ABSTRACT

Part I of this thesis consists of several reviews. Chapter one constitutes the first review which examines the secondary metabolites recently isolated from member species of the genus Laurencia. Chapter two studies all the sesquiterpenoids belonging to the chamigrane cla..., which have been elucidated from natural sources, while the third chapter discusses the syntheses of chamigranes and some approaches to spirocyclic compounds.

Part II investigates three Laurencia species, namely L. obtusa, L. scoparia and L. papillosa. In the first section, the isolation of four compounds, A, B, C and D, from L. obtusa is recounted. Compound A is the known chamigrenoid sesquiterpene, (+)-elatol, while compound B appears to be of the same chamigrane class, although its gross structure was not determined. The novel compound, C, is characterized as 2-chloro-3-hydroxy-α-chamigren-9-one, and D, the intramolecular conjugate addition derivative of C, is identified as the new compound, 2-chloro-3,7-epoxychamigran-9-one. The investigation of L. scoparia, resulting in the known sesquiterpenoid, 2,8-dibromo-9-chloro-4,5-epoxy-1,1,5,9-tetramethylspiro[5.5]undecane (compound E), is next described, followed by the examination of L. papillosa, which afforded no secondary metabolites. The final chapter presents a study of the biological properties of the extracts from two Laurencia species, as well as bioactivity analysis of several chamigranes. The L. obtusa extract was shown to be toxic, whereas the L. papillosa extract

possessed no biological activity. Compounds A and C from L. obtusa, together with several synthetic analogs of A, showed some bioactivity, but E did not.

Part III outlines an approach to the synthesis of sesquiterpenes belonging to the chamigrane and acorane class, and incorporates the attempts to carry out the reaction sequence leading to the synthesis of the chamigranes. Chapter one records the synthetic approach to be followed and chapter two details the preparation of the key intermediate, 2-methyl-6-hepten-3-one. The synthesis of the two bromides, 2-(3'-bromobutyl)-2-(1"-methyl-ethyl)-1,3-dioxolane and 6-bromo-2-methyl-2-heptene, respectively, are described in the following two chapters and attempts to utilise each bromide as a Grignard reagent in the alkylation of 4-methylcyclohexanone, are also discussed.