

(i)

SELECTED CHEMICAL STUDIES ON
COCOA, CARDAMOM AND NUTMEG WITH
SPECIAL EMPHASIS ON VOLATILE
COMPONENTS.

BY

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A thesis submitted for the degree of Master of Philosophy in Chemistry
at the University of Kelaniya, Kelaniya, SRI LANKA.

September 1986

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ABSTRACT

This thesis comprises 3 parts containing studies on (i) Cocoa sweatings (ii) Cardamom and (iii) Nutmeg.

Studies on cocoa sweatings are detailed in the first part of the thesis.

Cocoa sweatings drain off during the fermentation of cocoa beans and is normally a waste. These sweatings can be fermented by selected yeast cultures to obtain alcohol yield between 5.8% w/v during both minor and major seasons of cocoa production. This fermented alcoholic product contains similar flavour constituents to those reported in coconut toddy. Cocoa toddy and cocoa wine prepared were pronounced organoleptically satisfactory by a taste panel.

By further fermentation by bacteria cocoa toddy can be converted to a mixture of acids. Twenty five to fifty percent of the acid formed was non-volatile and was unidentified - not being a common plant or fermentation acid. The acid was used to coagulate rubber latex which was used to produce RSS 1 smoked sheet rubber which was as good as rubber from latex coagulated with formic acid.

In the second part of the thesis studies on cardamom are described.

Studies on cardamom *Elettaria cardamom* Maton were largely limited to (i) the effect of maturity on oil content and its composition and chlorophyll content (ii) studies aimed at retaining

the green colour of cardamom during and after processing.

Cardamom *Elettaria cardamom* Maton is generally harvested immature in Sri Lanka. The effect on maturity on the appearance of the capsule (including chlorophyll content), essential oil content and composition is reported here. With increase in maturity all the above parameters were altered. The main effect on volatile oil composition was an increase in 1,8 cineole content and a decrease in α -terpinyl acetate content. A preliminary study on storage showed that neither oil content nor its composition varied significantly and that on controlling moisture content chlorophyll losses were retarded.

Studies also showed that the green colour of cardamom, which causes that product to fetch premium prices in the world market, can be retained by modifying conditions of drying primarily relative humidity and temperature.

In the third and final part of the thesis studies on nutmeg oil are described.

Approximately 80 samples of Sri Lanka nutmeg oil (both industrially and laboratory distilled) were examined for relative density, optical rotation and refractive index and also analysed by gas chromatography. Results showed that although the oil resembled the West Indies type nutmeg oil rather than the East Indies type it had distinguishing features. Results of studies on industrially produced samples were as follows: Relative density (30°C/30°C), 0.8690 ± 0.0085 ; optical rotation (30°C), $31.7 \pm 2.7^\circ$; refractive index

(30°C), 1.4726 ± 0.0024 ; sabinene content, $38.9 \pm 12.7\%$; myristicin content, 2.3% (mean) and elemicin content, 1.2% (mean).

On the basis of these studies there appears to be a strong case for revising the Sri Lanka standard for nutmeg oil, Sri Lanka, which at the present time lays down specifications similar to that of the East Indies oil.