

ABSTRACT

Part I of this thesis presents a review of phytochemical investigations of various species of Capparaceae. These investigations have apparently been motivated by the pharmacological properties exhibited by these plants. Some of these properties have been attributed to glucosinolates occurring in almost all species of Capparaceae. The glucosinolates have also acquired a great chemotaxonomic importance in the reclassification of the family Capparaceae which belongs to the collective Order Rhoadales.

The presence of diterpenes in the family Capparaceae was hitherto unknown. The isolation of cleomeolide represents first such instance where the occurrence of a diterpene in the family is demonstrated. Its novel macrocyclic structure and chemistry have necessitated the examination of all other related macrocyclic diterpenes and a brief review about them is presented.

In Part II, the structural elucidation of cleomeolide, a metabolite of a Jamaican specimen of Cleome viscosa L. is described. This was done by

chemical degradation and spectroscopic analysis of the various derivatives combined with biogenetic arguments. Cleomeolide was revealed to be a bicarbocyclic $\alpha\beta$ -unsaturated ϵ -lactone. The carbon skeleton which is novel includes a twelve-membered ring and can be derived from the verticillane skeleton by successive 1,2 -shifts. The final structure and relative stereochemistry were established by X-ray crystallographic analysis of cleomeolide. The absolute stereochemistry was defined by application of Brewster's benzoate rule.

In the course of this work, an interesting base catalyzed transannular cyclization was uncovered which led to compounds containing the modified taxane nucleus called "neotaxane".