

Highlights of Research on Food Uses of Palm Oil

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Palm oil is a semi-solid product with a wide range of food uses. The most important uses are in margarines, shortenings, vanaspati and frying fats but it is also used as an ingredient in ice-cream, biscuits and other foods. The Chemistry & Technology Division of PORIM is actively involved in increasing the proportion and improving the performance of palm oil in existing edible products and in finding new uses. The following topics are under investigation:

Bakery Shortenings

The main objective of this project is to formulate shortenings with the maximum amount of palm oil and palm oil products. Several blends containing palm oil and palm oil products had been evaluated for their performances in Madeira cakes. Blend containing palm stearin, rapeseed oil and palm kernel oil (50:30:20) was shown to be comparable to the control (Spry shortening) in terms of performance. The effect of emulsifiers in improving the baking performance of the fat and the eating quality of the cakes will be further studied.

A promising blend based on 60% palm stearin and 40% rapeseed oil had been identified. More confirmatory trials are being carried out and the effect of aerating the shortening (with 10% air/nitrogen) is being studied. Such all-vegetable product will be comparatively cheaper than other all-vegetable products produced in temperate countries.

Margarine Formulations

The prime objective of this project is to formulate margarines for both tropical and temperate countries with maximum content of palm oil and/or its products. A survey of the commercial margarines from temperate and

tropical countries had been conducted. Margarines from different origins differed in their consistencies and the raw materials used. Palm oil was used at an average of 20% in some of the temperate margarines. Margarines from tropical countries like Malaysia were mainly based on palm oil or palm oil products. Experimental results obtained in PORIM indicated that up to 40% palm oil in table margarine is possible.

Use of palm stearin in the table margarine was shown to be rather limited unless it is subjected to further processing such as interesterification. A maximum level of 10% – 15% palm stearin can be used in table margarine. Preliminary results based on solid fat content have shown that 40% palm stearin can be used if interesterified with liquid oil and palm kernel oil.

A greater proportion of palm oil can be incorporated in industrial and puff pastry margarine. A fat blend comprising of palm stearin (50%), hydrogenated soyabean oil (15%), coconut oil (15%) and palm olein (20%) had been successfully formulated into cake margarine and all-vegetable general purpose shortening on a factory scale. The performance of the products was evaluated and found to be compatible with commercial products marketed in New Zealand.

Palm stearin and hydrogenated palm oil were found to be excellent ingredients for puff pastry margarine. Up to 100% palm oil products can be incorporated in formulating puff pastry margarine. This was illustrated by a PORIM blend comprising of palm stearin, hydrogenated palm oil and palm kernel olein which was found to be compatible in terms of performance with a tallow-based commercial puff pastry margarine (see *Figures 1a* and *1b*).

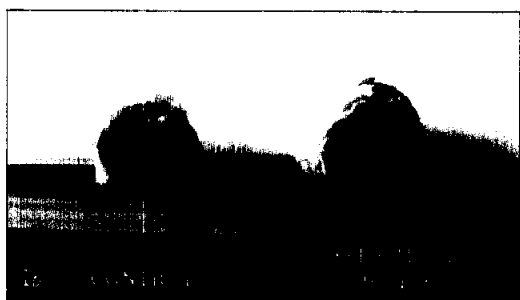


Figure 1(a) Vol au vents made from experimental all vegetable puff pastry margarine against tallow based control showing better lift up properties of the experimental. (b) Baking performance in sausage roll using experimental all vegetable puff pastry margarine against tallow based control.

Vanaspati Formulation

Vanaspati is a solid fat product which is much desired by consumers in many Middle-East countries and in the Indo-Pakistan sub-continent. This is mainly used as a domestic cooking fat and is similar in formulation to bakery shortenings. The amount of palm oil that can be used varies from 100% in Iraq and some Middle-East countries to 50% – 60% in Pakistan and 20% in India. The use of interesterification process in increasing the amount of palm stearin in vanaspati is now being actively pursued by PORIM.

Characteristics of Blends in Palm Olein with Vegetable Oils

The main objective of this project is to blend palm olein with other vegetable oils suitable as salad and cooking oil for temperate

climate. Cold stability tests such as cloud point and cold tests were carried out for the blends. A cloud point of 0°C could be obtained by blending up to 60% of palm olein with vegetable oils. For salad oil, only about 10% – 20% of normal palm olein could be added in order to pass the specified cold test which states that the oil must remain clear for a minimum of five hours at 0°C.

Formulation of Cocoa Butter Extender (CBE) Fats

This project aims at formulating CBE from palmitic oleic palmitic (POP) rich palm-mid fractions (PMF) produced by local refiners and commercially available palmitic oleic stearic (POS) and stearic oleic stearic (SOS) fat fractions. Samples of palm mid-fractions produced by Malaysian refiners and sal stearin (sals) samples obtained from Indian suppliers were evaluated for their physico-chemical characteristics. One of the PMFs was blended with three sal stearins (two dry and one solvent fractionated). Experimental data obtained indicated that at least 60% – 70% sal stearin had to be blended to the PMF sample in order to be compatible with cocoa butter (CB).

CBE based on binary mixture of sal stearin and PMF at varying proportions blended with cocoa butter will be evaluated in plain and milk chocolate formulations for their stability and tempering performance.

Palm Stearin Utilization in Industrial Frying Fat Blends

The prime objective of this project is to find new outlets for palm stearin. Instant noodles have been an important and a common food source principally in this region. The frying oils currently used are beef-tallow and palm oil. The use of palm stearin in frying would be more economical.

Experimental results have indicated that blends comprising of 50% soft palm stearin (slip melting point 44.2°C) in refined bleached and deodorised (RBD) palm oil is a perfectly

suitable medium for noodle frying. Particular emphasis was made on the organoleptic qualities of mouthfeel, texture (noodle-bite), flavour and aftertaste when evaluating the product. It was found that the differences in organoleptic quality was insignificant when compared to RBD palm oil as control. This result was also confirmed by an independent well-known local noodle manufacturer.

Characteristics of Palm Olein and Vegetable Oil Blends and their Frying Qualities

The objectives of this project are to characterise the physico-chemical parameters of

vegetable oils and blends with palm olein and determine the changes taking place and to provide basic background information on the frying performance of various fats and blends under laboratory simulated deep-fat frying.

Various vegetable oils were blended with 30% palm olein in order to obtain approximately 0°C cloud point. The blends were subjected to deep-fat frying of chips and various parameters pertaining to frying oil qualities were monitored. Preliminary results indicated that addition of 30% palm olein has no detrimental effect on the oils and in some cases, improves the flavour stability of the fried products.