

**EXTRACTION OF CRUDE COCONUT OIL FROM INDUSTRIAL
COCONUT WASTE AND DETERMINATION OF ITS PHYSICO-
CHEMICAL AND ANTIMICROBIAL PROPERTIES**

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture
Uva Wellassa University

In partial fulfilment of the requirements for the award of
Bachelor of Science in Palm and Latex Technology and Value Addition

By

UDAWALA HEWAGE DILUSHA AKALANKA KARUNARATHNE

Palm & Latex Technology and Value Addition Degree program

Faculty of Animal Science and Export Agriculture

Uva Wellassa University of Sri Lanka

2018

ABSTRACT

Coconut oil is one of the highly beneficial natural oil with many of the hidden medicinal values. High amount of low-fat coconut residue and sludge water is removed from coconut processing industry without any use. This study was conducted to extract oil from coconut residue and sludge water in order to compare the properties of extracted oil. Oil was extracted from 10 L of industrial sludge water by density separation. Low fat coconut residue was taken and oil was extracted using solvent extraction technique. N-hexane and Di-ethyl ether were two solvents used. Coconut residue (5 g) was taken and both solvents were added separately 1:1, 1:2, 1:3, 1:4 ratios and kept in water bath for 04 different time intervals (2, 4, 6, 12 h) at 37 °C. Later, the solvent was separated from the residue and kept in oven at 40 °C to remove the solvent and the oil was obtained. The physicochemical parameters were determined by standard methods using commercial coconut as control. According to the statistical results, there was a significant difference between the yields of two solvents ($p < 0.05$) with the best yield of for N-hexane in 1:4 ratio with 4 h retention time (20.14%), whereas yield obtained from sludge was 5.00%. Proximate analysis shown that the fat content in residual coconut was $28.33\% \pm 0.38$. According to the chemical analysis, peroxide ($\text{mg peroxide kg}^{-1}$), acid values and moisture content were 2.85 ± 0.09 , 1.39 ± 0.01 , 1.26 ± 0.09 , 1.59 ± 0.01 and 1.36 ± 0.03 , 0.097 ± 0.00 , 0.099 ± 0.00 , 42.2 ± 1.29 , and $1.23\% \pm 0.00$, $0.99\% \pm 0.00$, $1.49\% \pm 0.01$, $9.25\% \pm 0.02$ for commercial oil, hexane, ether extracted oils and sludge oil respectively. The TBARS results showed that oil extracted using hexane have less oxidation than control ($P < 0.05$). This study concludes that low fat residue and sludge water is no longer wastage and it contains significant amount of oil with good chemical properties. However further studies need to check the composition in the extracted oils.

Keywords: Low fat, Sludge, Extraction, Chemical properties