

## ABSTRACT

Investigations on the Secondary Metabolites from the Caribbean

Gorgonian *Erythropodium caribaeorum*

**DARRYL RICARDO BANJOO**

This dissertation describes the isolation and structural elucidation of diterpenoid metabolites from the Caribbean gorgonian *Erythropodium caribaeorum*. The metabolites were isolated via conventional chromatographic methods and High Performance Liquid Chromatography (HPLC). Their structures were elucidated by a combination of modern two-dimensional NMR spectroscopy and X-ray crystallographic analysis where appropriate.

Chapter 1 introduces the role of natural products chemistry in the isolation of bioactive metabolites. This chapter also highlights developments in natural products research and introduces the wide variety of secondary metabolites found in marine coelenterates, viz. cembranes, cladiellins/eunicellins, asbestinins and briareins. It also discusses the biogenesis and structural interrelationships of these gorgonian metabolites.

Chapter 2 reviews the existing literature on the chemical constituents of marine coelenterates mainly from the sub-class octocorallia. The cladiellins/eunicellins and the asbestinins are briefly discussed whereas the briareins are treated in more detail.

Chapter 3 discusses the chemical investigation of the Caribbean gorgonian *Erythropodium caribaeorum*. A brief review of the literature on the secondary metabolites from this organism is given followed by a detailed investigation of this gorgonian. Twelve erythrolides were isolated from two samples of *E. caribaeorum*. Of these, five were the known compounds erythrolide A, B, C, F and J. The remaining seven named erythrolide K – Q, although similar to erythrolides previously reported, have unique structures and are being reported for the first time. Of these seven new compounds, one, named erythrolide K, possessed a novel structure which involves the carbon atoms in rings A and B as part of a bicyclo [9.2.1] tetradecane skeleton.

Chapter 4 discusses the conversion of erythrolide A to erythrolide K. This conversion was achieved in two steps. The first involved a thermal homodienyl [1,5]-sigmatropic hydrogen shift to give an intermediate, and the second the elimination of an acetic acid molecule from this intermediate. A brief introduction of pericyclic reactions is given followed by a more detailed treatment of sigmatropic reactions.

Keywords : Darryl Ricardo Banjoo; Briareins; *Erythropodium caribaeorum*; Erythrolides; Gorgonians; Secondary metabolites.