Chemistry of Natural Compounds, Vol. 32, No. 1, 1996

CHANGE IN THE BIOAVAILABILITY OF THE PROTEINS OF TOMATO PROCESSING WASTES

G. A. Piyakina and T. S. Yunusov

UDC 547.962.5

Tomato processing wastes form one of the nontraditional sources of food protein and oil. In a number of publications, the possibility has been shown of using dry tomato press residues as a fodder for animals [1-3]. The absence of antifeedant substances from this source has been demonstrated [3-6]. One of the criteria for evaluating the nutrient properties of food and fodder products is their capacity for being digested by various proteases [7].

In the present communication we give results on the digestion of wastes from tomatoes of local varieties by pepsin. There is no doubt that the seeds and skin of the tomato differ in their morphological properties and that this, in its turn, leads to different digestibilities of the components of the wastes by animals. We have shown previously [8] that the proteins of the tomato skin and, particularly, of tomato seeds have a low solubility at pH < 7.

Two approaches have been used to increase the bioavailability of proteins: 1) grinding the press residues in a mill to a flour; and 2) treating the ground flour with water at pH 7.5 for 1 h with a magnetic stirrer — i.e., treating it at the pH at which a sharp jump in solubility has been observed.

Figure 1 shows the digestibility curves of three samples of tomato waste treated with Serva pepsin (37°C, pH 2.0, enzyme:substrate ratio 1:100). The rate of hydrolysis was evaluated spectrophotometrically on the basis of the optical density at a wavelength of 280 nm from the amount of protein passing into solution after various intervals of time. As can be seen from Fig. 1, the rate of digestion of the ground flour (curve 2) was somewhat higher than that of the initial tomato residues, while the digestion of the ground flour that had previously been treated with water at pH 7.5 (curve 3) was almost three times as great as that of the initial residues.

Thus, a change in the bioavailability of the proteins of tomato processing wastes on preliminary treatment with water at pH 7.5 has been shown.

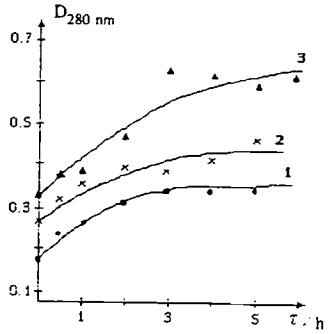

Fig. 1. Curve of the digestibility of tomato wastes treated with pepsin: *1*) tomato press residues; *2*) ground flour; *3*) ground flour treated with water at pH 7.5.

Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, fax (3712) 89 14 75. Translated from Khimiya Prirodnykh Soedinenii, No. 1, pp. 112-113, January-February, 1996. Original article submitted June 5, 1995.

 0009-3130/96/3201-0094$15.00

REFERENCES

1. E. S. Lazos and P. Kalathenos, Int. J. Food Sci. Technol., **23**, 649 (1988).
2. D. Bradowski and J. R. Geisman, J. Food. Sci., **45**, No. 2, 228, 235 (1980).
3. S. J. Latlief and D. Knorr, J. Food Sci., **48**, No. 6, 1583 (1983).
4. M. S. Saulebekova and S. R. Rakhmetova, Pishch. Prom., **12**, 44 (1991).
5. A. Kramer and W. H. Kwee, J. Food Sci., **42**, No. 1, 212 (1977).
6. A. F. Zagibalov, A. K. D'yakonova, and G. P. Pozdnyakova, Achievements of the Biotechnology–Agroindustrial Complex. Abstracts of Lectures [in Russian], Chernovitsy (1991).
7. J. Adler-Nissen, J. Chem. Technol. Biotechnol., **32**, 138 (1982).
8. G. A. Piyakina and T. S. Yunusov, Khim. Prir. Soedin., 594 (1995).