

RAPID-ENERGY BISCUIT BY INCORPORATING MEDIUM CHAIN TRIGLYCERIDES (MCTs)

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Biscuits are a very popular snack food. They contain basic ingredients such as flour, fat, sugar, egg, flavour, and leavening agent, similar to cake but at different proportions. In biscuits, fat or shortening may be selected to aid in producing the most desirable spread, to produce volume or to furnish other textural attributes (Andres, 1985).

Important characteristics for biscuits are their texture and flavour. Texture is the composite of those properties that arise from the physical structural elements and the manner in which it is registered by the physiological senses.

Biscuits formulated for health have shown 152% growth over the past three years from 1998 and are now worth US\$100 million a year. Other developments showed that *healthy* formulations, whether by reducing fat or sugar and salt, were on offer across the entire range of prepared foods. Among the market leaders were Heinz (Shape), and United Biscuits (Go-Ahead) (Berger, 1998).

For Malaysia, in absolute terms, the sales value of the biscuit industry expanded markedly from RM 83.8 million in 1980 to RM 294.2 million in 1990. It breached the RM 300 million mark a year later, when it recorded a sales value of RM 343.4 million (UMBC Business Report, 1993). The export value of biscuits rose sharply from RM 0.6 million in 1988 to RM 64 million in 1991.

It is encouraging to note that the export of biscuits continues to show good growth potential. Notwithstanding this, local biscuit manufacturers should continually look abroad to explore and exploit available opportunities for further expansion. This is because the domestic market for biscuit is rather small, and hence likely to limit the potential of local biscuit manufacturers from expanding at a much faster pace.

There are a number of challenges which biscuit manufacturers would have to face in order to position themselves as major producers and exporters in the world

market. These challenges relate primarily to key areas such as production technology, product development, market development and positioning.

Medium chain triglycerides (MCTs) are specialty oils consisting mainly of 1% - 2% C6, 65% - 75% C8, 25% - 35% C10 and 2% C12. Although MCTs are fats, they are different from conventional fats and oils (Babayan, 1968) and sometimes tend to behave more like carbohydrates. The caloric value of fat is 9 kcal g⁻¹ while that of MCTs is 8.3 kcal g⁻¹. MCTs are a concentrated source of energy compared to 4 kcal g⁻¹ for carbohydrates and protein. MCTs are nearly colourless oils with neutral odour.

TABLE 1. TYPICAL MCT OIL SPECIFICATIONS

Free fatty acids (% as lauric acid)	0.1
Saponification value (mg KOH g ⁻¹)	345–355
Iodine value (g I ₂ /100 g)	1.0
Colour (Lovibond)	1.0R 10 Y
Unsaponifiable matter (%)	0.5
Hydroxyl value (%)	5.0

Source: adapted from Babayan (1968).

Unlike conventional triglycerides, MCTs are absorbed through the portal vein and not through the lymphatic system. They are not carnitine dependent for transport, do not require chylomicron formation and are less likely to be stored in adipose tissue. They are readily metabolized for energy, more easily oxidized through the β -oxidation pathway compared to regular triglycerides.

The demand for rapid-energy food products designed for specific sport activities will potentially increase the use of MCT as a concentrated source of rapid energy. Although MCTs have not been shown to enhance performance parameters such as speed, their daily consumption is nevertheless believed by some to increase endurance (Merolli, 1997).



A higher standard of living coupled with increased income among Malaysians has created a niche market for highly specialized functional food for health benefits.

The idea of producing high-energy biscuits as functional food by incorporating and formulating these with MCTs has a place in the current trends. In particular, interest in functional foods has increased.

PALM-BASED MCTs BISCUIT

We have successfully developed a biscuit formulation that incorporates sufficient amount of MCTs without compromising the textural and rheological properties of the biscuits. This proprietary biscuit formulation is currently being offered to interested commercial organizations for production and subsequent sale in local and international markets.

Sensory evaluations, textural analysis and stability tests on the formulated product indicate that this is comparable to premium biscuits in the market. *Figure 1* is the flow chart of biscuits production and *Figure 2* shows the biscuit produced using our current formulations.

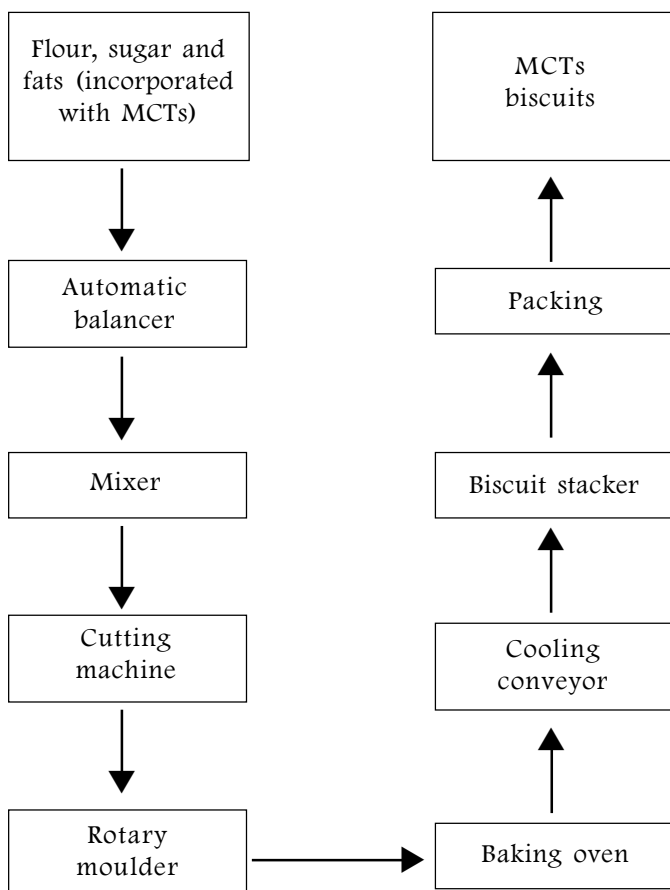


Figure 1. The flow chart of biscuits production.

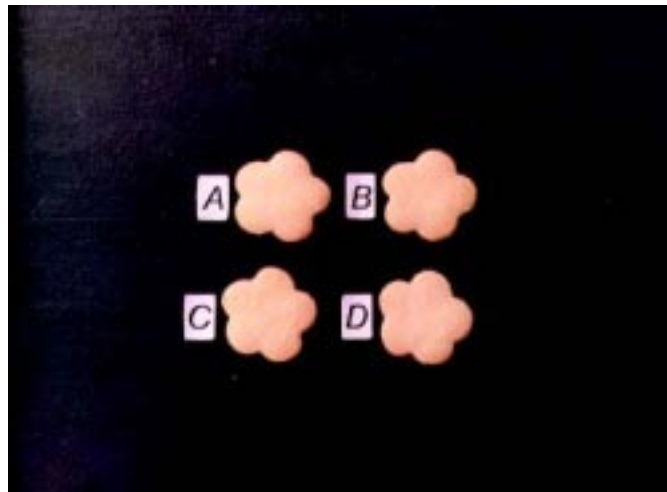


Figure 2. The MCTs biscuits.

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