AMINO ACIDS OF *Astragalus falcatus*

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In plants of the genus *Astragalus* L. growing in Georgia we have found free amino acids. For their isolation, 1 kg of the air-dried leaves of *A. falcatus* Lam. was extracted with 80% ethanol, the ethanol was distilled off, the resinous substances that had separated out were filtered off, and the mother liquor (0.5 liter) was treated with 2.5 liters of acetone. This gave a precipitate of 3 g of plate-like crystals of substance A with the composition $C_4H_8O_3N_2$, mp 225-227°C, $[\alpha]_D^{20}$ +5.2° (c 1.0; water), insoluble in acetone and ether, sparingly soluble in ethanol, and soluble in water. On a paper chromatogram, the substance was shown by an orange-red color at the level of an authentic sample of L-asparagine under the action of a 1% ethanolic solution of ninhydrin; a mixture gave no depression of the melting point. In its constants, substance A corresponded to the L-β-aminosuccinamic acid or L-β-asparagine described in the literature [1, 2].

After the separation of substance A, the acetone was eliminated from the extract and the aqueous mother liquor was passed through KU-1 cation-exchange resin (4.5 × 30 cm). The column was washed with 3 liters of distilled water and then with 0.5 liter of ethanol until colorless eluates were obtained. The amino acids were eluted from the column with 5 liters of a 1% solution of ammonia. The ammoniacal eluates were concentrated under vacuum and the residue (3.5 g) was dissolved in 25 ml of water and reprecipitated from 150 ml of acetone. This gave 2 g of a white crystalline precipitate. By partion chromatography on a column of Sephadex LH-20 (3 × 25 cm) using butan-1-ol saturated with water as eluent, from this combined product we obtained three individual substances (B, C, and D).

Substance B, with the composition $C_3H_7O_2N$, formed white rhombic crystals with mp 295-298°C, $[\alpha]_D^{20}$ + 2.3° (c 1.0; water), readily soluble in water and insoluble in acetone and ether, and on a paper chromatogram it appeared at the level of an authentic sample of L-α-alanine. The reagent ninhydrin colored it violet [1, 3]. A mixture gave no depression of the melting point.

Substance C, with the composition $C_5H_9O_2N$, mp 220-221°C, $[\alpha]_D^{20}$ +81.9° (c 1.0; water) formed rod-like crystals soluble in acetone and ether. On a paper chromatogram it had the same mobility as D-proline. In contrast to other amino acids, the ninhydrin reagent colored it yellow [1, 3].

Substance D, $C_5H_{11}O_2N$, mp 312-316°C, $[\alpha]_D^{20}$ +6.3 (c 1.0; water) was soluble in water, sparingly soluble in ethanol, and insoluble in ether. On a paper chromatogram it appeared in the region of L-valine with a violet color (ninhydrin reagent); a mixture gave no depression of the melting point [2].

The results of the work performed permit the conclusion that the amino acids that we obtained from the leaves of *A. falcatus* are L-asparagine, L-alanine, D-proline, and L-valine [2-4].

LITERATURE CITED

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