

Santan Sawit was first introduced by the Malaysian Palm Oil Board (MPOB) as a novel product in 2008 (Zaida *et al.*, 2008; 2012). It was prepared as an alternative to the traditional coconut *santan*. Santan Sawit is ready-to-use and in great demand in domestic market. The product is popular to consumers and marketed in local supermarkets and other retailers.

Santan Sawit is comparable to coconut milk in taste and appearance. It has a variety of benefits, including low saturated fat content and more long-lasting. Santan Sawit is rich in vitamin A, vitamin E and contains equal proportions of saturated and unsaturated fatty acids. Myristic acid (1%), stearic acid (5%) and palmitic acid (44%) make up the saturated fatty acid component in addition to mono-unsaturated oleic acid (39%) and polyunsaturated linoleic acid (11%) in Santan Sawit (Table 1).

TABLE 1. NUTRITIONAL COMPOSITIONS OF SANTAN SAWIT PLUS, COMMERCIAL SANTAN SAWIT AND COCONUT MILK (SANTAN)

Food component	Santan Sawit PLUS	Commercial Santan Sawit	Coconut milk
Total fat (g)	26.8	28.0	29.4
Protein (g)	1.2	1.3	2.2
Carbohydrates (g)	9.3	7.2	2.3
Moisture (g)	62.5	61.8	65.3
Ash (g)	0.2	0.3	2.1
Calories (kcal)	283	298	280
Vitamin A (μ g) (pro-vitamin A carotenoid)	ND (<100)	ND (<100)	ND
Vitamin E (mg) (total tocopherol and tocotrienol)	12.3	12.5	ND

Note: Amount per serving 100 g.
ND – not detected.

Saturated fat has been shown to have loads of positive effects. Several human clinical studies have found that saturated fats do not create high cholesterol, do not contribute to heart disease (Alfin-Slater and Aftergood, 1980), not cancer-causing (Cranton and Frackelton, 1984) and do not clog arteries (Ravnskov *et al.*, 1998). In fact, saturated fats play many vital roles in the body to help strengthen the immune system (Kabara, 1986), promote healthy bones (Watkins *et al.*, 1996), provide energy and structural integrity to the cells, protect the liver (Nanji *et al.*, 1994), and assist metabolism of essential fatty acids (Garg *et al.*, 1998). Studies also found that palm oil increases the good HDL cholesterol levels while having a neutral to beneficial effect on the bad LDL cholesterol levels, thus promoting cardiovascular health (De souza *et al.*, 2015; Ong, 2002; Edem, 2002).

Santan Sawit remains stable for almost one month at ambient temperature, 27°C. Santan Sawit PLUS is an innovative and cost effective product with extended shelf-life compared to previous innovation, Santan Sawit. It has a shelf-life of more than 10 months at ambient temperature (Figure 1).

PRODUCT PROPERTIES

Storage Stability

Santan Sawit PLUS stays fresh, without separation and deterioration when stored for 10 months at 5°C, 10°C, 15°C, 20°C, 25°C, 27°C and 30°C (Table 2).

TABLE 2. STORAGE STABILITY OF SANTAN SAWIT PLUS

Appearance and physical characteristics	
Storage condition	Initial – 10 months
5°C-27°C	<ul style="list-style-type: none">• Off-white• Physically stable• Uniform emulsion• Smooth emulsion

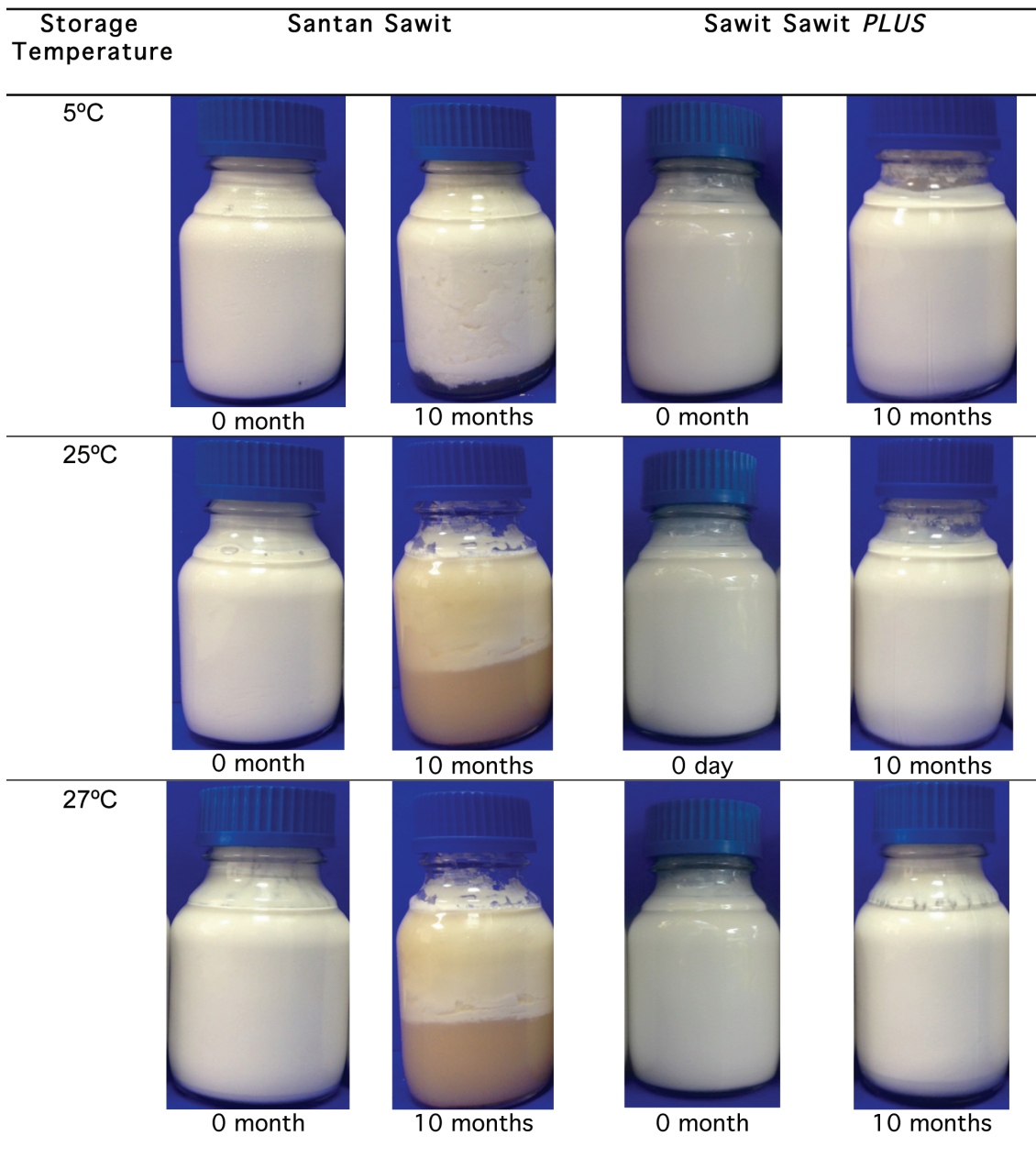


Figure 1. Santan Sawit PLUS with improved process had longer shelf-life of 10 months at various temperatures.

Sensory Properties

The properties for appearance, odour, taste, creaming and overall acceptance of Santan Sawit PLUS in sensory evaluations were comparable to those of the commercial Santan Sawit (Figure 2).

Microbial Study

Microbial study revealed that Santan Sawit PLUS was microbiologically safe after 10 months storage at 27°C. *Escherichia coli*, *Salmonella* spp, *Clostridium* spp, *Staphylococcus* spp, *Streptococci* spp, yeast and mold were not detected during the 10-month storage (Figure 3).

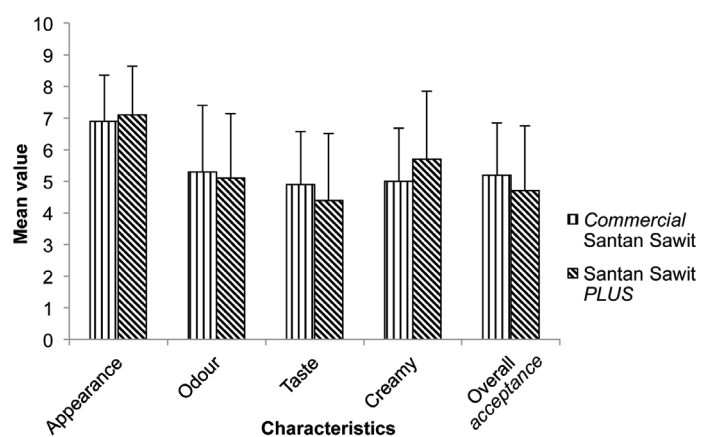


Figure 2. Sensory evaluation of commercial Santan Sawit and Santan Sawit PLUS. No significant difference between the two products.

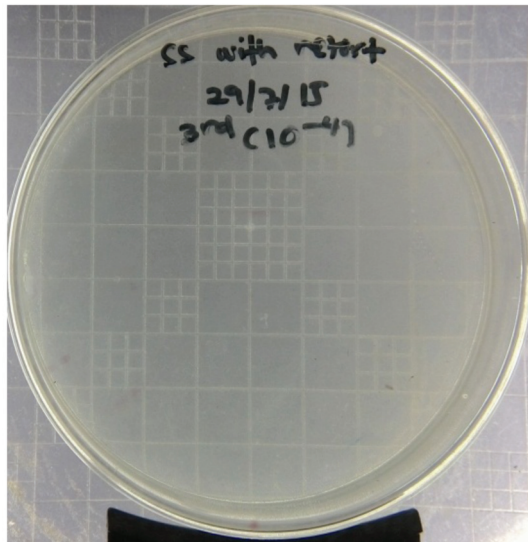


Plate 1. Santan Sawit PLUS with improved process at 1 month

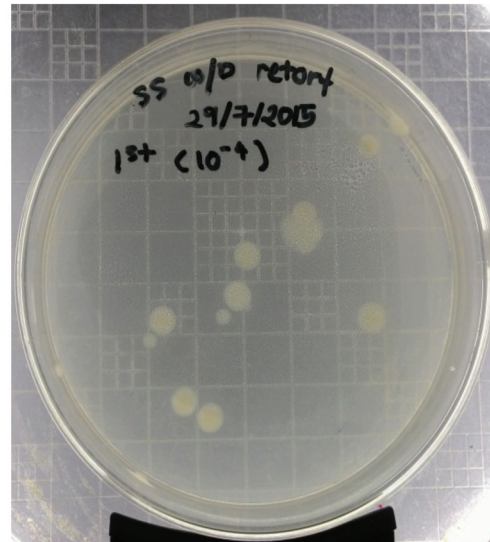


Plate 2. Santan Sawit without improved process at 1 month

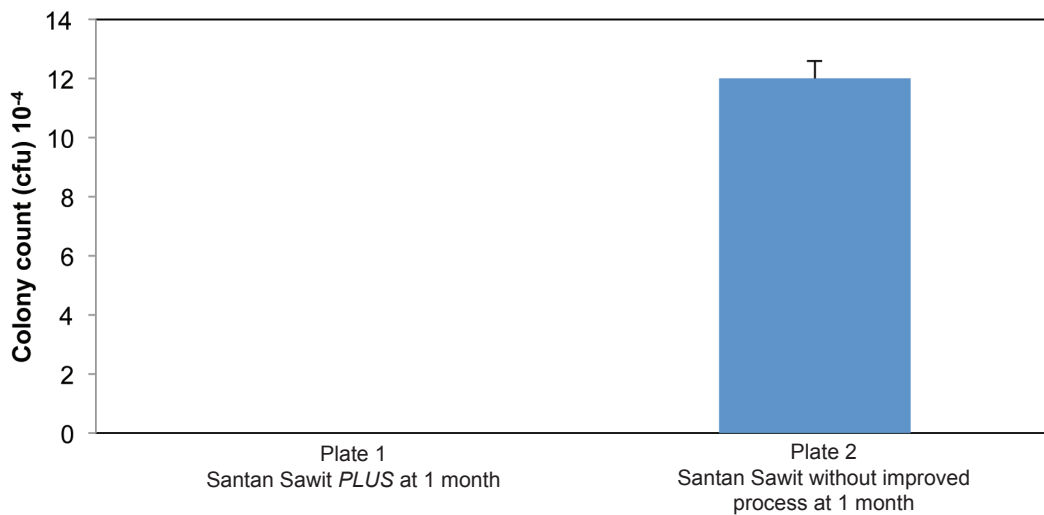


Figure 3. Microbial study on Santan Sawit and Santan Sawit PLUS.

NOVEL SOLUTION: SANTAN SAWIT PLUS

- Stable shelf-life and ready-to-use at various temperatures from 5°C to 30°C.
- Taste good similar to coconut milk, *trans*-free, natural and without preservative.
- Contains natural vitamin A and E.
- Sensory properties comparable to commercial Santan Sawit.
- Longer shelf-life of 10 months. Foods prepared using Santan Sawit PLUS hardly becoming rancid after one month, pending on type of food.

ECONOMIC EVALUATION

The estimated expenditure and other economic parameters for producing Santan Sawit PLUS are shown in Table 3. The estimated total investment cost is RM 2 900 000. At a production capacity of

1 200 000 kg per annum with a long-term price of RM 8 per kg, it is expected to generate an income of RM 7 100 000 per year. The prospects for Santan Sawit PLUS are attractive with a payback period of two years.

TABLE 3. FINANCIAL ANALYSIS FOR INVESTMENT IN PRODUCING SANTAN SAWIT PLUS

Items	Value
Cost (materials)	RM 4.80 per kg
Capital expenditure	RM 2 900 000
Benefit to cost ratio	1:1.37
Payback period	two years
Internal rate returned (IRR)	63%
Net present value (NPV)	RM 7 100 000
Return on investment (ROI)	204 %

CONCLUSION

Santan Sawit *PLUS* is a liquid Santan Sawit (coconut milk substitute) with longer shelf-life. It is a healthy product containing low levels of lauric and myristic acids and naturally rich in vitamin A and E, especially tocotrienol. It is a palm oil-based product with improved process and can be stored for more than 10 months at ambient temperature (27°C). The improved process does not only retain its sensory properties, but also microbiologically safe. Santan Sawit *PLUS* can be marketed overseas due to its long shelf-life.

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