

Effects of Process Parameters on the Yield of Oil from Coconut Fruit

Authors : Ndidi F. Amulu, Godian O. Mbah, Maxwell I. Onyiah, Callistus N. Ude

Abstract : Analysis of the properties of coconut (*Cocos nucifera*) and its oil was evaluated in this work using standard analytical techniques. The analyses carried out include proximate composition of the fruit, extraction of oil from the fruit using different process parameters and physicochemical analysis of the extracted oil. The results showed the percentage (%) moisture, crude lipid, crude protein, ash, and carbohydrate content of the coconut as 7.59, 55.15, 5.65, 7.35, and 19.51 respectively. The oil from the coconut fruit was odourless and yellowish liquid at room temperature (30°C). The treatment combinations used (leaching time, leaching temperature and solute: solvent ratio) showed significant differences ($P < 0.05$) in the yield of oil from coconut flour. The oil yield ranged between 36.25%-49.83%. Lipid indices of the coconut oil indicated the acid value (AV) as 10.05 NaOH/g of oil, free fatty acid (FFA) as 5.03%, saponification values (SV) as 183.26 mgKOH-1 g of oil, iodine value (IV) as 81.00 I₂/g of oil, peroxide value (PV) as 5.00 ml/ g of oil and viscosity (V) as 0.002. A standard statistical package Minitab version 16.0 program was used in the regression analysis and analysis of variance (ANOVA). The statistical software mentioned above was also used to generate various plots such as single effect plot, interactions effect plot and contour plot. The response or yield of oil from the coconut flour was used to develop a mathematical model that correlates the yield to the process variables studied. The maximum conditions obtained that gave the highest yield of coconut oil were leaching time of 2 hrs, leaching temperature of 50 °C and solute/solvent ratio of 0.05 g/ml.

Keywords : coconut, oil-extraction, optimization, physicochemical, proximate

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