Chapter I

INTRODUCTION

Stemonone ($C_{19}H_{14}O_8$) is an insecticide which can be synthesized from extract of Stemonone roots, and is formed in crystals of transparent orange needle shape of various sizes. The largest single crystal available to us has dimensions of approximately 0.3 X 0.05 X 0.7 mm. Chemical investigations of the compound have been made by Vichitra Uaprasert (Pakasem 1967) who proposed for it the formulae :
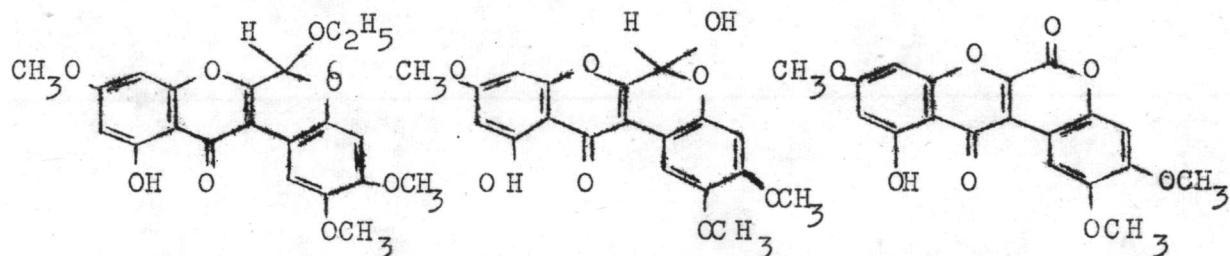
Stemonacetal   Stemonal   Stemonone

m.p. 203-4°C   m.p. 229-30°C(d)   m.p. 215-6°C(d)

An investigation of the crystal unit cell dimensions has previously been undertaken by White Chaipayungpun (1970). By means of rotation and Weissenberg methods about the c-axis, he found that the crystal is triclinic, belonging to the space group P1 or P$\bar{1}$ with 2 molecules in a cell of dimensions

$$a = 12.73 \overset{\circ}{A} \quad , \quad b = 9.90 \overset{\circ}{A} \quad , \quad c = 8.25 \overset{\circ}{A}$$
$$\alpha = 105°14' \quad , \quad \beta = 90° \quad , \quad \gamma = 124°42'.$$

The observed and calculated density at 27.5° C are 1.514 and 1.519 gm/cm^3 respectively.

The present investigation was carried out as a continuation of the work of W. Chaipayungpun to refine the unit cell dimensions of the crystal. Well developed crystals of Stemonone were mounted on the goniometer heads separately and by taking Rotation and Weissenberg photographs along the b and c axes, together with the powder photograph, the unit cell dimensions were determined, and all cell parameters were then refined by the least-squares method.

From the Integrating-Weissenberg photographs, multiple-film technique, taken along the C axis, the intensity of each reflection was measured by using a microdensitometer. After appropriate correction for Lorentz and polarization factors, the relative intensities were transformed into a set of amplitudes of observed structure factors.