ABSTRACT

This thesis is presented in two parts. Part I consists of four chapters dealing with chemical, taxonomic and biological studies of some Croton species. Screening for antimicrobial activity and some chemical studies on thirty five marine algae are dealt with in Part II of this thesis.

Chapter 1 describes the isolation and structure elucidation of ten compounds from the roots of Croton aromaticus, C. lacciferus and C. officinalis. C. aromaticus yielded β-amyrin (45), (-)-hardwickiic acid (3) and a new sesquiterpenoid named aromatenoic acid (75). Extractives of C. lacciferus afforded acetylaleuritolic acid (50), oleanolic acid (92), 2,6-dimethoxybenzoquinone (93) and two new furanoditerpenoids, namely 2-deoxytinophyllone (89) and 2-deoxy-18-carbomethoxytinophyllone (91). In addition to these compound kauranoids obtained from C. lacciferus are discussed in chapter 2. C. officinalis gave two furanoditerpenoids: penduliflaworosin (15) and a new clerodane named officinalin (96).

Seven kauranoids, four of which were new, isolated from the roots of C. lacciferus are described in chapter 2. The new compounds were 16α-H-ent-kauran-17-oic acid (102), ent-kaur-15-en-17-hydroxy-3β-yl acetate (114), ent-kaur-15-en-3β,17-diol (106) and ent-kauran-3β,16β,17-triol (116). This description is preceded by a comprehensive review on kauranoids isolated from higher plants covering literature published upto 1982.

In chapter 3, a study on the distribution of β-amyrin (45), (-)-hardwickiic acid (3), 5-hydroxy-3,7,4'-trimethoxyflavone (119) and sitosterol (46) in seven Croton species is presented. The results of this chemotaxonomic study supports the contention that C. aromaticus and C. lacciferus be maintained as two different species.

The extracts of C. aromaticus and C. lacciferus showed antifungal activity against Cladosporium cladosporioides, and the active compound of C. lacciferus was found to be 2,6-dimethoxybenzoquinone (93). The insecticidal activity against both Callosobruchus chinensis and Aphis craccivora was detected in the root extracts of C. aromaticus and C. lacciferus. The compounds responsible for insecticidal activity in these two plants were found to be (-)-hardwickiic acid (3), aromatenoic acid (75), 2-deoxytinophyllone (89), ent-15β,16-epoxykauran-17-ol (105), ent-kauran-16β,17-diol (32) and ent-kaur-15-en-3β,17-diol (106).

Part II of the thesis includes the screening of thirty five species of marine algae against four micro-organisms, namely Cladosporium cladosporioides, Candida albicans, Staphylococcus aureus and Escherichia coli. Twenty six species displayed activity against one or more organisms tested. The chemical analyses of Chondrococcus hornemanni, the alga which displayed the highest activity furnished myrcene derivative (18) and an active component containing mostly dihalogenated monoterpenes. The active component of Gracilaria corticata and Ulva lactuca appears to be acrylic acid.