

**OIL RECOVERY FROM DESICCATED
COCONUT PROCESS WATER TO PRODUCE
HIGH QUALITY COCONUT OIL**

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ABSTRACT

Sri Lanka is the second largest producer of desiccated coconut (DC) in the world. A typical factory with a daily capacity of 50,000 coconuts discharges 40,000 to 60,000 liters of wastewater per day. The high fat content of the wet process water is the major environmental problem caused by the DC mills. A pilot scale system for recovery of high quality coconut oil from the DC process water was developed aiming at the reduction of the environmental problems. The oil recovery system consists of four main successive sections: The first one included collection of wet process water into a collection tank using PVC gutters and pipes. The second stage was separation of coconut milk (light cream) with 30% fat content and aqueous portion with 0.5% fat content using a gravity separation tank made out of stainless steel. The third section of the procedure was concentration of the light cream and produces a thick cream containing 50% oil and 30% moisture. In the last stage the thick cream was heated in a steam jacketed kettle using steam at $100\pm 2^{\circ}\text{C}$ under different time periods to break the emulsion. The results showed that heating duration of 2 ½ hrs represented the most effective extraction conditions with an oil yield of 8 L from 20 L of thick cream. The final outcome of the whole procedure was a coconut oil with characteristic appearance and pre-treated wet process water with reduced content in fat.

The extracted oil was analyzed for basic quality parameters. Moisture content, color, saponification value and iodine value of the extracted oil were 0.12%, 0.7 (Y+5R), 262 and 10 respectively. The gas chromatogram showed this oil contained high lauric acid (46.03%), 8.3% of caprylic, 5.5% of capric, 19.57% of miristic, 8.89% of palmitic, 2.63% of stearic, 7.14% of oleic and 1.94% of linoleic acid respectively. Evaluation for shelf life for 2 ½ months showed an increase in free fatty acids content from 0.2% to 0.28% and peroxide value from 0.9 to 2 (ml of 0.002N sodium thiosulphate per one gram of oil). The results of sensory evaluation depicted that the extracted oil is acceptable for edible purposes. The technique for recovering oil from DC wet process water is a significant improvement in both oil quality and profitability over the traditional method.

Keywords: Desiccated coconut wet process water, gravity separation, centrifugation, coconut oil.