AN INVESTIGATION OF THE VENOM OF THE CENTRAL ASIAN SCORPION

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In the venoms of scorpions, toxins have been found which act selectively on warm-blooded animals, insects, and crustaceans; some of them have been isolated in the pure state, and their primary structures have been established [1-3]. Having the final aim of obtaining analogous substances from the venom of the Central Asian scorpion, we have investigated the composition and some properties of its venom.

The venom was obtained from adult individuals of the scorpion Buthus occitanus by massaging the telson, in which the poison gland is located, and the venom was washed with distilled water and was freeze-dried. A solution of the venom in distilled water had a reaction close to neutral (pH 6.45). The extinction of the venom (1 mg/3 ml) at 280 nm was 0.285, and at 260 nm it was 0.275; calculation from a homogram [4] shows that the bulk of the venom (about 80%) consists of a protein. Similar results have been obtained from measurements of the content of protein in the venom by Lowry's method. On disk electrophoresis [5] in a basic medium (pH 8.6), the venom separated better than in an acid medium (pH 4.3). The venom is composed of 15 or 16 components mainly with anodic mobility (Table 1). The same results have been obtained in an investigation of the venoms of other scorpions by electrophoresis in starch gel under conditions analogous to ours [6]. By electrophoresis at pH 4.3 we detected nine fractions migrating to the cathode. Electrophoresis on cellulose acetate in acetate buffer (pH 4.2) separated the venom of the scorpion L. quinquestriatus into eight anodic components, while one component remained at the start [7]. It is probable that the venoms of different species of scorpions differ in composition. On filtration through Sephadex G-50 gel (column 15×300 mm, eluent 0.1 M ammonium acetate buffer, pH 8.0), the venom separated into three fractions; the bulk of the venom issued in fraction (II). Disk electrophoresis showed that this fraction contained the largest number (14) of electrophoretically detectable components of the venom (see Table 1).

On injection into mice, the venom of the scorpion causes a state of excitement, enhanced salivation, dyspnea, and then contraction of the muscles and paralysis; this took place 20 min after the injection of the venom. Fraction II of the venom acted similarly on animals, but in smaller concentrations. This fraction will be studied further with the aim of isolating the substances with a toxic action.

TABLE 1. Electrophoretic Characteristics of the Venom of the Central Asian Scorpion

Conditions of electrophoresis	No. of components		
	anodic	cathodic	total
Scorpion venom			
a) tris-glycine buffer, pH 8.6	10	5	15
b) β-alanine buffer, pH 4.3	—	9	9
Fractions obtained by gel filtration			
a) tris-glycine buffer, pH 8.6			
fraction I	1	3	4
fraction II	11	3	14
fraction III	No separation		
b) β-alanine buffer, pH 4.3			
fraction I	—	1	1
fraction II	—	14	14
fraction III	—	1	1

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