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Comparative Study of the Effects of Process Parameters on the Yield of Oil from Melon Seed (Cococynthis citrullus) and Coconut Fruit (Cocos nucifera)

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Abstract : Comparative analysis of the properties of melon seed, coconut fruit and their oil yield were evaluated in this work using standard analytical technique AOAC. The results of the analysis carried out revealed that the moisture contents of the samples studied are 11.15% (melon) and 7.59% (coconut). The crude lipid content are 46.10% (melon) and 55.15% (coconut).The treatment combinations used (leaching time, leaching temperature and solute: solvent ratio) showed significant difference ($p < 0.05$) in yield between the samples, with melon oil seed flour having a higher percentage range of oil yield (41.30 – 52.90%) and coconut (36.25 – 49.83%). The physical characterization of the extracted oil was also carried out. The values gotten for refractive index are 1.487 (melon seed oil) and 1.361 (coconut oil) and viscosities are 0.008 (melon seed oil) and 0.002 (coconut oil). The chemical analysis of the extracted oils shows acid value of 1.00mg NaOH/g oil (melon oil), 10.050mg NaOH/g oil (coconut oil) and saponification value of 187.00mg/KOH (melon oil) and 183.26mg/KOH (coconut oil). The iodine value of the melon oil gave 75.00mg I2/g and 81.00mg I2/g for coconut oil. A standard statistical package Minitab version 16.0 was used in the regression analysis and analysis of variance (ANOVA). The statistical software mentioned above was also used to optimize the leaching process. Both samples gave high oil yield at the same optimal conditions. The optimal conditions to obtain highest oil yield ≥ 52% (melon seed) and ≥ 48% (coconut seed) are solute - solvent ratio of 40g/ml, leaching time of 2hours and leaching temperature of 50oC. The two samples studied have potential of yielding oil with melon seed giving the higher yield.

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