

# PALM-BASED MOZZARELLA CHEESE AS PIZZA TOPPING

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JUNE 2004

# 254

**MPOB TT No. 252**

MPOB INFORMATION SERIES

ISSN 1511-7871

**D**airy products such as cheese and butter are usually made using cow's milk and the major source of fat present is milkfat. The manufacture of natural cheese conventionally involves the treatment of milk products, including inoculation with particular and specific strains of microorganisms, treatment with enzymes (*e.g.* rennin) allowing a cheese curd to form, separating the cheese whey, collecting the curd and pressing of the curd into molds, followed by ripening and ageing of various period of time, depending upon the established standard of identity for the particular cheese product.

In view of the cost, both with respect to raw material and time involved in traditional procedures for natural mozzarella cheese manufacture, alternative formulations and manufacturing methods have to be adopted. In the production of palm-based mozzarella cheese (*Figure 1*), a steam injection kettle (Stephan, UM/SK 5) was used to integrate major ingredients such as casein, palm-based products, water and other minor ingredients. As well as savings in the manufacturing process, raw materials are considerably cheaper per tonne of product than milk, with vegetable oil cheaper than butterfat and casein up to 50 % cheaper than skim-milk powder.

## POPULARITY OF MOZZARELLA CHEESE

Mozzarella is now consumed worldwide, largely due to the growth in popularity of pizza and similar foods. The food industry rarely uses high moisture mozzarella (>52 but ≤ 60%) as a pizza ingredient because of its poor shredding, matting and limited shelf-life. Low moisture mozzarella has lower water content (<52%) and is used primarily as an ingredient for pizza. Mozzarella differs from most cheeses in that it is usually consumed in the melted state (Kindstedt and Guo, 1997).



*Figure 1. Palm-based mozzarella cheese.*

## SPECIAL CHARACTERISTICS

- Soft and normally white in colour;
- Must be shreddable to enable homogeneous distribution;
- Fibrous structure;
- Good melting and stretching properties;
- Mild aroma and flavour; and
- Consumed in the melted state and specially used as pizza topping.

## ORGANOLEPTIC CHARACTERISTICS AND FUNCTIONAL PROPERTIES

Mozzarella cheese contribute to the organoleptic characteristics of most foods in which it is incorporated by possessing certain:

- taste;
- aroma;
- texture; and
- mouth-coating characteristics.

Upon grilling or baking, it is required to melt, flow, brown, blister, oil-off, and/or stretch to varying degrees. It is also expected to be chewy and contribute to certain mouth-coating characteristics.

ISSN 1511-7871



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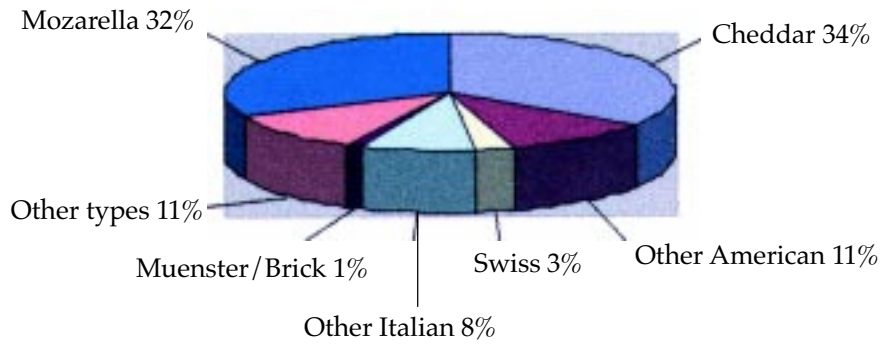


Figure 2. 2000 US cheese production (percent by type).

### PROCESSING OF NATURAL AND PALM-BASED MOZZARELLA CHEESE

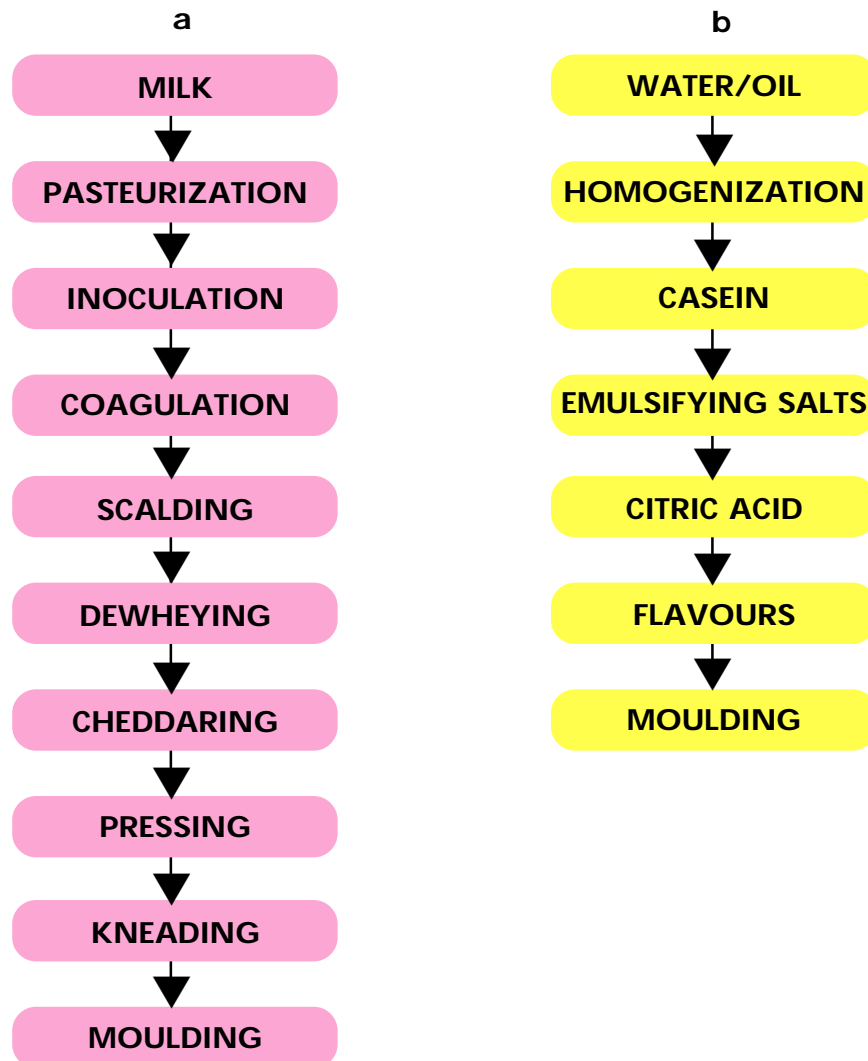


Figure 3. Flow chart for the production of a) natural and b) palm-based mozzarella cheese.

**TABLE 1. SENSORY EVALUATION OF PALM-BASED MOZZARELLA CHEESE AS PIZZA TOPPING**

Sample	Colour	Appearance	Odour	Taste
Control	7.0 <sup>a</sup>	6.8 <sup>a</sup>	7.5 <sup>a**</sup>	7.6 <sup>a*</sup>
Palm stearin	6.1 <sup>a</sup>	5.9 <sup>a</sup>	5.9 <sup>b</sup>	5.5 <sup>b</sup>
Palm olein	6.3 <sup>a</sup>	5.8 <sup>a</sup>	6.0 <sup>b</sup>	6.1 <sup>b</sup>
Palm kernel oil	6.0 <sup>a</sup>	5.7 <sup>a</sup>	6.2 <sup>b</sup>	6.1 <sup>b</sup>
Palm oil	6.7 <sup>a</sup>	6.5 <sup>a</sup>	5.9 <sup>b</sup>	6.2 <sup>b</sup>

Notes: The higher the score, the better the product.

Numbers with similar superscript within a column are not significantly different:

\*\* p < 0.01

\* p < 0.05

The type of cooking application determines whether one or more of these functions are necessary.

Some important functional attributes of melted cheese on a cooked pizza pie are as follows:

- melt time - an index of how rapidly the shredded cheese on a pizza pie melts and flows into a homogeneous molten mass showing no traces of shred identity;
- flowability - a measure of the degree of flow;
- stretchability – a measure of the tendency to form cohesive strings or sheets when extended; and
- apparent viscosity- a measure of chewiness.

Upon baking, a good quality pizza cheese melts relatively quickly, flows adequately to give the desired degree of surface coverage, and possesses the desired degrees of chewiness and stretchability, which, perhaps more than other functional properties, endow pizza pie with its unique culinary qualities (Fox *et al.*, 2000).

### ADVANTAGES

1. Versatility in flavour and colour of product to suit local consumption.
2. Cholesterol free, non-dairy cheese.
3. Minimal processing time.
4. Maximize the use of palm-based products.
5. Reduce import of cheese for pizza topping.
6. Tailor made to suit the requirements of manufacturers/consumers.
7. High yield.

### ECONOMIC FEASIBILITY

1. Milk (100 litres) is required to yield 10 kg of cheese (natural mozzarella cheese).
2. Retail price of natural mozzarella cheese (block/ shredded) = RM 35-RM 40/kg

3. Casein (500 g) is required to yield 2 kg of palm-based mozzarella cheese.
4. Cost of producing palm-based mozzarella cheese = RM 20-RM 25/kg.

Sensory evaluation analysed by MPOB staffs and students from institutions of higher learning revealed no significant difference ( $p < 0.05$ ) for colour and appearance between the palm-based mozzarella cheese and the control sample (*Table 1*). However, significant differences in taste and flavour were detected due to the replacement of milkfat with palm-based products. This could be rectified with the addition of artificial flavours. For all attributes evaluated (colour, appearance, odour and taste), palm oil mozzarella cheese ranked as the most preferred sample.

### CONCLUSION

Palm-based products such as palm oil, palm olein, palm kernel oil and palm stearin can successfully be incorporated into the formulation of mozzarella cheese as a substitute for milkfat. Palm oil and palm olein mozzarella cheese were the preferred samples. Palm-based mozzarella cheese has the advantage of flavour versatility to suit the taste buds of local consumers. Its processing technique is less tedious and time consuming but the yield is more lucrative compared to its natural counterpart.

### REFERENCES

FOX, P E; GUINEE, T P; COGAN, T M and MCSWEENEY, P L H (2000). *Fundamentals of food science*. Aspen Publication. Maryland.

KINDSTEDT, P S and GUO, M R (1997). Recent developments in the science and technology of pizza cheese. *Australian Journal of Dairy Technology*, 52: 41-43.

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