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**CHEMISTRY AND BIOACTIVITY  
OF SOME SRI LANKAN  
MENISPERMACEAE AND LAURACEAE**

A THESIS SUBMITTED BY

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ABSTRACT

This study consists of two parts. Part I describes the chemistry and bioactivity of two Menispermaceae, Diploclisia glaucescens (Bl.) Diels and Anamirta cocculus (L.) Wight et Arn. and Part II describes the chemistry and bioactivity of alkaloids of two Sri Lankan Lauraceae, Litsea gardneri (Thw.) Hook.f. and Actinodaphne speciosa Nees.

Both D. glaucescens and A. cocculus are woody climbers, growing in Sri Lanka, the southern part of the Indian subcontinent and in other regions of South East Asia.

The stem of each plant was processed for non-quaternary alkaloids. D. glaucescens gave two proaporphine alkaloids stepharine and a new alkaloid, named glaucescine. The latter has been identified as 12-methylisocrotonosine. A. cocculus gave (-)-8-oxotetrahydropalmatine, oxypalmatine and stepharine. All carbon and proton resonance in the latter three alkaloids have been assigned.

Stepharine showed moderate spermicidal activity and weak hypotensive activity.

The methanol extract of the stem of D. glaucescens showed molluscicidal activity and a highly positive response for saponins in both the froth and hemolysis tests. Separation of the methanol extract gave stigmasterol, serjanic acid ( $3\beta$ -hydroxy-30-methoxycarbonylolean-12-en-28-oic acid), phytolaccagenic acid ( $3\beta$ ,23-dihydroxy-30-methoxycarbonylolean-12-en-28-oic acid), ecdysterone and two new saponins 3-O- $\beta$ -D-glucopyranosylphytolaccagenic acid and 3,28-di-O- $\beta$ -D-glucopyranosylphytolaccagenic acid (diploclisin). This is the first report of the isolation of serjanic acid and phytolaccagenic acid from the family Menispermaceae. Ecdysterone, an arthropod

moulting hormone, has been isolated in a yield of 3.2%, the highest recorded for the isolation of any moulting hormone from a natural source.

The procedure for the isolation of ecdysterone has been extended to a large scale by a combination of vacuum liquid chromatography (VLC) and medium pressure liquid chromatography (MPLC).

Ecdysterone showed significant spermicidal activity, moderate insecticidal activity and also gave highly positive froth and hemolysis tests.

The residual methanol extract of D. glaucescens, after removal of 3,28-di-O-β-D-glucopyranosylphytolaccagenic acid (diploclisin), showed highly positive froth and hemolysis tests for saponins. The n-butanol extract of the methanol extract showed highly positive froth and hemolysis tests, high spermicidal activity, molluscicidal activity and anti-inflammatory activity. Chromatographic separation of the n-butanol extract gave four new saponins and vibo-quercitol.

The structures of the four new saponins have been established as 3-O-β-D-glucuronopyranosylserjanic acid, 3-O-β-D-glucuronopyranosylphytolaccagenic acid, 3-O-β-D-glucuronopyranosyl-28-O-β-D-glucopyranosylserjanic acid and 3-O-β-D-glucuronopyranosyl-28-O-β-D-glucopyranosylphytolaccagenic acid. However only the first saponin, 3-O-β-D-glucuronopyranosylserjanic acid showed molluscicidal activity of acceptable order. The third saponin, 3-O-β-D-glucuronopyranosyl-28-O-β-D-glucopyranosylserjanic acid showed mild anti-inflammatory activity.

Chromatographic separation of the n-butanol extract of the defatted stem of A. cocculus gave two triterpenoids and three triterpenoid saponins. Out of the two triterpenoids, the less polar

is a new natural product identified as  $2\alpha,3\beta,23$ -trihydroxy- $11\alpha,12\alpha$ -epoxyolean- $28,13\beta$ -olide. The other is arjunolic acid ( $2\alpha,3\beta,23$ -trihydroxyolean- $12$ -en- $28$ -oic acid) isolated for the first time from the family Menispermaceae and reported to be useful in the treatment of skin cancer.

Out of the three triterpenoid saponins, one is a known compound,  $28\text{-O-}\beta\text{-D-glucopyranosylarjunolic acid}$  obtained for the first time from the family Menispermaceae. The hitherto unreported saponins are  $23\text{-O-}\beta\text{-D-glucopyranosylarjunolic acid}$  and a  $28\text{-O-}\beta\text{-D-glucopyranosyl-}1\alpha,3\alpha,23\text{-trihydroxyolean-}12\text{-en-}28\text{-oate}$ .

All five compounds showed neither antifungal nor molluscicidal activity.

## Part II

The mature stem of L. gardneri and leaves of A. speciosa were processed for non-quaternary alkaloids. L. gardneri gave two aporphine alkaloids actinodaphnine and laurolitsine whereas A. speciosa gave two aporphine alkaloids N-methyllaurotetanine and laurotetanine together with N-methylcoclaurine.

Antibacterial activity was observed only for laurolitsine.

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