

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF GLUTEN-FREE
COCOS NUCIFERA (COCONUT)
PULP FLOUR AND ITS IMPACT ON
QUALITY OF MALAY
TRADITIONAL KUIH**

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MSc

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.


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ABSTRACT

Gluten is an essential protein which is found in cereal crops such as wheat, rye, barley, and oat. It exhibits an elasticity property that aids in the shaping of food products into various suitable shapes and forms. However, despite its crucial role in food production, it has a negative impact on gluten intolerant individuals. Hence, the motivation behind this study to produce an alternative gluten-free flour from leftover coconut pulp (LOCP). The physicochemical properties (colour, water activity, and milling yield), chemical (proximate analysis, gluten, and peroxide value), and microbial content of LOCP being identified. The LOCP was used to formulate a gluten-free *Apam balik kuih* (ABK) and compared with wheat flour by testing their physical and sensorial acceptability (semi-trained panel and consumer analysis). The LOCP flour was produced using three major processes, encompassing drying, grinding, and sieving. The dehydration process at 40°C for 3 hours was found to be appropriate for producing LOCP flour. The results for the physical analysis emanated with LOCP flour having a water activity of 0.47±0.01, colour analysis of 65.94±0.04 (L*), 9.67±0.02 (a*), and 12.25±0.01 (b*). Consequently, the physical analysis resulted in a yield value of 51.43%. In terms of chemical analysis, results showed that LOCP flour had a moisture content (7.1±0.37g), ash (1±0.05g), crude fibre (60.3±0.54g), protein (4.0±0.78g), fat (20.6±0.42g), carbohydrate (67.3±0.87g) and for energy (471kcal). Moreover, wheat (control sample) had a moisture content (11.92±0.24g), ash (0.47±0.03g), crude fibre (2.7±0.73g), protein (10.33±0.66g), fat (1±0.15g), carbohydrate (76.31±0.75g) and energy (364kcal). Gluten identification result of the LOCP flour also suggested to be gluten-free (<2 mg/kg). The microbial analysis which was conducted for 10 weeks, resulted in the following peroxide values; 0 day (4.30±0.01), week 2 (11.34±0.13), week 4 (19.13±0.04) week 6 (27.14±0.01) and week 10 (18.90±0.07) meq/kg. The LOCP flour exhibited the following total plate count; 0 day (5.04±0.02), week 2 (4.85±0.06), week 4 (5.85±0.04) week 6 (4.00±0.05) and, week 10 (3.62±0.11) cfu/g. In terms of physical and sensorial analysis of the *kuih*, 3 sets of *kuih* were evaluated, encompassing the original ABK, the mixture flour ABK (i.e. 100% LOCP flour and rice flour), and the 100% LOCP flour ABK. In terms of the physical analysis, the water activity of all *kuih* samples were below the pathogenic bacteria growth level (<0.85). Also, the original ABK was harder and firmer than the two formulated *kuih*; however, in terms of springiness, the original ABK was less than formulated *kuih*. The sensorial analysis involved the services of a trained panel, who chose the mixture flour ABK as the best on the basis of colour, appearance, mouthfeel, and taste. Based on the findings, LOCP flour can be a suggested gluten-free alternative for gluten intolerant people.

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