RED PALM OIL (RPO) CHOCOLATE SPREAD

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Chocolate spread is a beloved confectionery product enjoyed by people of all ages, particularly children. Commonly used as a spread on bread, pancakes, or as a filling in baked goods, it comes in various types such as plain, milk, or flavoured varieties. Supermarkets typically stock chocolate spread in glass jars or plastic tubs, with popular brands including Nutella, Hershey, and Cadbury. According to Statistica Market Insights (2025), the global chocolate spread market is projected to reach USD140.10 billion in 2025, with a Compound Annual Growth Rate (CAGR) of 4.74% from 2025 to 2030. In Malaysia, the market is forecasted to be worth USD1.54 billion, boasting an impressive annual CAGR of 8.19% over the same period.

Palm oil and its fractions serve as an ideal fat phase in chocolate spreads, offering excellent physical properties and structural stability. Traditionally, some chocolate spreads relied on partially hydrogenated fats to achieve desired textures. However, following the United States Food and Drug Administration's (USFDA) ban on *trans* fatty acids due to their harmful health effects, palm oil and its fractions have emerged as superior alternatives.

Red palm oil, in particular, is a nutrient-rich option, containing high levels of vitamin E and beta-carotene (provitamin A), both of which contribute to overall health. Vitamin E boasts numerous benefits, including antioxidant, anti-diabetic, and anti-cancer properties, as well as positive effects on bone metabolism, cardiovascular health, neurological function, and brain development (Azlina *et al*., 2005; Mutalib *et al*., 2003; Ngah *et al*., 1991; Norazlina *et al*., 2010; Sen *et al*., 2010; Siddiqui *et al*., 2010; 2013). Meanwhile, beta-carotene supports antioxidant activity and is essential for maintaining healthy vision. Incorporating red palm oil as the fat phase in chocolate spreads not only enhances their functionality but also enriches our daily diet with vital nutrients like vitamin E and beta-carotene, making it a delicious and health-conscious choice.

THE TECHNOLOGY

This technology introduces an innovative formulation and processing method for red palm oil-based chocolate spread. The formulation incorporates red palm oil, which is rich in vitamin E and beta-carotene, offering a healthier alternative to traditional chocolate spreads. Additionally, the processing methods are streamlined, making production efficient and accessible. *Table 1* highlights the composition of red palm oil chocolate spread in comparison to commercial varieties. Over a six months period storage, the product demonstrated excellent stability with no incident of phase separation. *Figure 1* and *2* illustrate the retention of vitamin E and beta-carotene, respectively, during storage. Remarkably, the red palm oil chocolate spread retained at least 90% of its vitamin E content and 80% of its beta-carotene after six months, underscoring its durability and nutrient preservation.

Sensory properties of the red palm oil chocolate spread were compared to those of commercial chocolate spreads. Attributes such as glossiness, spreadability, colour, sweetness, taste, melt-in-the-mouth texture, and overall acceptance were assessed by a panel of 60 sensory panellists. Notably, the red palm oil chocolate spread scored comparably to commercial products in overall acceptance, indicating it is well-received and appealing to panellists/consumers.

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TABLE 1. COMPOSITION OF CHOCOLATE SPREAD

Samples	Vitamin E (ppm)	Vitamin A/ provitamin A (ppm)	Protein (%)	Fat (%)	Carbohydrate (%)
Red palm oil chocolate spread	670.0	271.0	9.8	39.5	47.2
Commercial chocolate spread	210.0	14.4	5.7	36.2	49.8

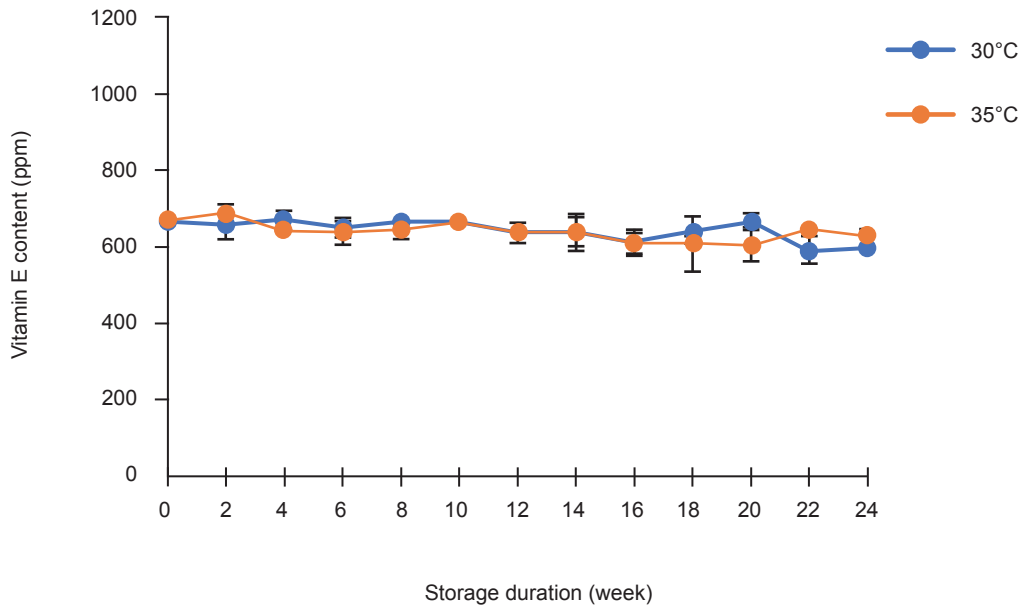

Figure 1. Vitamin E content of red palm oil (RPO) chocolate spread stored at 30°C and 35°C for 24-week storage study.

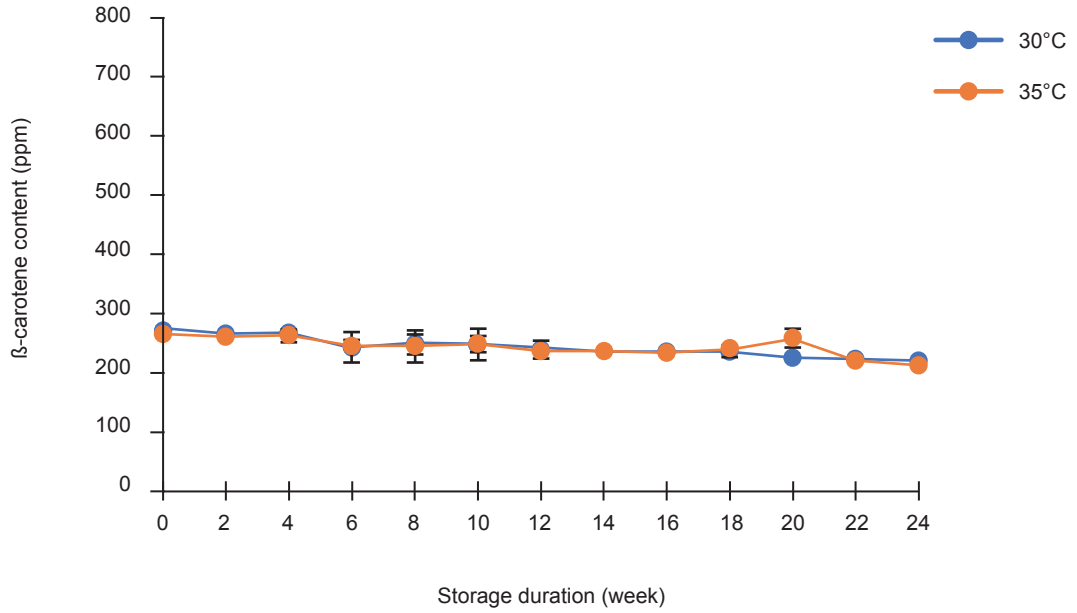

Figure 2. ß-carotene content of red palm oil (RPO) chocolate spread stored at 30°C and 35°C for 24-week storage study.

Figure 3. Example of red palm oil chocolate spread.

NOVELTY

The red palm oil chocolate is rich in vitamin E and beta-carotene (provitamin A), enhancing its nutritional value while preserving the desirable qualities and attributes of traditional chocolate spreads. Additionally, the red palm oil-based chocolate spread is cost-effective and benefits from an easy-to-follow and efficient production process.

BENEFITS AND ADVANTAGES

- Rich in vitamin E and beta-carotene (provitamin A), providing added nutritional value;
- Maintains exceptional nutrient retention, preserving at least 90% of vitamin E and 80% of beta-carotene after six months of storage;
- Exhibits excellent spreadability, appealing colour, and high overall acceptance among consumers; and
- Features an efficient and straightforward processing method.

ECONOMIC ANALYSIS AND COMMERCIAL BENEFIT

With a steady annual production capacity of 238,500 units, the cost of the raw ingredient to produce 350 mL bottle red palm oil chocolate spread was RM7.14. With its unique health benefits and competitive pricing, red palm oil chocolate spread demonstrates strong market potential. Currently, no chocolate spreads in the market are formulated using red palm oil, as most manufacturers rely on palm fractions or alternative oils and fats.

CONCLUSION

Red palm oil chocolate spread provides an innovative solution for incorporating vitamin E and beta-carotene from red palm oil into daily diets. Through a streamlined processing method, it maintains its functionality and high-quality attributes, earning overall acceptance comparable to commercial chocolate spreads.

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