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**CHEMISTRY AND BIOACTIVITY OF THE FRUITS OF  
*AVERRHOA CARAMBOLA***

A THESIS PRESENTED BY

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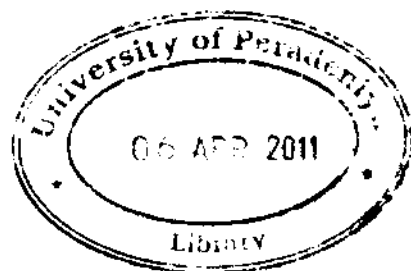
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**CHEMISTRY AND BIOACTIVITY OF THE FRUITS OF**  
***AVERRHOA CARAMBOLA***

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This study describes the detail study of chemistry and bioactivity of the fruits of *Averrhoa carambola* L. and some bioactivity studies of the crude extracts of the fruits of *Limonia acidissima* L., *Elaeocarpus serratus* L. and *Aegle marmelos* L. Preliminary bioassay screening of these extracts indicated that the significant phytotoxic activity and antioxidant activity of crude extracts of *A. carambola* fruit juice than other extracts.

Preliminary studies on both ethyl acetate and *n*-butanol extracts of the fruit juice of *A. carambola* indicated the presence of antioxidant and phytotoxic compounds. Chromatographic separation of the combined ethyl acetate and *n*-butanol extracts over combination of chromatography over silica gel, sephadex LH-20, reverse phase silica and HPLC furnished *cis*-abscisic acid (1), *trans*-abscisic acid (2), *trans*-abscisic alcohol (3), vomifoliol (4), *cis*-abscisic acid  $\beta$ -D-glucopyranosyl ester (5), *trans*-abscisic alcohol  $\beta$ -D-glucopyranoside (6), roseoside (7), *cis*-abscisic alcohol  $\beta$ -D-glucopyranoside (8) and epicatechin (9) identified by detail analysis of NMR and mass spectral data. Qualitative analysis of the antioxidant activity of compounds 1-9 was determined against DPPH (2, 2'-diphenyl-1-picrylhydrazyl) radical by TLC bioautography method. Only the compound 9 showed off white spot on TLC when concentration reduced to 1  $\mu$ g/ spot. Hence the antioxidant property of 9 was quantitatively determined by the spectrophotometric method and 9 showed the strong antioxidant activity with the IC<sub>50</sub> 2.80 ppm compared to the butylated hydroxy anisole (BHA) (4.10 ppm) and Ascorbic acid (3.50 ppm).

Phytotoxicity of 1-9 was evaluated against lettuce seeds (*Lactuca sativa*) germination assay. Compound 4, 5, 8 and abscisic acids showed strong phytotoxicity with the IC<sub>50</sub> -

10, 5, 10 & 5 ppm respectively while 3 and 6 showed moderate phytotoxicity,  $IC_{50}$  80 ppm for both compounds. Compound 7 and 9 did not show any phytotoxicity.

Crude ethyl acetate and *n*-butanol extracts of *L. acidissima*, *E. serratus* and *A. marmelos* were subjected to antioxidant activity (against DPPH), phytotoxicity (against *L. sativa*), cytotoxicity (against *Artemia salina*) and antifungal activity (against *Cladosporium cladosporioides*).

Ethyl acetate and *n*-butanol extracts of *A. carambola* showed strong antioxidant activities in comparison to the crude extracts of *A. marmelos*, *L. acidissima* and *E. serratus*. Ethyl acetate extracts of both *A. carambola* and *E. serratus* were showed strong phytotoxicity. Among the crude extracts of *A. carambola*, *A. marmelos*, *L. acidissima* and *E. serratus*, only the ethyl acetate and *n*-butanol extracts of *A. marmelos* showed the antifungal activity against *C. cladosporioides*. The crude extracts of *A. marmelos*, *L. acidissima* and *E. serratus* showed the strong cytotoxicity against the *Artemia salina* at 500 and 1000 ppm levels while the crude extracts of *A. carambola* did not show any cytotoxicity against the *A. salina*.