

УДК 637.521.2

**15. APPLICATION OF TRANSGLUTAMINASE IN MEAT SYSTEMS WITH
DIFFERENT PROTEIN SOURCES**

Yepishkin S., Strashynskyi I., Pasichnyi V., Safonik N.

National university of food technologies

One of the important directions by which to ensure public health is to expand the range of products for a healthy diet, which are characterized by high nutritional and biological value and include essential components in balanced ratios. A balanced diet

provides full vitality and helps to prevent pathological disorders and human diseases. It is important to study approaches that use the application of plant raw materials with proven functional properties in the technology of combined products, which allows one to modify the composition and adjust the technological properties of food accordingly.

Due to the current deficit of animal protein in the world, the population's needs are being met using other sources, mainly of plant origin.

The increased requirement for protein sources and, at the same time, the need to ensure a rational diet have led to the emergence and development of a new direction in food production, namely, one of obtaining combined foods based on the potential resources of dietary proteins of both animal and plant origins. The combination of meat- and vegetable-based raw materials provides high nutritional value of processed products, increases the variability of formulations, leads to a homogeneous distribution of ingredients, minimizes losses during heat treatment, and ultimately contributes to the creation of products of stable quality.

In the traditional technology of minced products, the problem of obtaining a uniform product with homogeneous structure is solved by adding food additives, generally of inorganic origin (for example, phosphates). In the manufacture of combined products containing a significant amount of plant components, the phosphate content might be increased to achieve the necessary texture, which is unacceptable according to sanitary and hygienic standards, especially in healthy food product technology.

One of the approaches to solving the problem may be application the enzyme preparations to obtain a dense, homogeneous structure of the combined product. Transglutaminase (TG) produces inter-and intramolecular cross-linking bonds in the proteins. Lantto et al. [1] noted works in which studies of the effects of TG on proteins of various origins are presented, e.g., about catalysing bonds between meat and soy proteins or between meat, casein, and gluten. Cross-linking proteins containing various essential amino acids improve nutritional value, and therefore, such combined proteins are valuable in food production.

Microbial transglutaminases attracted initial interests of the food industry due to its ability to mold minced meat into a firm steak. The restructure of meat products ensures greater firmness causing little loss of quality during cooking [2]. The mTGase yields a final product with retained organoleptic properties similar to conventional meat in terms of flavor, texture, appearance, and taste. Some of these studies also show that mTGase supplementation could increase the gel strength in meat products and cause positive effects on the development of meat proteins of pork, beef, chicken, and fish.

The cross-linking of proteins and other compounds of the gel system causes changes in the proteic fraction of food matrices, leading to improved texture and stability in terms of temperature denaturation, emulsifying properties, gelation, and increased water-binding capacity.

Literature

1. R. Lantto, P. Platin, M. Niemistö, J. Buchert, and K. Autio, “Effects of transglutaminase, tyrosinase and freeze-dried apple pomace powder on gel forming and structure of pork meat,” *LWT-Food Science and Technology*, vol. 39, no. 10, pp. 1117–1124, 2016.
2. Lesiow T, Rentfrow GK, Xiong YL (2017) Polyphosphate and myofibrillar protein extract promote transglutaminase-mediated enhancements of rheological and textural properties of PSE pork meat batters. *Meat Sci* 128:40–46.