

EFFECT OF DRYING TEMPERATURE ON THE COMPOSITION OF HYDRO DISTILLED CINNAMON BARK OIL

N.D.I. Kumarage

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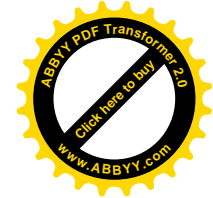
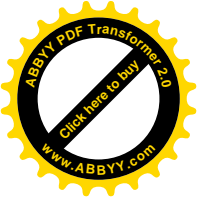
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Nawammalie Dushyantha Iroshini Kumarage

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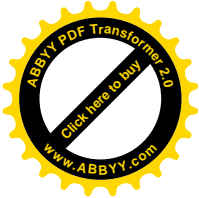
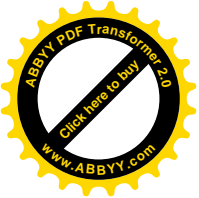
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Thesis submitted in partial fulfillment of the requirements for the degree Master of
Science in Sustainable Process Development

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University of Moratuwa
Sri Lanka

August 2013



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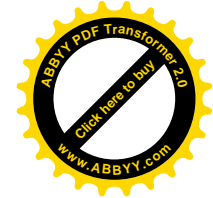
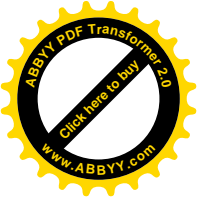
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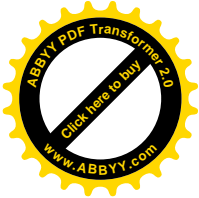
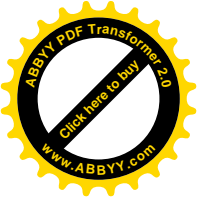
Abstract

Cinnamon (*Cinnamomum Zeylanicum*) is an endemic plant popularly known as “Kurundu” in Sri Lanka. Cinnamon yields mainly cinnamon leaf oil and cinnamon bark oil. Cinnamon bark oil produces by processing dried cinnamon chips. Composition of cinnamon bark oil varies due to many factors including the type and quality of cinnamon chips. Good quality cinnamon chips can be produced by uniform drying. Present study examines the effect of air drying temperature during pre processing of cinnamon chips on the volatile organic compounds of cinnamon bark oil extracted by the method of hydro-distillation of cinnamon chips. Laboratory scale tunnel dryer fitted with an electrical heater was used to dry cinnamon chips at five different air drying temperatures; ambient temperature, 35 °C, 40 °C, 45 °C and 50 °C. The extracted cinnamon bark oil was analysed by gas chromatography-mass spectrometry (GC-MS). A total of 16 compounds were identified, cinnamaldehyde-E, cinnamyl acetate, linalool and eugenol, in that order, being the main volatile organic compounds. Results indicated that air drying temperature of cinnamon chips significantly altered the composition of cinnamon bark oil. Percentage of Cinnamaldehyde-E increased with the increase in drying temperature. High percentage of monoterpenes, cinnamaldehyde and cinnamaldehyde derivatives such as cinnamyl acetate, and 2-methoxy-cinnamaldehyde was observed at low temperature drying. Increase in drying temperature resulted in substantial losses in certain oxygenated terpenes and sesquiterpene. The percentage of cinnamaldehyde-E could be substantially increased by hot air drying but at the expense of oil yield.

Keywords: Bark oil, air drying, volatile organic compounds, cinnamon chips



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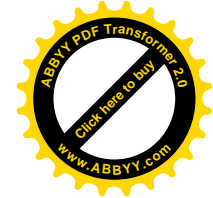
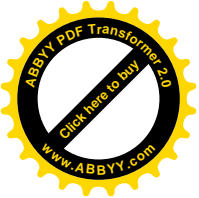


DEDICATION

This thesis is dedicated to my beloved **PARENTS, HUSBAND** and **SON**



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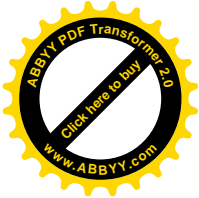
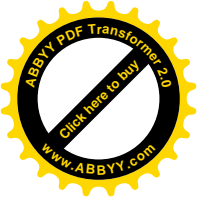
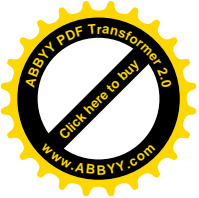
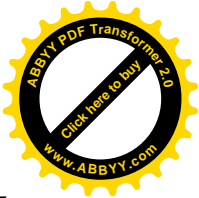


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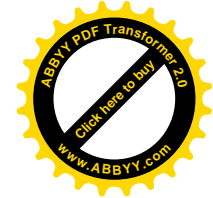
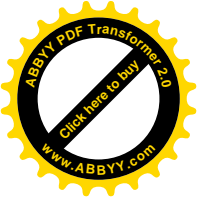
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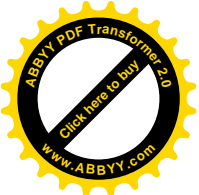


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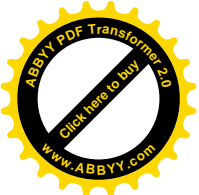
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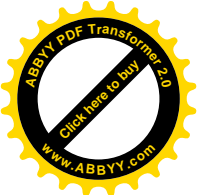
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LIST OF ABBREVIATIONS

Abbreviation	Description
R&D	Research & Deveopment
SNK	Student Newman Keuls
PCA	Principal Component Analysis
SCF	Super Critical Fluids
GLC	Gas Liquid Chromatography
GC	Gas Chromatography
MS	Mass Spectrometry
IR	Infrared
HPLC	High Performance Liquid Chromatography
TTE	1,1,2-trichloro- 1,2,2-trifluoroethane
SDE	Simultaneous distillation extraction
LSD	Least Significant Difference
ANOVA	Analysis of Variance
MST	Mean Square Treatment
MSE	Mean Square Error
PC	Principal Component
DF	Degrees of Freedom
RSD	Relative standard deviation

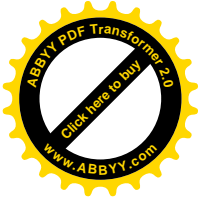
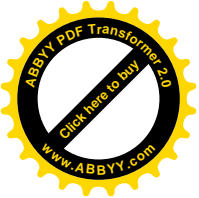


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