BIOACTIVE COMPOUNDS FROM *MICHELIA* AND *PERSEA* SPP.

AND SYNTHETIC STUDIES ON ISOPRENOIDS

A THESIS SUBMITTED BY

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ABSTRACT

This thesis consists of three parts. The first part describes the chemical investigation of the root and stem barks of *Michelia champaca* and *M. nilagirica*. The root bark extract of *M. champaca* contained the alkaloid, liriodenine, the sterol, sitosterol and two sesquiterpene lactones, costunolide and parthenolide, previously reported from this plant together with three more sesquiterpene lactones, 8α-acetoxyparthenolide, magnograndiolide and michampanolide. The latter is a new sesquiterpene lactone with a previously unknown skeleton for which we have given the trivial name, michampane. *M. champaca* stem bark contained 8α-acetoxyparthenolide, parthenolide, sitosterol and the previously reported liriodenine.

M. nilagirica stem bark contained sitosterol, costunolide and parthenolide, while its root bark contained in addition, 8α-acetoxyparthenolide and liriodenine.

The second part of the thesis describes the bioactivity directed fractionation of *M. champaca* and *M. nilagirica* root bark and *Persea gratissima* leaf. The extracts of *M. champaca* and *M. nilagarica* root bark showed herbicidal activity against *Nasturtium* and *Agrostis*, while the former also showed fungicidal

activity against *Cercospora* sp. The compound responsible for the activity was shown to be parthenolide.

P. gratissima leaf extract showed insecticidal activity against *Aedes egyptii* larvae and *Aphis craccivora* adults. The active compound was shown to be heptadec-16-ene-1,2,4-triol. Although four derivatives of the triol were prepared in an attempt to study structure-activity relationships, the triol was found to be much more active than any of the derivatives.

The third part of the thesis describes an attempt to develop a one-step sythesis of a synthon, 2-methyl-6-methylene-2,7-octadien-1-ol, which could be used iteratively in the syntheses of isoprenoids. It was only possible to synthesize the synthon in three steps from the starting material, 2-methyl-6-methylene-1,7-octadien-3-ol. The reaction was, however, used as the basis for a synthesis of β-sinensal in four steps from 2-methyl-6-methylene-1,7-octadien-3-ol through Claisen rearrangement of its vinyl ether, followed by reduction of the ketone formed, halogenation and oxidation of the primary allyl halide to aldehyde with *N*-methylmorpholine *N*-oxide. It was also established that this reagent could be conveniently used to also oxidise primary non-allylic alkyl halides into aldehydes.