PALM-BASED DIETARY FIBRE FOR FOOD INDUSTRY

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Palm-based dietary fibre is an innovative functional food ingredient derived from palm fruit fibre through mechanical processing. The technology converts palm fruit fibre into high-value dietary fibre suitable for food applications, particularly as a fibre enrichment ingredient in bakery and functional food products.

Background and Market Context

The global demand for dietary fibre has increased significantly due to rising consumer awareness of health and wellness, particularly in managing chronic diseases such as diabetes (Xu et al., 2022). Commercial dietary fibres are widely used in the food industry; however, their cost remains relatively high. Meanwhile, palm fruit fibre is abundantly available in Malaysia (Parveez et al., 2025) being primarily used for biofuel generation and bio-composite production but is largely underutilised in food segment. From a nutritional perspective, palm fruit fibres are rich in insoluble dietary fibre, offering untapped potential for value-added food applications.

Problem Statement

The utilisation of palm fruit fibres has been predominantly directed toward low-value applications. At the same time, the food industry relies on relatively expensive commercial dietary fibres, creating a market need for cost-effective alternatives. Developing a method to convert palm fruit fibres into dietary fibre addresses both issues. It provides the food industry with an affordable and functional ingredient while creating additional revenue streams for palm oil millers through the recovery and valorisation of biomass.

THE TECHNOLOGY

Objective

The objective of this technology is to develop a cost-effective method to convert palm-based materials into functional dietary fibre with properties comparable to commercial products. The technology aims to enhance the value of oil palm by-products while providing a sustainable and affordable ingredient for the food industry.

Methodology (Field Trial Study)

The technology involves mechanical processing of palm fruit fibres, including pretreatment and controlled processing to obtain suitable fibre characteristics (*Figure 1*). The resulting dietary fibre is formulated and incorporated into food products such as cookies and bread. Sensory evaluation was conducted to assess appearance, colour, smell/aroma, mouthfeel/texture, taste/flavour and overall acceptability. The results demonstrated that products containing palm-based dietary fibre performed comparably to commercial products (*Figure 2* and *3*).

NOVELTY OF THE TECHNOLOGY

The technology introduces a novel approach to converting low-value palm fruit fibres into food-grade dietary fibre using fully mechanical processing methods. It demonstrates comparable functional and sensory performance to commercial dietary fibres while utilising an abundant agricultural by-product. This approach promotes sustainable resource utilisation and adds value to the oil palm industry.

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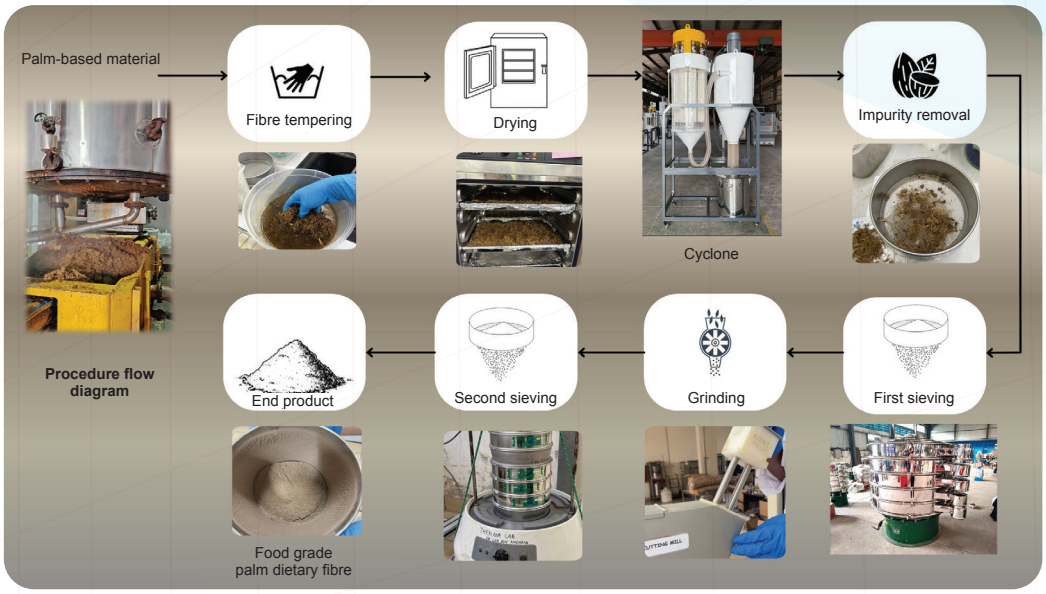

Figure 1. Procedure flow diagram of palm dietary fibre.

Figure 2. From left to right: Comparison appearance of the appearance of cookies prepared from flour containing 0% (control), 5% and 10% palm-based dietary fibre.

Figure 3. From left to right: Cross-sectional views of sandwich loaves prepared from wheat flour substituted with 0% (control), 5% and 10% palm-based dietary fibre.

BENEFITS AND ADVANTAGES

The palm-based dietary fibre offers a cost-effective alternative to conventional dietary fibres with comparable functional properties (Teh & Lau, 2025, in press). It provides potential health benefits, including the ability to reduce blood glucose and cholesterol levels. The technology supports waste valorisation and promotes a circular economy by utilising oil palm by-products. Additionally, it enhances the economic value of palm oil milling activities and maintains consumer acceptability in food applications.

ECONOMIC ANALYSIS

The ex-factory cost of palm-based dietary fibre is approximately RM1.10/kg. The selling price of food-grade dietary fibre in the RM5.00–RM20.00/kg range typically corresponds to fibres derived from agricultural by-products such as grain husks and brans. These fibres are widely used in high-volume food applications, including bakery and processed foods, where they are used to enhance nutritional value and functionality. The economic analysis of palm-based dietary fibre is shown in *Table 1*. This significant cost advantage enables competitive pricing and strong market positioning. The growing demand for functional and health foods further enhances commercialisation potential. The technology also provides opportunities for industry collaboration, licensing and integration into existing palm oil and food processing industries.

IMPACT

The technology contributes to sustainable development by reducing agricultural waste and promoting resource efficiency. It supports the growth of the functional food sector and provides

TABLE 1. ECONOMIC ANALYSIS OF PALM-BASED DIETARY FIBRE FOR FOOD INDUSTRY

Economic analysis	Value
Initial CAPEX	RM 1,400,000.00
Net present value (NPV)	RM 15,874,896.00
Internal rate of return (IRR)	148.56%
Discounted payback period	0.7 year
Discounted benefit: Cost ratio	1.97: 1

Note: The value is based on production of 10 t/day. The initial capital expenditure (CAPEX) includes purchase of equipment (vibrating screen, washer, industrial dryer, industrial grinder and GMP-compliant packaging plant), purchase of vehicles and renovation/civil and structural.

an alternative food ingredient for consumers. Additionally, it strengthens the economic sustainability of the oil palm industry by creating new revenue streams from palm-based material utilisation.

IP STATUS

The technology is protected under MPOB trade secret (MPOB RD 007/2024 and MPOB RD 008/2024). This allows knowledge transfer for commercial use while maintaining a competitive advantage.

CONCLUSION

Palm-based dietary fibre presents a promising, sustainable and cost-effective alternative to conventional dietary fibres. With comparable functional, sensory and health benefits, the technology has strong potential for commercialisation while addressing key challenges in both the oil palm and food industries.

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