Comparison of Yield and Physicochemical Properties of Virgin Coconut Oil Extracted by Different Methods

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Virgin coconut oil (VCO) is extracted from mature coconut meat without the use of high heat or chemicals. This process helps retain the natural flavour, aroma, and nutrients of the coconut oil. In this study three distinct methods were used to extract VCO: The Modified Natural Fermentation Method (MNFM), the Modified Kitchen Method (MKM) and the Direct Heat Method (DHM). The physicochemical properties of the extracted VCO were then compared to a commercial control sample and the standards established by the Asia Pacific Coconut Community and the Codex Alimentarius Commission. The highest yield was obtained using the MNFM (32.83kg/100kg) and the lowest VCO yield was given by DHM (19.15kg/100kg). The total medium-chain fatty acids in the extracted oil ranged from 56.5 % to 62.0 % of the total fatty acids, while the commercial control sample contained 63.7 %. Lauric acid content ranged from 45.3 % to 48.6% with the highest lauric acid content reported in the oil extracted by MNFM. The peroxide value, which indicates rancidity due to the formation of aldehyde and ketones, was measured using the AOAC standard method. The oil extracted using the DHM exhibited the highest peroxide value ($2.52 meqkg^{-1}$) while the MNFM yielded the lowest ($0.86 meqkg^{-1}$). The DPPH assay was used to measure the antioxidant activity. EC_{50} values were 6.63 mg/ml for the MNFN, 10.12 mg/ml for the MKM, 15.23 mg/ml for the DHM and 39.42 mg/ml for the commercial sample. The moisture content of all extracted oils and commercial samples was below 0.05%, meeting the acceptable level for cooking oil. Physical properties were analyzed by a sensory panel with eight persons. The MNFM produced a strong pleasant coconut aroma, whereas the MKM and DHM produced a milder pleasant coconut aroma. All methods yielded colourless VCO without any turbidity. Rancidity was assessed in all samples by monitoring changes in aroma over four months and no changes in aroma were detected in any of the three samples. All physical and chemical properties were within the ranges specified by international standard bodies. The Modified Natural Fermentation Method and the Modified Kitchen Method are the most suitable methods for VCO production.

Keywords: Virgin Coconut Oil, Modified Natural Fermentation Method, Modified Kitchen Method, Direct Heat Method