

8. Use of proteolysis in gerodietetic products

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Introduction. Today gerontology has a number of methods and tools that improve health, psychological and physical possibilities of older and elderly age people. The most studied and effective of them is the rational mode of muscle activity and a balanced diet, with the obligatory inclusion in the diet ingredients that have geroprotective and protective effect. According to domestic and foreign research, through properly organized diet the number of illnesses (diabetes, arthritis - 50%, heart disease - 25%, diseases of eyes - 20%, etc.) can be reduced and significantly reduce the risk of premature aging. Today, there are very few of these substances in our diets, which reduces the protective properties of the organism. For this reason, it is necessary to create specialized food products with specifically declared properties. Therefore, a new look at the potential of biotech food raw materials, grounding of new biotechnological solutions in technology of gerodietetic products are particularly important.

Materials and methods. Therefore, it is necessary to create such food systems, where the maximum amount of calcium will be associated with protein compounds for better assimilation in body. Therefore, as a readily available source of protein we have chosen by-products of second category, in particular cattle rumen (collagen content 62%). However, to increase the number of functional groups, it was necessary to conduct cattle rumen fermentation.

From the analytical review of the literature due to indexes of collagenases activity (Table 1) collagenase nutritive produced by close joined-stock company "Bioprohres" according to industrial standards 9158-002-11734126-94 (Schelkovo, Moscow region, Russia) was selected as the enzyme.

Result and discussing. The dependence of the proteolytic activity of collagenase nutrition on the duration of the process at different values of the ambient temperature measured in the range 0 ... 90 ° C at pH 7.0 during 10 x 60 s. Accepted in the experiment temperature range was suitable for technological production process and, thus, allowed to predict the intensity of enzymatic proteolysis of the protein in a particular technology.

Increase of the ambient temperature to 35 ° C leads to an increase in enzyme preparation activity. Further increase in temperature above 45 ° C causes partial inactivation of the enzyme preparation; the higher the temperature and longer duration of heat exposure, the more intensively enzyme preparation inactivates.

To determine the rational mode of enzymatic proteolysis a full factorial design method was used, followed by mathematical modeling in problem-oriented package MathCad. As a parameter of optimization amino nitrogen content in the hydrolyzate was selected. Within the two-factor model experiment, the content of amino nitrogen in the rumen of cattle hydrolyzate according to the temperature and duration of enzymatic proteolysis was calculated by equation. It is known that proteolytic enzymes preparations catalyze the cleavage reaction of protein molecules with water. However, the introduction of large amount of water to the rumen of cattle will lead to higher costs in its drying. Justification of the minimum duty water curve that ensures the efficient conduction of proteolysis was carried out by the intensity of accumulation of amino nitrogen in the water-soluble fraction of hydrolysates of cattle rumen at different values of duty water curve.

According to received experimental data for the effective proteolysis of rumen of cattle sufficient duty water curve is "water: rumen of cattle" - 1:3. Further increase of water content in the environment does not lead to a significant increase in the degree of proteolysis.

The analysis of the received data showed that there is a direct correlation with the amino nitrogen, that is processes of accumulation of soluble fractions and accumulation of amino nitrogen are going in parallels.

As expected, during the processing by 0.1% solution of enzyme the amount of soluble protein is higher, moreover, the greatest increase of soluble protein is observed within the first hour. Since the second hour of fermentation, the rate of formation of soluble protein decreases and slows down at fourth hour of fermentation.

Conclusion.

1. Analysis of experimental data and also their mathematical treatment, allowed to justify the use of enzyme preparation - nutritive collagenase to increase functional groups in the by-products of II category (rumen of cattle).

2. It is founded that the maximum proteolytic activity of enzyme preparation - nutritive collagenase at pH - 5,0-7,5; duty water curve - 1:2; temperature - 25-40 ° C, proteolysis duration - 3 hours.

References

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