STUDY THE FACTORS AFFECTING THE PRODUCTION OF GOOD QUALITY COPRA

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Degree of Master of Science in Sustainable Process Development

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Sri Lanka

November 2011
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Dissertation submitted in partial fulfillment of the requirements for the degree Master of Science in Sustainable Process Development

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November 2011
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Dedication

This project is dedicated,
- to my Parents who have never failed to give me necessary support throughout my journey of life.
- to my teachers who were always behind me during my education.
Acknowledgement

I was supported by many people during this research work. This thesis would not have been a reality without their supports. I am really thankful to Dr. A.D.U.S. Amarasinghe for giving me his fullest support from the beginning. His advices and guidance as my research supervisor were always helpful to me to complete this study. I take this opportunity to acknowledge Dr. P.G. Rathnasiri for his great efforts on coordinating the MSc course and giving me an opportunity to the following the MSc course.

I would like to express my deep gratitude to Mr. Sugath Handunge, Chairman (CDA) and Mrs. Poorasinghe, Head of Quality Assurance division of CDA for allowing me to carry out physicochemical tests for coconut oil. Further, I am grateful to Mr. Amarasiriwardana, Marketing Development and Research Division of Coconut developmat Authority (CDA) for giving me required information on the field of study.

Next, I must mention that support I received from my friends. Mr. Bandara Dissanayake supported me much on finding required information in my research area. Mr. Eric Haputhanthri, Mr. Udes Jayakody, Mr. Janitha Bandara, Mr. M.A.S. Kumara, Mr. Udayanga Senarathna, Mr. K.A. Chandra and Mr. Washeera Wijesinghe helped me much during fabrication of the unit and experimental works. I place on record my sense of gratitude to them for their tremendous support which has offered me great convenience during my works.

I express my deep gratitude to Mr. Saman and all family members for their cordial support given to me during experiments and providing me required raw materials.

I wish to express my thanks to the laboratory staff of Department of Chemical and Process Engineering, University of Moratuwa for their helps during my lab works. I would like to convey special thank to the technical officers; Mr. Jayaweera and Miss. Amali for their assistance during laboratory works.

Last but not least I wish to avail myself of this opportunity, express a sense of gratitude and love to my beloved parents and sister for their manual support, strength, helps and for everything throughout my life.
Abstract
Copa is one of the major traditional products processed from coconuts and is used primarily as a source of coconut oil. It is the kernel of coconut after reducing the moisture content from 50% (wet basis) to 6% (wet basis) by drying. Traditional drying processes are vastly used in manufacturing of copra and that has created many quality problems leading to hygienic and health issues. Hence the coconut oil extracted from copra always is considered as a low value product in world market. Therefore, it is important to introduce cleaner drying methods with minimum quality problems to produce good quality copra.

A small scale, forced convection, solar-biomass hybrid drier was designed, fabricated and tested for drying copra. The dryer is consisted with solar air heater, biomass-stove heat exchanger and drying chamber. The biomass consumption was reduced by more than 60% when the solar air heater was in operation. The dryer was designed with 3 compartments to examine both single bed and multi bed drying characteristics of copra.

Good quality white copra could be produced from the proposed dryer. The multi bed drying was found to be more economical with higher thermal efficiency and lower specific moisture evaporation rate than single bed drying. The production rate of multi bed drying (0.74 kg/hr) was almost double the production rate of single bed drying (0.35 kg/hr). However single bed drying produced considerably high amount of white copra than multi bed drying.

At drying temperatures around 70 °C high fraction (about 80%) of copra became with brown in color. However by maintaining the drying temperatures lower than 60 °C more than 70% of white copra could be produced. Colorless coconut oil with good quality could be extracted mechanically by using both white copra and light brown copra obtained from hybrid drying.

Keywords: Copra, drying, white copra, multi bed drying, single bed drying
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