Numerous diphenylsulphur derivatives have been synthesized. They constitute neuroleptic phenothiazine analogs where one of the C-N bonds of the central nucleus is broken, and where the partial rigidity of the phenothiazine molecule was decreased. The X-ray crystallographic study of 9 derivatives shows that for some of them the aliphatic chain R has a tendency to fold up over the B ring. Such a conformation cannot exist in phenothiazine derivatives. This folding can be modified by the nature of substituent located on the rings, especially in 1 position.

Quantum mechanical calculations have been performed in order to evaluate the energy levels of the various conformations. Semi-empirical methods have been used in order to define the parameters of freedom of these isolated molecules, in comparison with the crystallographic conformation.

In relation with the molecular structure, biological studies have been performed (binding on the dopamine receptor).

In the venom of the Columbian frog Phyllobates aurotaenia which contains neurotoxins, Aconitine is a diterpenoid alkaloid isolated from aconitum napellus and other plants; whereas batrachotoxin is a steroidal alkaloid found in the venom of the Venemous snake Porthidium eurasiatica and other species.

A recent review by Cattrell (Ann. Rev. Pharmacol. Toxicol. 1980; 20:15-43) indicates that the wide variety of pharmacological effects of these toxins results from the depolarization of nerve and muscle due to increased Na+ permeability of the excitable membrane. Ion flux experiments have defined a common receptor site for aconitine and batrachotoxin.

We have recently determined the structure of aconitine and several of its congeners. The structure of batrachotoxin has been published (Carie and Carie, Acta Cryst. 1969 B25 428-434). Since the evidence suggests that the two alkaloids interact with the same receptor site, a three dimensional mapping of the active portions of the two molecules will delineate some of the structural requirements of the receptor. In addition, specific models of the receptor can be tested against the 3-dimensional structures of the two toxins.

Crystal Data: Aconitine, M = 646; Space group, P212121, \(a = 15.616(6)\), \(b = 17.069(7)\), \(c = 12.243(4)\) Å, \(Z = 4\), \(\rho = 0.999\).