

## ABSTRACT

### Natural Products from One Marine and Three Terrestrial Organisms: *Aspidosperma excelsum*, *Callyspongia vaginalis*, *Cleome viscosa* and *Clerodendrum chinense*

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This dissertation comprises eight chapters and describes the isolation and characterization of secondary metabolites found in *Aspidosperma excelsum*, *Callyspongia vaginalis*, *Cleome viscosa* and *Clerodendrum chinense* following a number of chemical studies. Preceding the details of each chemical investigation is a review of the compounds previously isolated from the corresponding genus. Therefore, for example, chapter one comprises a review of the alkaloids from the genus *Aspidosperma* and is followed by chapter two which comprises the chemical investigation of *Aspidosperma excelsum*.

The main objectives of this research project were to isolate and characterize novel compounds from each of the four organisms examined. It follows that altogether twenty compounds (compounds A-T) were characterized which included four semi-synthetic derivatives and a hydrolysate. Of these twenty compounds, seven (compounds B, E-G, K and S-T) were identified as new natural products, while 1D- and or 2D-NMR data for a number of known compounds (A, D, H-J and O-

P) are reported here for the first time. Additionally, the four semi-synthetic derivatives (compounds **L-N** and **R**), which were mentioned above have not been reported previously.

A number of separatory techniques were used to isolate the compounds from their respective organisms. Among them were Silica Gel Column Chromatography, Preparative Layer Chromatography, Sephadex LH 20 Column Chromatography as well as Reverse-Phase and Recycling HPLC.

Structural elucidation was made possible via spectroscopic means which included:  $^1\text{H-NMR}$ ,  $^{13}\text{C-NMR}$ ,  $^1\text{H-}^1\text{H-COSY}$ , HMQC or HSQC, HMBC and  $^1\text{H-}^1\text{H-T-ROESY}$  or  $^1\text{H-}^1\text{H NOESY}$ . IR, UV, OR, melting points and mass spectrometry were also instrumental in the characterization of each compound wherever it was possible. In cases where the compounds were known, a comparison of the NMR data with the reported data was sufficient to establish their identities.

Keywords: Tanya Heidi Layne, *Aspidosperma*, *Callyspongia*, *Cleome*, *Clerodendrum*, *Aspidosperma excelsum*, *Corynanthé*  $\beta$ -carboline alkaloids, *seco*-akuammiline, quaternary indole alkaloids, 1-azoniatricyclo[4.4.3.0]undecane, *Callyspongia vaginalis*, butenolide, *Cleome viscosa*, cembrane diterpenes, coumarino-lignans, pheophorbide A, *Clerodendrum chinense*, neo-clerodane diterpenes, steroids,  $\text{C}_{13}$  norisoprenoids, flavone glycosides .