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РОЗДІЛ 3

**СУЧАСНІ ТЕНДЕНЦІЇ В ТЕХНОЛОГІЇ ПИТНОЇ ВОДИ ТА
ПЕРЕРОБЦІ М'ЯСА, МОЛОКА Й МОРЕПРОДУКТІВ**

НТБ ОНХАТ

C, mg / kg	20.0	20.0	20.0
Gross energy, mJ/kg	18.0	17.8	17.1

It has been determined that growing tilapia is promising both in the world and in Ukraine, the benefits of growing tilapia are investigated, according to industry, the production of domestic feed for fish is analyzed, the needs of this type of fish in amino acids, micro and micro elements and vitamins are analyzed. The program of tilapia feeding was developed, also feed recipes were calculated based on it.

Supervisors – Ph.D., D.Sc. (Engineering), Professor, Yegorov B. V.,
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DEVELOPMENT OF TECHNOLOGY FOR LOW-FAT, LOW-SALT and LOW-PHOSPATES RESTRUCTED MEAT PRODUCTES

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Currently, consumers need for high quality, leaner meats, and meat products for their “healthy concern”. Although dietary fats play an important role in the metabolism of a living organism, the excess fat and salt level in diets are highly correlated with higher chances of high blood pressure and coronary heart disease. Thus, reduced salt and fat in diets are recommended. A lot of research projects have been performed to develop a variety of ingredients, enzymes and new technologies to manufacture low-fat functional meat products for the satisfaction of consumer demand.

Transglutaminase (TGase: protein-glutamine γ -glutamyltransferase) catalyzes the reaction of ϵ -(γ -glutamyl) lysyl crosslinks among food proteins. It improves the textural properties of certain foods, especially in meat products. Motoki and Seguro reported that the TGase could be used in several foods which require gelation for food texture. Kuraishi et al. reported that non-meat proteins functioned as substrates for TGase to have a similar binding capacity to those with salt, and sodium caseinate was the best substrate for the crosslinking to meat proteins among other non-meat proteins. In addition, TGase can be made the non-thermal gelation in processed meat products without cooking. This technology could be effective for not only the manufacture of reduced-salt and low-fat sausages but also restructured meat products (RMPs) without the addition of emulsified-meats, which are normally used for the manufacture of RMPs for the improvement of binding capacity. To have a similar binding capacity to

those with emulsified-meats, TGase could bind with meat pieces or other non-meat ingredients as substrates.

Some microorganisms that produced TGase-like enzymes were screened using the hydroxamate assay. These microorganisms excreted TGase-like enzymes into the cultural broth, and one microorganism gave a high activity. The ability of this enzyme to form the G±L bond in proteins, the critical property of TGase, was investigated. The results demonstrated that the enzyme was definitely TGase, and it was named microbial TGase (MTGase). The microorganism was subsequently taxonomically classified as a variant of *Streptovorticilliummobaense*.

MTGase can produce restructured meat by binding meat pieces at temperatures below 10 °C, overnight. Kuraishi et al. have developed the new meat-binding system using MTGase and caseinate simultaneously. Caseinate, when treated with MTGase, becomes viscous, and the viscous caseinate acts as a glue to hold different foodstuffs together. Using this system a larger piece of restructured meat like beef (or pork) steaks or fish fillets from their smaller pieces can be prepared (Fig. 1). Meat pieces, including minced meat, can be also bound together by MTGase without salt (sodium chloride) and phosphates, resulting in “healthy” meat products. The MTGase treatment shows a synergistic effect when combined with salt and phosphates. In addition, MTGase enables low-fat meat production, and the use of cross-linked caseinate as a fat substitute in Bologna-type sausages has been suggested.

Technological functions of the MTGase application in meat production technology:

- improves the consistency and biting of finished products;
- increases output and succulence of products;
- provides thermostability and the desired "crunch" - as the action of the enzyme is thermosetting;
- improves the elasticity of products (especially in the case of portions);
- increases the moisture and emulsifying capacity of muscle tissue proteins;
- provides stable quality with a high percentage of output;
- it is possible to use in the technology of a wide assortment of sausage wares, which makes the additive universal;
- reduces moisture loss (syneresis) in packed (cut) form;
- the high technological activity of the additive ensures minimum dosing pressure and high economic efficiency.

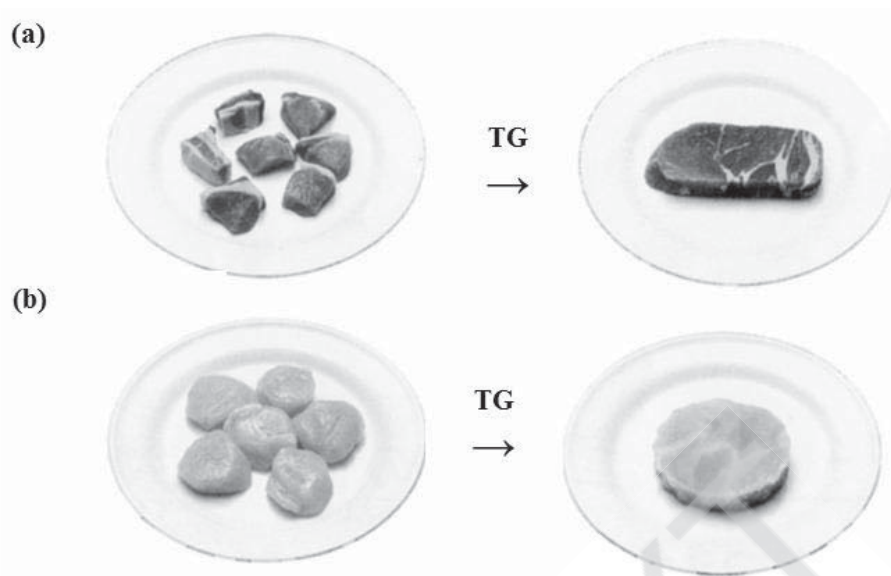


Fig. 1 – Application of microbial transglutaminase (MTGase): (a), restructured steak from small pork chunk pieces; (b), new type of seafood from scallops.

Methods of using MTGase:

1) The method of direct addition. Adding high-protein MTGase to the mixture allows the ingredients to stay together. His second advantage is to provide a nice "glossy" texture. This method is well suited for the connection of sausages, pasta, and rolls, hence what we need.

2) Spraying. This technique is mainly used by chefs. Based on the name it is clear that you just need to sprinkle two desired pieces of meat stick. For this purpose, the small tea sieve is best suited. After that, tightly press the products to each other, wrap them in the film and vacuum them.

3) Suspension - preparation of the solution. This method is used in kitchens and in the treatment of large pieces, to avoid excess dusting with a powder of MTGase.

The activity of this enzyme is manifested in a very narrow range and depends on the pH of the medium, its range is from +5 to +55 ° C. At 60 ° C, the inactivation of the enzyme begins gradually, and at 70 ° C the enzyme is completely inactivated. The pH value at which the enzyme is active is in the range of 5-9, the maximum activity - at pH 6 - 7. An important feature of MTGase is that it becomes inactive when the temperature inside the product reaches about 70 ° C and above. This means that after the heat treatment of meat products, MTGase is completely inactivated and not determined in the finished product.

The aim of the scientific work is to develop a technology for the production of structured products of balanced nutritional value from low-grade meat raw materials with a low content of fat, salts, and phosphates. Such products are desirable on the market of meat products because they have low cost and are useful for health.

Supervisor – Associate Professor A. Soletska

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DEVELOPMENT OF TECHNOLOGY FOR MEAT STUFFED PRODUCTS WITH IMPROVED ORGANOLEPTIC PROPERTIES

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A modern view of the meat products market is increasingly linked to an increase in nutritional value. Scientifically, it was proved that the addition of plant material to meat products greatly increases their nutritional and nutritional value.

According to experiments carried out on vegetable supplements, it was proved that using different types of drying, quality, nutrition and vitamin content of vegetables was significantly higher than that of heat treatment of raw, hydrated and blanched vegetables of the same group.

That is why the purpose of conducting experiments with meat raw materials was a dried powder of vegetables that would be most suitable for meat products, namely, chopped semi-finished products and sausage products. Meat raw material is pork, beef and chicken of the first brand.

In the course of research, two types of vegetable mixtures were made, which differed in filling and the quantitative composition of different types of vegetables. The most important difference between the mixtures is that the main components are adding to the first carrot convection drying, and the second dried beet. In the previous experiments on the use of mixtures, optimal proportions were determined for adding mixtures to raw materials and minced meat. In the preparation of mixtures, each of them was mixed with 50 g of butter and melted in a steam bath. During the preparation, a fat-and-vegetable mixture was made, which was successfully combined with the meat constituent. So, a mixture of carrots in a ratio of 100 g of the mixture:

— Carrots dried (50 g), among the vitamins that contains this vegetable, and the highest concentrations are the following: PP, B, E, C, K, and the carotene contained in carrots is capable of transforming into an essential vitamin A for us;

— Parsley dried root (10 g). Parsley is known for diuretic, cholagogue and stimulating actions. Parsley contains a large amount of fiber. When it is added in small amounts in food, it promotes the elimination of toxins, provides a mild stimulating effect on the intestines and accelerates the metabolism;

— Parsnip dried root (10 g). Parsnip contains carotene, vitamin C, carbohydrates, and essential oils. Essential Oil - Strengthens the sexual drive. In the root crops there are vitamins B1, B2, PP, mineral salts, essential oils. By the content of easily digestible carbohydrates, parsnips are one of the first places among the roots. Pasternak contains a significant amount of potassium and has the ability to reduce the water content in the body, promotes blood circulation, improves digestion, has a beneficial effect on the nervous system;

— Tomatoes dried (10 g). Mature tomatoes rich in sugars and vitamin C, contain proteins, starch, organic acids, fiber and pectin substances, minerals (calcium, sodium, magnesium, iron, chlorine, phosphorus, sulfur, silicon, iodine) , as well as carotenoids carotene and lycopene (they determine the yellow-orange or red color of the fruits), vitamins of group B, nicotinic and folic acid, vitamin K;

ВИКОРИСТАННЯ ДОПОМІЖНИХ РЕЧОВИН ДЛЯ ВИПРАВЛЕННЯ НЕДОЛІКІВ БІЛИХ СТОЛОВИХ ВІНОМАТЕРІАЛІВ	
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