

# Research of Thermodynamic Parameters of Meat Products

Urishbay Chomanov, Tamara Tultabayeva, Gulmira Kenenbay, Aruzhan Shoman

**Abstract-** The indicator "water activity" is an important tool in the development of technological processes and production, as well as ensure high quality and extend shelf life of food products. All natural foods contain water in their composition, in varying amounts of their states, from this largely depends on their technological properties and shelf life. In our country, for the characteristics of the water content of a single indicator is used in food products - is "the mass fraction of moisture," or product humidity. This quantitative measure does not reflect all the complex interactions that are present in the food product and to which is water. However, there is a figure "water activity", which is the main criterion of the characteristics of the state of water in foods and is widely used around the world as to predict the technological properties of the products, and is a powerful quality control tool for the food shelf life and his. We have studied the thermodynamic water activity in smoked sausages with food ingredients during storage. As a result of studies found that long-term storage of cooked sausages water activity increased from 0.87 to 0.90, while the boiled-smoked sausages from 0.882 to 0.885. According to the results, the introduction of food ingredients possible to obtain products with a value of water activity 0.0030-0.0038 units lower compared to the control. Thus the shelf life of cooked sausages is 5 days, and boiled-smoked 7 days.

**Keywords**— smoked sausages, tasty and spicy aromatic ingredients, vegetable raw materials

## I. INTRODUCTION

Condition of water in the product is determined by various characteristics, such as: Water binding capacity, energy, water connection, etc. In recent years become increasingly important indicator of "water activity" ( $a_w$ ) as the most promising and informative. It is a measure, introduced in the 1950s and V.I.Skottom H.Salvinom, characterizes the state of water in foods used by microorganisms for their livelihoods.

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According to a number of foreign authors, the measurement of water activity is one of the necessary quality control kinds of products, without which it is now cannot do any one enterprise food industry [1,2].

In our country, for the characteristics of the water content of a single indicator is used in food products - is "the mass fraction of moisture," or product humidity. This quantitative measure does not reflect all the complex interactions that are present in the food product and to which is water. However, there is a figure "water activity", which is the main criterion of the characteristics of the state of water in foods and is widely used around the world as to predict the technological properties of the products, and is a powerful quality control tool for the food shelf life and his. In our country, the research on the development of methods for determining the activity of water in foods and their classification, carried out under the guidance of Academician Urishbay Chomanov.

## II. MATERIALS AND METHODS

Conducted research on the development of technology of sausages with food ingredients and vegetable raw materials in the laboratory technology for the processing and storage of crop production [3,4,5]. As a control, smoked sausage has been taken in accordance with GOST-developed in 16290. In developed sausages thermodynamic water activity during storage (Figure 1) was investigated. The water activity was investigated on the instrument developed by Academician of NAS RK U. Chomanov [6].

## III. RESULTS AND DISCUSSION

To determine the shelf life of sausages was investigated water activity (Fig. 1).

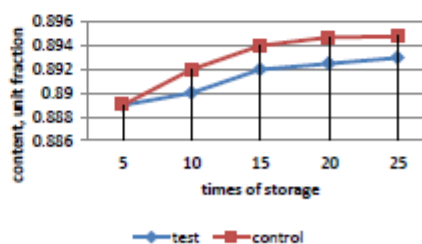


Fig. 1 Water activity modification of sausages in storage

Organoleptic characteristics defined of sausages with food ingredients after drying (Fig. 2).

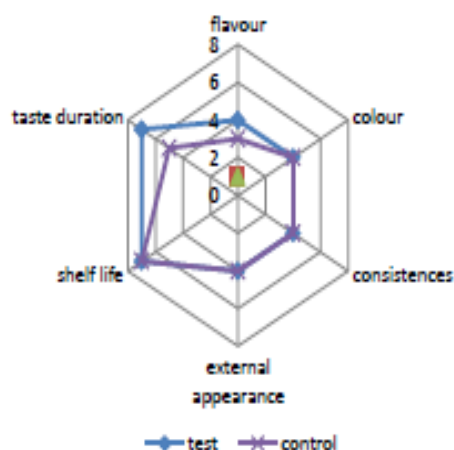


Fig. 2 The organoleptic characteristics of sausages with food ingredients

Sensory evaluation of finished products after drying showed that at 10-12°C sausage had a good presentation, monolithic texture, with a water activity unite of 0.892 and relative humidity 76 ± 5%.

#### IV. CONCLUSION

The results show that the addition of food ingredients delicatessen preserves its quality, and provide a set expiration date. As a result of studies found that long-term storage of cooked sausages water activity increased 0.889 to 0.892. According to the results, the introduction of food ingredients possible to obtain products with a value of water activity 0,0030-0,0038 units. lower compared to the control. Thus the shelf life of cooked sausages is 15-18 days.

#### REFERENCES

- [1] R. Davis, G. Birch, K. Parker Food intermediate moisture // M.: Food Industry, 1980
- [2] Water activity: Influences on food quality / Ed. Rockland L.B. - New York: Academic Press Inc. - 1981 - 921 P.
- [3] Chomanov U., Tultabayeva T., Kerenbay G., Shoman A. Formulation of food ingredients from plants // Proceedings of the National Academy of Sciences of Kazakhstan. Series of Agrarian Sciences, №1. 2013 - From 29-32.
- [4] Kerenbay G., Chomanov U., Tultabayeva T., Shoman A. Technology development of receiving food ingredients from vegetable raw materials // 2nd International conference on food and agricultural engineering, Penang, may 8-9, 2013 202-204
- [5] Kerenbay G., Chomanov U., Tultabayeva T., Shoman A. Sausages sensory analysis // 3rd International Conference on food, agriculture, ecology and medical sciences, Jan.11-12, 2015 Dubai 203-204
- [6] AC № 155940. An apparatus for determining the activity of water in food / Chomanov U.; publ. 1985 Bull. Number 18.