PREPARATION OF A PROTEIN HYDROLYSATE FROM TOMATO SEED MEAL

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Tomato seeds — wastes from the preserving industry — contain 25-35% of nitrogenous substances [1]. A method of isolating proteins by extraction with a 0.2% solution of alkali that has been described permits about 11% of the desired product to be obtained [2], but a considerable amount of nitrogenous substances still remains in the meal, and for their extraction we have used the method of obtaining protein hydrolysates [3].

The tomato seed meal (Tashkent preserving factory) was ground in a mill and was defatted with acetone at room temperature by the steeping method. The defatted flour (100 g portions) was covered (1:5) with 2 N and 4 N solutions of sulfuric acid, the mixtures were placed in round-bottomed flasks fitted with reflux condensers, and were boiled for 8 h. Amine nitrogen was determined by formol titration [4], 5-ml samples of the solution being taken every hour. As the maximum amount of amine nitrogen we took the results of 24-h hydrolysis of the meal using 4 N sulfuric acid.

The mixtures obtained, after cooling to room temperature, were filtered, and the filtrates were neutralized with calcium oxide. The precipitates formed were eliminated by centrifugation at 8000 rpm, and the solution was lyophilized. The yield of total hydrolysate amounted to 50% of the weight of the defatted flour, and the yield of total amino acids to 40%.

Below we give the characteristics of the meal and the tomato hydrolysate:

Sample	Total nitrogen, %	Calculated to food protein, % (N·6.25)	Amine nitrogen, mg, %
Meal	4 04	25,2	3,25
Hydrolysate (2 N H_2SO_4)	5 03	31,4	1,30
Hydrolysate (4N H_2SO_4)	7,11	44,4	2,90

The amino acid compositions of the tomato hydrolysates were as follows (%):

Amino acid	2 N H_2SO_4	4 N H_2SO_4	Amino acid	2 N H_2SO_4	4 N H_2SO_4
Aspartic acid	4.3	6.12	Methionine	0.6	0.4
Threonine	0.8	1.8	Isoleucine	0.5	1.2
Serine	1.0	3.2	Leucine	1.2	3.2
Glutamic acid	3.7	7.4	Tyrosine	0.6	1.79
Proline	1.1	1.8	Phenylalanine	0.6	1.50
Glycine	0.7	2.14	Histidine	1.4	3.2
Alanine	1.13	2.6	Lysine	0.6	1.1
Cysteine	—	—	Arginine	1.4	3.3
Valine	0.6	1.2			
			Total	20.1	41.9

The optimum is the use for this of 4 N H_2SO_4 for 8 h, which permits the yield of protein product to be increased.

LITERATURE CITED

1. Ya. M. Gol'denberg, Konservnnaya i Oboshchesushil'naya Promst., 1 (1968).
2. M. T. Turakhodzhaev, R. A. Alibekova, S. R. Rakhmetova, L. P. Zubkova, and T. T. Zakirov, Khim. Prir. Soedin., 829 (1979).

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0009-3130/86/2206-0747$12.50

3. A. D. Neklyudov and S. A. Navashin, Prikl. Biokhim. Mikrobiol., 1, 3 (1985).
4. J. Houben-Weyl, Methoden der Organischen Chemie, Georg Thieme Verlag, Stuttgart, 4th edn. (1958).