

Frozen dough is an important product for in-store bakery and food service operations. It retains the flavour as fresh bread dough and easy to use. However, it has to be thawed first before it can be used. Frozen dough dominates the food market covering sectors such as supermarkets, restaurants, institutions and catering businesses. In China, bakery industry is growing rapidly with an annual throughput of 1.6 million tonnes of bakery products.

TECHNOLOGY OFFERED

The technology offered is palm-based specialty oil formulation for frozen Chinese dough production. The baking quality of frozen dough bread made from palm-based specialty oil and commercial oil was compared (Table 1). Palm-based specialty oil met the industrial requirements for frozen Chinese dough.

INGREDIENT AND PROCESSING

The frozen dough specialty oil was formulated using palm-based interesterified (IE) fat. The processing condition was similar to margarine production (Figure 1).

PRODUCT CHARACTERISTICS

Palm-based specialty oil for frozen Chinese dough with an oil-in-water (O/W) portion provides a good emulsion stability, which gives specific volume of the loaves and good sensory quality.

The specific volume of the loaves after baking is 4.26 ml g⁻¹. The crumb firmness of frozen dough bread made from the specialty oil and commercial shortening is 2695.26 and 3328.88 N cm⁻² respectively.

TABLE 1. BAKING QUALITY OF FROZEN DOUGH BREAD MADE OF SPECIALTY OIL AND COMMERCIAL OIL

Oils and fats product	Type	Specific volume (ml g ⁻¹)	Score sensory evaluation (Total: 100)
Margarine (Brand: Hua Qi)	W/O	3.75	71.0
Shortening (Brand: Beihai)	No water	3.82	71.0
Shortening (Brand: Shuanghui)	Lard based shortening, no water	3.90	72.5
Specialty oil	O/W	4.26	76.5

Note: W/O = water-in-oil; O/W = oil-in-water.

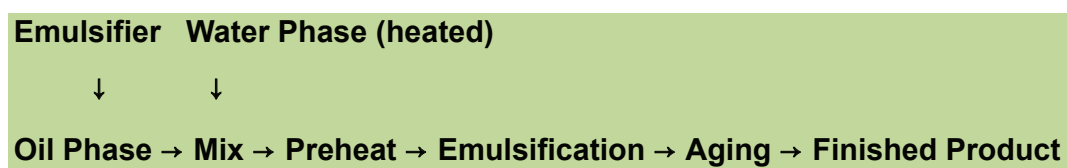


Figure 1. Process flow for palm-based specialty oil.

TABLE 1. ESTIMATED EXPENDITURE AND ECONOMIC VALUES

Item	Value
Capital asset (IE) RMB	RMB 1 000 000 (RM 614 052.47)
Benefit to cost ratio	1.01
Payback period, (yr)	4
Internal rate of return (IRR),%	17.63
Net present value (NPV) @10%	RMB 2 567 949 (RM 1 576 939.74)
Return on investment (ROI), %	24

NOVELTY

Trans free palm-based specialty oil for frozen Chinese dough.

BENEFITS AND ADVANTAGES

- Free from *trans* fatty acids.
- Free from cholesterol.

ECONOMIC EVALUATION

Bakery industry in China is growing rapidly in recent years with its annual throughput of 1.6 million tonnes of bakery products.

Conventionally, the bread products contain up to 20% specialty oils.

The investment in the production of the palm-based specialty oil for frozen dough is financially

feasible as shown in *Table 1*. The estimated total investment is RMB 44 000 000 (RM 27 000 000) with a capital expenditure for interesterification equipment of approximately RMB 1 000 000 (approximately RM 617 057). The parameters are evaluated based on the price of palm-based specialty oil for frozen Chinese dough of RMB 7.00 kg⁻¹.

CONCLUSION

The formulated palm-based specialty oil for frozen Chinese dough meets the desired SFC similar to that of the commercial products at 10°C-45°C. It also gives a good specific volume of the loaves and sensory quality as well as delays the staling rate of bread.

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