Capital asset	RMB 2 000 000 (RM 1 228 107.39)
Benefit to cost ratio	1.19
Payback period, (year)	5
Internal rate of return (IRR),%	32.36
Net present value (NPV) @ 10%	RMB 1 926 733 (RM 1 183 218.31)
Return on investment (ROI),%	24.7

ECONOMIC EVALUATION

The investment required for the production of chocolate coating is financially feasible as shown in *Table 1*. The estimated total investment is RMB 3 115 100 (RM 1 912 988.73) with a capital expenditure of approximately RMB 2 000 000 (RM 1 228 203.74). For the production of 50 000 kg yr^{-1}, the parameters shown are evaluated based on the price of chocolate coated product at RMB 50 kg^{-1} (approximately RM 30 kg^{-1}).

CONCLUSION

PMF and HPKOL-blended specialty fat was successfully used to manufacture *trans*-fat free chocolate coatings. PMF-based *trans*-fat free chocolate coating has the quality that matches the commercial products in terms of palatability and physical appearance. It has better stability which curbs oil migration, or chocolate bloom formation on the finished product. These properties give the final product longer shelf life.

REFERENCES

Billion State Power Network (2016). http://www.ebrun.com/20160923/193881.shtml

China Leading Institute of Industry Research (2017). http://bg.qianzhan.com/report/detail/a00903dacb534af0.html, accessed on 6 February 2018.

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