CHEMISTRY AND ANTIVIRAL/ANTI-HIV ACTIVITY STUDIES OF FAMILY CLUSIACEAE

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GISHANTHI P. K. MARASINGHE

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ABSTRACT

This thesis describes the chemistry and antiviral/HIV activity studies of *Calophyllum cordato-oblongum* and *Calophyllum moonii*.

The twigs of *C. cordato-oblongum* have been shown to contain the 12-*O*-methylcordatolide A, 12-*O*-methylcordatolide B, 12-*O*-methylcordatolide C, three reported pyranocoumarins; (cordatolides A and B, oblongulide), friedelin, canophyllol and sitosterol. Methylation of cordatolide B and attempted methylation of cordatolide A under acidic conditions gave the 12-*O*-methylcordatolide B and 11,12-anhydrocordatolide. These findings together with the results of the methylation of soulattrolide and inophyllum A have led to the proposed mechanism for the methylation of the 12 hydroxy group of *Calophyllum* pyranocoumarins. The methyl ethers of cordatolide A, B and C as well as 11,12-anhydrocordatolide are new compounds.

The root bark of the *C. cordato-oblongum* afforded friedelin, sitosterol and an acid mixture. The acid mixture was esterified under acidic condition and methyl esters of cordato-oblongic acid and *iso*cordato-oblongic acid were isolated. This is the first report of the occurrence of *iso*cordato-oblongic acid in nature.

The buds of the *C. moonii* gave friedelin, sitosterol, inophyllum A and soulattrolide. They were previously reported from the leaves of the same species. The presence of

pyranocoumarins (inophyllum A and soulattrolide) in the buds of *Calophyllum moonii* indicates the protective role of pyranocoumarins in tender plant tissues.

All the above compounds were isolated by various separation techniques such as PTLC, MPLC, gravity column chromatography, flash chromatography and crystallization. Their structures were elucidated by spectral (IR, UV, NMR, HPLC) analysis, physical (mp, $[\alpha]_D$) methods and chemical conversions.

Methanolic extracts of the various plant parts of *C. cordato-oblongum* were subjected to the Aspartic Proteinase Bioassay and the stem bark extract showed promising activity. Therefore, the stem bark extract was further purified by Anion Exchange Chromatography and some of the fractions showed inhibition but the percentage inhibition of the major peak fractions was low.

As cordatolide A and cordatolide B have shown significant activity on HIV-1 RT assay, oblongulide and 12-*O*-methylcordatolide B were subjected to the RT assay and they have shown insignificant activity. However, the inactivity of oblongulide and 12-*O*-methylcordatolide B indicated the important role of the three chiral centers and in particular the 12-OH of the pyranocoumarin in the activity.