

Replacement of Palm Oil with Refined Coconut Oil in Bakery Products – Biscuit Manufacturing

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Palm-oil (PO) is a primary ingredient for confectionery industry in Sri Lanka. At present, government of Sri Lanka has banned the cultivation and importation of oil palm to encourage the utilization of coconut oil (CO). Thus, this research was conducted to evaluate the replacement of PO with CO for making soft dough biscuit (MARI). The dough preparation was done with five oil combination, namely OB1 (100% CO), OB2 (75% CO), OB3 (50% CO), OB4 (25% CO) and OB5 (100% PO). Physio-chemical properties of oil blends and oil in biscuits after baking process were compared using standard methods. The MARI was further evaluated to its physic-chemical, and biological properties by using commercial MARI as a reference sample. Significantly low level of peroxide, Iodine, free fatty acid, conjugated diens and triens, moisture content, refractive index, relative density and melting point were observed in OB1 as 0.80 ± 0.80 meqO₂/kg, $2.90 \pm 0.14\%$, $0.03 \pm 0.01\%$, $0.02 \pm 0.03\%$, 0.0005% , $0.03 \pm 0.008\%$, 1.4480 , 0.917 g/ml and 24.42 ± 0.63 °C respectively and values were increased by palm oil substitution and OB5 contained higher values as 4.60 ± 0.20 meqO₂/kg, $9.38 \pm 0.21\%$, $0.14 \pm 0.06\%$, $0.1328 \pm 0.05\%$, 0.0033% , $0.037 \pm 0.01\%$, 1.4580 , 0.9091 g/ml and 27.42 ± 0.38 °C respectively. Moreover, these values were increased by baking process and high level of peroxide, free fatty acid, conjugated diens and triens were observed in pure palm oil added biscuit sample as 6.74 ± 0.33 meqO₂/kg, $1.70 \pm 0.48\%$, $39.45 \pm 0.30\%$ and $0.27 \pm 0.02\%$ and low in pure coconut oil added sample as 4.69 ± 0.61 meqO₂/kg, $0.78 \pm 0.05\%$, $28.40 \pm 0.08\%$ and $0.18 \pm 0.005\%$, respectively. Adhesiveness, fracturability, hardness, thickness, spread ratio and diameter of OB1 did not show significant difference ($p > 0.05$) compared to the commercial MARI and OB5. OB1 was the preferred sample by semi-trained sensory panel and no objectionable characteristics of OB1 were observed due to coconut oil. Therefore, refined bleached and deodorized coconut oil can be used for production of soft dough biscuit MARI instead of palm oil.

Keywords: Coconut oil, Oil blenders, MARI, Palm oil, Physio-chemical properties