UNIVERSITY OF CALIFORNIA

SANTA CRUZ

Natural Products As A Resource For Biologically Active Compounds

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by

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This dissertation of
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approved:

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Dean of the Graduate Division

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ABSTRACT

The goal of this study was to investigate various sources of biologically active natural products in an effort to identify the active pesticidal compounds involved. The identification of such compounds is important to help understand the ecological aspects of secondary metabolites and to enable utilization of natural products as a resource for biologically active compounds.

The study is divided into several parts. Chapter 1 contains a discussion of several new compounds from plant and animal sources. Section 1.1 discusses the separation and structural elucidation of two new insecticidal limonoid-like compounds from a plant source. Section 1.2 presents the constituents of what is believed to be the defense secretion of a new species of millipede.

Chapter 2 introduces a new NMR technique. In section 2.1 a new technique for better utilizing the lanthanide relaxation agent $Gd(fod)_3$ is presented which allows the predictable removal of resonances without line broadening. This is applied towards several common natural products. Section 2.2 discusses a variation of this technique for use in an aqueous solvent by applying this technique towards identifying the binding sites of metals of biological interest. Section 2.3 presents an unambiguous ^{13}C NMR assignment of melibiose.

Chapter 3 deals with work relating to the molting hormone of most arthropods, 20-hydroxyecdysone. Section 3.1 discusses the use of two-dimensional NMR (2D NMR) to assign the ^{1}H NMR spectrum of this biologically important compound. Section 3.2 presents a new application for Droplet countercurrent chromatography (DCCC). It is applied here to isolate 20- hydroxyecdysone in an analytical capacity at a level of sensitivity not possible by HPLC without preconcentration steps.

Chapter 4 presents a basic improvement to the commercial DCCC instrument that is currently being applied to future commercial instruments.

Chapter 5 discusses a curious observation of the effects that two previously known compounds, nagilactone C and (-)-epicatechin, have on lettuce and rice and suggest a possible new role for the ubiquitous flavanol (-)-epicatechin in plants.

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