

**CHEMICAL CONSTITUENTS OF SOME SRI-LANKAN
ZANTHOXYLUM SPECIES AND THEIR BIOLOGICAL ACTIVITY**

A Thesis submitted by

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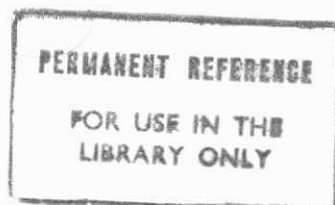
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ABSTRACT

This thesis comprises three parts.

Part 1 consists of an introduction to the family Rutaceae. It is mainly concerned with the phytochemistry and chemotaxonomy of this family. It includes a discussion on types of compounds that have been encountered during previous investigations carried out on this family and a discussion on the taxonomic significance in the distribution of compounds. Particularly this part deals with the previous chemical studies on one Sri Lankan Genus of Rutaceae, Zanthoxylum.

Part 2 describes chemical studies on the stem bark of Zanthoxylum tetraspermum Wight & Arn, and Zanthoxylum caudatum Wight & Arn. belonging to the family Rutaceae.

Chemical constituents of the stem bark of Z. tetraspermum were examined. From the light petroleum extract, sesamin, a lignan, was isolated as a major component along with a new lignan, 2α -[3'-methoxy 4'(3"-methylbut-3-enoxy)phenyl]- α -[3',4'-methylenedioxyphenyl]-3,7-dioxabicyclo(3,3,0)-octane, together with β -sitosterol, β -amyrin, α -amyrin, isoarboréol, betulinic acid, a lechexanthone, one sesquiterpenoid spathulenol and a long chain fatty acid, myristic acid. Its dichloromethane extract contained two new amide derivatives and an aporphine alkaloid, liriodenine. Structures related to isoarnottianamide, arnottianamide, integriamide and iwamide, previously isolated as major bark components of Zanthoxylum species, have been proposed for the two amide alkaloids.

The structures were determined exclusively by spectroscopic analysis. Of the thirteen compounds isolated, three were found to be new natural products and their structure elucidation has been described in detail.

The bark extractives of Zanthoxylum caudatum, a rare endemic plant, were investigated and were found to contain a derivative of the butanolide, hibalactone along with sesamin, one isobutylamide derivative and two other components, β -sitosterol and stigmasterol in the light petroleum extract. The dichloromethane extract of the plant was found to be a rich source of alkaloids and contained two benzophenanthridine alkaloids, decarine and 2,3-methylenedioxy-8-methoxy-9-hydroxy benzophenanthridine and isobutyl amide derivative together with sesamin and sterol. All the features of these structures were established by extensive spectral analysis.

Isolation of lichexanthone and spathulenol from the bark of Z. tetraspermum constitutes the first report of their occurrence.

Part 3 discusses the biological activities of some selected constituents isolated from Z. tetraspermum and Z. caudatum. Medicinal uses and biological properties of Rutaceae species are also discussed.