

ABSTRACT

Phytochemical investigation of selected species of local meliaceae and aspects of their biological activity.

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This dissertation describes the re-examination of the ethyl acetate soluble extracts from two species of Meliaceae: *Swietenia macrophylla* and *S. aubrevilleana*. Two new limonoids were isolated. The base hydrolysis of the known compound, 2-hydroxyswietenine, yielded a new triol. In addition, ten known compounds were re-isolated and purified. The identification and structural elucidation of the compounds were accomplished using 1D, 2D NMR and mass spectroscopy. The pure compounds were assessed for biological activity.

Chapter 1 gives an introduction to the current interest in natural products in medicine and agriculture. A brief survey of the use of plants containing limonoids in medicine and agriculture is discussed. Biosynthesis of limonoids and the variations in their structures are described with an emphasis on the bicyclononalide class of limonoids. An update of the recent publications of bicyclononalide limonoids is given. Bioassay and its use in the isolation of bioactive natural products are discussed. A survey of some of the biological

properties of limonoids is covered and emphasis is placed on the biological properties of the bicyclononalide limonoids.

Chapter 2 outlines the purification and identification of ten known compounds. The identification was achieved using spectroscopic data and comparison with the information in the literature.

Chapter 3 deals with the identification and structure elucidation of two new compounds, S20 and S22. S20 is similar to the known compound 2-hydroxyswietenine except that there is an isobutanoate moiety at the C3 position. S22 is similar to the known compound humilinolide F except that there is only one acetate group which is located at the C6 position. Hydrolysis of the ester groups of 2-hydroxyswietenine was attempted, and the resulting hydrolysis product after methylation, the triol, was formed in low yield. As a result, further modifications of this compound was not attempted. Spectroscopic data was used for structure elucidation and the stereochemistry was assigned by comparison of this data with that of similar known compounds.

Chapter 4 discusses the bioassay evaluation of the thirteen pure compounds isolated from *S. macrophylla* and *S. aubrevilleana*. A general toxicity screen using the brine shrimp, *Artemia salina*, and a choice disc antifeedant assay using the larvae of the 4th instar of the lepidopteran *Spodoptera frugiperda* (J. E. Smith) [fall armyworm] were done and the results are discussed in this chapter. The statistical analysis of the results is presented in addition to some suggestions for further work.