EVALUATION OF THE INFLUENCE OF ENZYMIC PREPARATION ON QUALITY TRAITS OF COOKED SAUSAGE PRODUCTS

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***Abstract* – research work has been conducted on the study of the influence of enzymic preparation – transglutaminase on quality traits of cooked sausage products, particularly on sensory evaluation, structural-mechanical characteristics and microstructure of final product.**

***Index Terms*- enzymic preparation, transglutaminase**

I.INTRODUCTION

The origin of enzymology as an independent section of biological chemistry is connected with the discovery of the Russian chemist Kirhgoff in the beginning of the 19th century. 19 years later the isolation of amylase enzyme from the malt by French chemists promoted the development of preparative chemistry of enzymes. And already since the mid of 20th century owing to the development of the methods of physical-chemical analysis and the methods of protein chemistry the primary structure of many enzymes has been deciphered.

At the present time enzymic preparations have found application not only in medicine, but also in food industry, because they are catalysts of different biochemical processes and thus allow improve the technological processes of food products. By the sources of enzymic preparations they are classified into animal, plant and microbial origin. At the present time the enzymic preparations, obtained by the method of microbiological synthesis, having wide application in many branches of food industry are prevailing in the world. Their process technologies are based on culturing of specially selected strains of microorganisms – active producers of enzymes with subsequent isolation of preparations.

However, in the use of some enzymes an undesirable effect is observed, because they are capable to hydrolyze proteins, fats, and starches. In connection with this, enzymes-ferments, obtained about 10 years ago and capable of binding protein molecules are interesting for meat industry. Thus the enzyme - tranglutaminase, capable of binding protein molecules due to formation of cross links between them is of particular interest.

According to literature data, at the present time transglutaminase is used in food industry for improvement of physical properties of products, such as texture, strength and elasticity.

II.MATERIALS AND METHODS

The specialists of the institute have conducted investigations on the influence of transglutaminase, genetically produced by not-modified strain *Streptovertcillium mobranese* on quality characteristics of cooked sausage products.

The objects of investigations were samples of cooked sausage, consisting of the following recipe components: 42.5% of beef of first grade, 42.5% of semi-fat pork and 15% of concentrated wheat protein; up to 2% of cooking salt was introduced additionally to each sample. To the experimental sample (contrary to the control one) transglutaminase was introduced during sausage meat preparation in the amount 0.05% to the weight of the weight of raw materials. Thermal treatment was carried out according to technological instruction to GOST R 52196-2003 till the temperature in the centre of the sausage reached 72^{0}C.

In the final products chemical composition, structural-mechanical and characteristics of microstructure and digestibility *in vitro* were determined and then their sensory traits were evaluated.

The sensory evaluation has shown that the introduction of transglutaminase into experimental sample at 0.05% to the weight of the raw materials did not influence the appearance, color, aroma and taste of a final product. All the members of the panel marked more dense and elastic consistency for the experimental sample, as compared to the control one.

From Table 1 it can be seen, that introduction of transglutaminase into the experimental sample at 0.05% did not influence chemical composition of a final product.

Table 1.

Sample	Content in %		
	protein	fat	Moisture
Control	17.1 ± 0.2	20.2 ± 0.2	60.4 ± 0.2
Experiment with transglutaminase	16.9±0.2	19,8 ± 0.2	59.6± 0.2

To study the influence of transglutaminase on proteins condition in final products, and thus their availability, the work on the determination of digestibility *in vitro* was carried out. From the obtained results (Fig.1) digestibility of final product on pepsin and trypsin of the control sample was by 5% and 11.5%, respectively, higher, as compared to the experimental sample with transglutaminase.

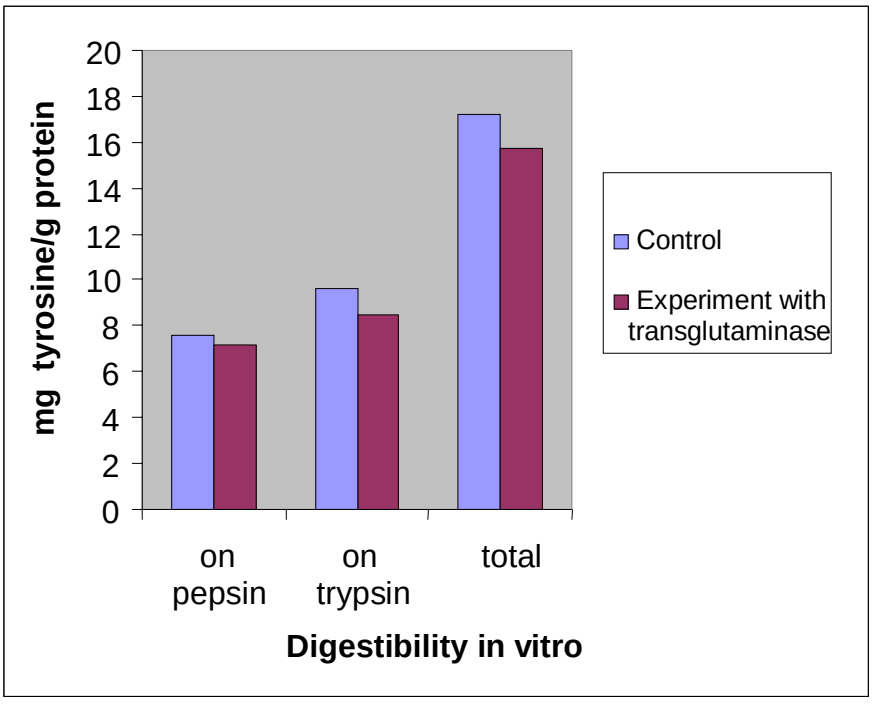

Fig. 1. **Studies of digestibility in vitro**

The data of structural-mechanical characteristics, obtained with the help of the instruments (Fig.2) confirm the results of sensory evaluation. Maximum shear stress of the sample with transglutaminase was by18 kN/m^2 greater, than for the control sample. The same dynamics was observed in the determination of cutting stress.

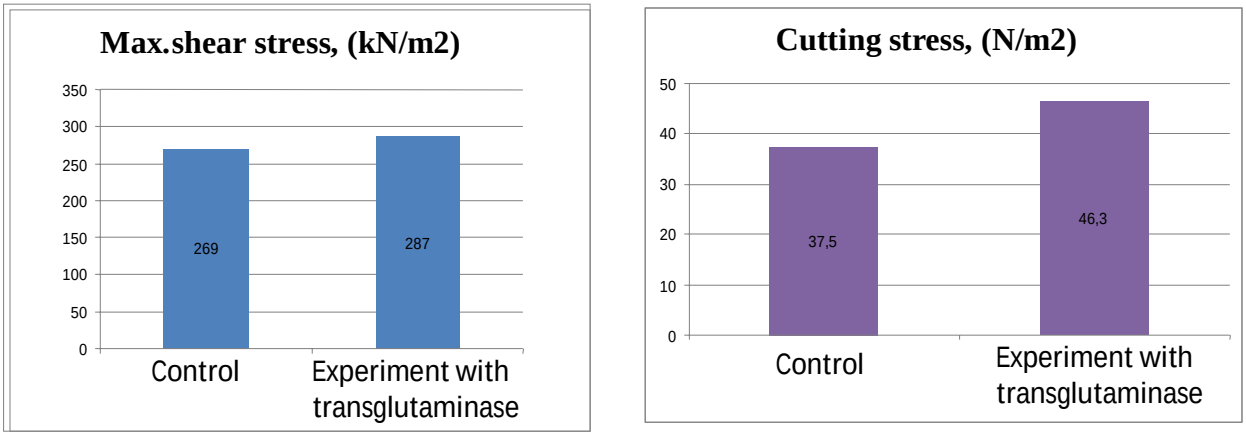

Fig. 2. Results of the study of structural-mechanical characteristics

The studies of microstructure of a final product (Figs, 3 and 4) have shown that the investigated products have significant differences with regards to the arrangement of structural components. In this case the experimental sample with transglutaminase featured a more compact mass, the structural elements of which formed a dense spatial frame with tightly connected protein particles between them. It was also marked that the experimental sample, contrary to the control one, was pierced by smaller capillaries with clearly outlined borders. It should be noted that transglutaminase did not have any influence on the degree of destruction, swelling or any other characteristics of the main structural elements of sausage meat.

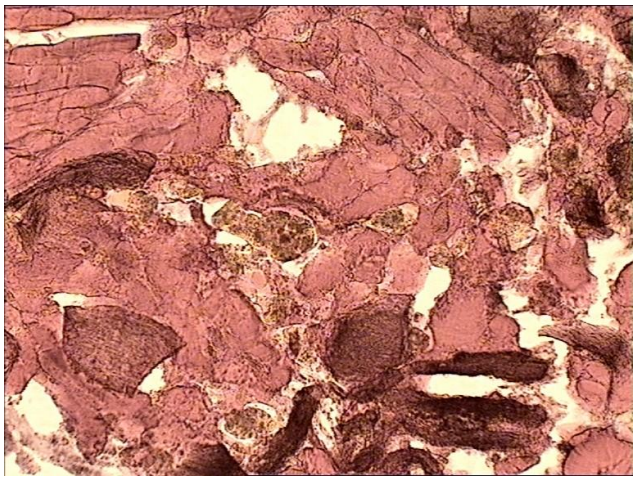

Fig. 3. Microstructure of control sample

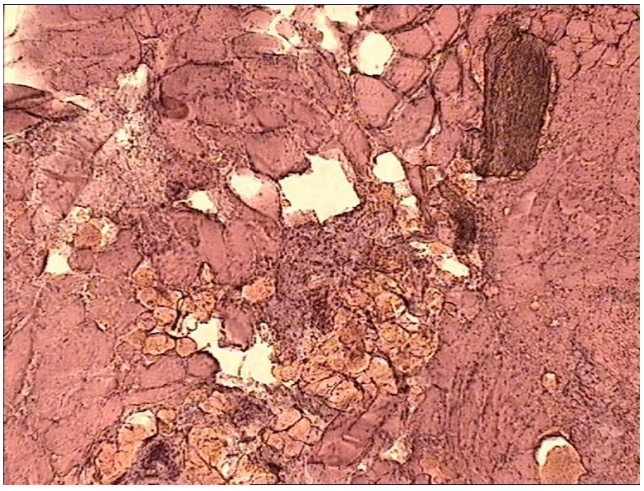

Fig. 4. Microstructure of experimental sample with transglutaminase

Thus, the conducted studies have shown a positive influence of transglutaminase on quality traits of final products, such as density and consistency.