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## PSYLLIUM USING IN THE TECHNOLOGY OF MEAT GROUND SEMI-COOKED PRODUCTS

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**Abstract:** *The meat semi-cooked products technology supposes to use in the recipes the functional ingredients, the range of which is too wide & finished products not always correspond to the healthy food. That is why it is appropriate enough to think about the adding of the cellular tissue during the production of healthy food.*

*The adhesive substance, which Plantago psyllium aril contains, is very interesting: the transparent colorless thick liquid, which falls into the category of plant origin thickeners.*

*All over the world this product is used everywhere in the food segment & as practical purposes. Psyllium doesn't disperse completely in the water, but it swells & makes heavy-bodied dispersion. The main target of this research was organoleptic estimation of meat ground semi-cooked products to find the acceptable quantity of the psyllium cellular tissue which had been added, moreover the evaluation of the ready cutlets value after the heating.*

**Keywords:** *psyllium, poultry meat, cellular tissue, meat mince, result.*

### INTRODUCTION

Over recent years the tendency to healthy nutrition has started to dictate its own rules. The consumers most often prefer natural products. The products, which contain only natural components, more often appear on the shop counters. In the meat industry because of unsteady functional & technological qualities of meat materials, which come to the production, it is impossible not to use setting agents, stabilizers & emulgators. The content of these additions in the body of meat food is the main factor for the consumers who wants to have healthy lifestyle. One of the ways how to solve this problem is to find natural structure-forming additives made of untraditional plant recourses.

Meat industry holds top positions in the agro industrial complex of Ukraine. It supplies the population with the products with high content of the protein. Every year the culture of fowl consumption increases on the territory of Ukraine as this kind of meat is cheaper than its competitors, and also from the point of usefulness to the consumers' body is nutritious. Nowadays the healthy food tendency is becoming more actual & more popular, annually the consumption of food fibers rises.

Food fibers (cellular tissue, ballast materials) are the complex of biopolymers, which forms the walls of plant cells (Grechko, V., Strashynskiy, I., Pasichnyi, V, 2018).

Psyllium cellular tissue can be used as a gelling agent & thickener to create the product texture. Psyllium is mainly grown on the western territories of India such as Radgastan & Gudgarat. The harvest is picked once a year in winter.

The most valuable part of Psyllium is its outer shell which is 26-32% from the total volume. The shell is sorted by its clearness degree & by color. It has the ability to absorb the water creating the gel. The gels are represented primarily as water – soluble highly branched polysaccharides - arabinoxylans (85%) (Yuge, N., Qi, X., Wonhee, J., Liangli, Y, 2019; Manish, K., Bhakti, T., Hariom, G., Avinash, M., Bhavanath, J, 2019).

One more perspective ingredient for meat industry is chia seeds. Семена чиа *Salvia hispanica* относятся к семейству яснотковых, они же губоцветные. Chia seeds *Salvia hispanica* are from the mint family, or salvia family. Their homeland is the territory of modern South Mexico & Guatemala. This herblike annual plant quite often grows up to 175cm. Its seeds, small, oval, about 1 mm in the diameter, are very valuable. They can be black, white, grey, brown & colorful, the color of the seeds doesn't influence on the taste. In pre-Columbus era chia seeds were very popular among Aztecs, being on the third place in their nutrition after maize & kidney-bean. The Indians highly rated this plant for its exceptional nutrition characteristics. According to the legend Aztec warriors could keep their powers during the whole day thanks to a little handful of seeds, not more than a soup spoon, if to use the modern analogs. With their help it was treated the injuries, cold, angina, digestive disorder, got rid of unpleasant body smell (Ruchkina, N, 2017).

The high demand in chia plant components can be explained by their unique chemical content. 100 g of chia seeds contain: protein (20-22g), fat (30-35g), food fibers (15-30g), carbohydrates (25-41g), ash (4-6g). According to the information given by the scientists, chia seeds contain about 21% of protein, which is more than grains such as wheat (14%), maize (14%), rice (8,5%), oats(15,3%), barley ( 9,2%), amaranth (14,8%) (Scientific Opinion of the Panel on Dietetic Products Nutrition and Allergies, The EFSA Journal, 2009).

Chia seeds contain the oil which is 1/3 of their mass and 60% of it is  $\alpha$ -linolenic acid, that makes this ingredient the source of omega-3 fatty acids. Such a favorable fatty acid content shows the functionality of chia seeds as a useful addition for food. Chia seeds have the ability to create the gel & to keep the moisture by mass which 27 times increases the total gel mass (Hernández, L., 2012).

Nowadays in the scientific literature there is a limited amount of gel research, which was made of chia seeds, & their characteristics (Timilsena, Y., Adhikari, R., Kasapis, S., Adhikari, B., 2015). It is known the using experience of chia seeds flour in the production of flour confectionary goods (Khromchenkova, E., Makarenko, M., Bessonov, V., 2014). & noodle products (Naumova N., Obraztsov A., Kozubtsev M., 2016). In the bread making industry chia seeds flour is used to bake bread (Ligostaev D., Naumova N., Lukin A., 2017). In the meat industry it's known the experience of using 10% of chia seeds flour (by substitution the same quantity of pork without fat) (Naumova, N., Lukin, A., Semizdralova. V. (2016). Also there is a way of the production of the gluten-free bread with psyllium (Wilma M., Renata P., Raquel B., 2009; Camilly, F., Denise, G., Fernanda, G., Vanessa, D., 2018)

Thanks to these characteristics it makes sense to use psyllium & chia seeds in the meat industry, particularly in the meat-processing industry, to make the goods of definite structure & parameters.

## EXPOSITION

In our researches it was found the influence of concentration of adding cellular tissue, taken from the psyllium & chia seeds flour, on the organoleptic markers & the mass result of ready product of model samples of meat ground semi-cooked food.

It was chosen the eutrophic concentration of the cellular tissue of psyllium & chia seeds flour. It was chosen as a controlling sample «Chicken cutlets» ТУ У 10.1-34485173-009:2013 Fowl semi-cooked products, coney, subproducts with decorative spices mixes & in the marinades.

We developed 5 recipes of meat ground semi-cooked products, where we used the adding Pultermax in the model recipes, that is used as a structure-maker, and substituted it with the

cellular tissue Psyllium & chia seeds flour. The quantity of psyllium & chia seeds flour was: Sample №1-- 0,3 and 0,5 %, Sample №2 – 0,5 and 0,4 %, Sample №3 – 1 % and 0,5 %, Sample № 4 – 2 % and 0,7 %, Sample № 5 – 4 % and 1 % naturally.

Table 1. The developed recipes of meat ground semi-cooked products

Components	Control	Sample №1	Sample№2	Sample№3	SАmple№4	SАmple№5
Main basic materials, g:						
1	2	3	4	5	6	7
Turkey fillet, ground degree 5 MM	70	70	70	70	70	70
Fat, ground degree 5 MM	15	15	15	15	15	15
Breadcrumbs	13	13	13	13	13	13
Fried dry onion	2	2	2	2	2	2
Water	18	18	18	18	18	18
Additional basic materials, g:						
Food salt						
Pulmarex	1	-	-	-	-	-
Psyllium cellular tissue	-	0,3	0,5	1	2	4
Chia seeds flour	-	0,5	0,4	0,5	0,7	1

The sensor estimation of mmeat ground semi-cooked products is made according to the standars ДСТУ 4437:2005. The research was done by the degustators who characterized the product by six markers ( outer look, color, smell, consistence, taste & juiciness) with the method of mark estimation according to five-mark grading system). The preparation to the tasting was held according to the standars ДСТУ 4823:2007. After the degustation every degustator filled out the tasting lists. The results were summed up & got the general sensor product mark. The data of organoleptic estimation of studying samples are shown in table 1.

Table 1. Organoleptic estimation of meat ground semi-cooked products

Markers	Controlling	№1	№2	№3	№4	№5
Outer look	4,3±0,11	4,3±0,2	4,4±0,15	4,6±0,18	4,7±0,19	4,9±0,17
Color	4,4±0,14	4,5±0,15	4,5±0,18	4,5±0,13	4,7±0,18	4,9±0,15
Smell	4,4±0,12	4,6±0,13	4,5±0,18	4,5±0,19	4,5±0,16	4,9±0,17
Taste	4,4±0,17	4,2±0,16	4,4±0,16	4,8±0,17	4,8±0,12	4,9±0,18
Consistence	4,1±0,12	4,2±0,17	4,2±0,14	4,5±19	4,5±0,15	5±0,14
Juiciness	4,0±0,16	4,3±0,14	4,4±0,11	4,5±0,19	4,5±0,2	4,7±0,21
Total estimation	4,26±0,21	4,35±0,2	4,4±0,19	4,56±0,21	4,61±0,18	4,88±0,16

After heat processing the products with Psyllium cellular tissue & chia seeds flour have the same surface, hold the shape well & juicy. The sensor characteristics of controlling & studying samples are shown on pic.1

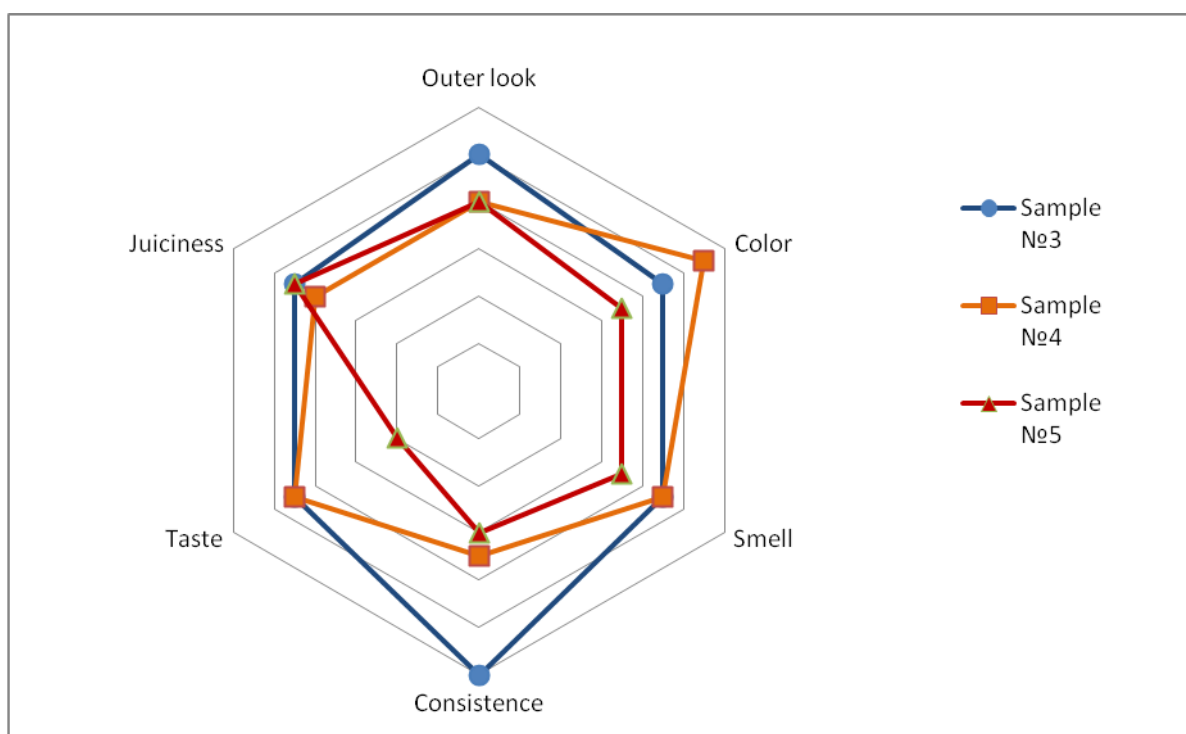
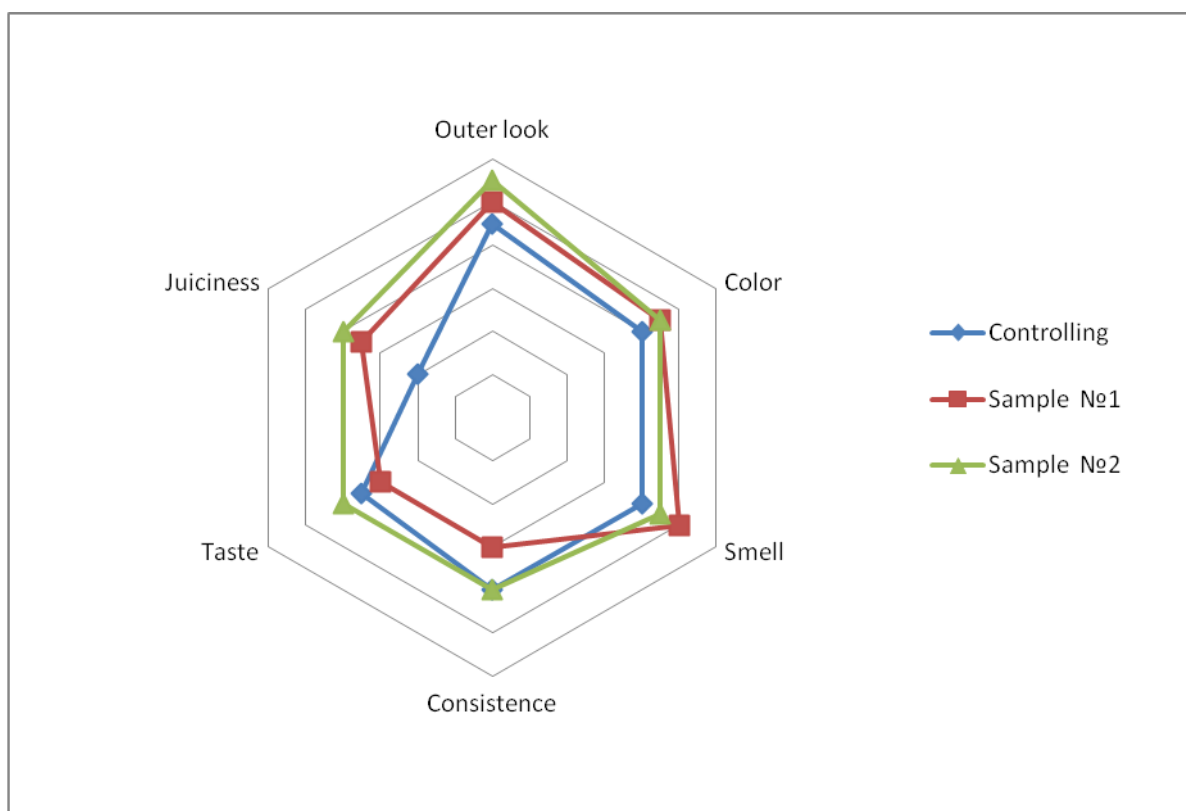


Fig.1 Sensor characteristic of the controlling & experimental samples.

According to the estimation samples № 4-5, where the content of the used adding was the biggest, have got the best marks.

The result of meat ground semi-cooked products has highly increased in comparison with controlling sample. In sample № 1 is 89,58% , in sample №2 - 88,08 % , in sample №3 - 93,71 % , in sample №4 - 95,35 % , in sample №5 - 100,01 % , which is connected with higher mixture-holding & fat-holding ability of Psyllium cellular tissue & chia seeds flour.

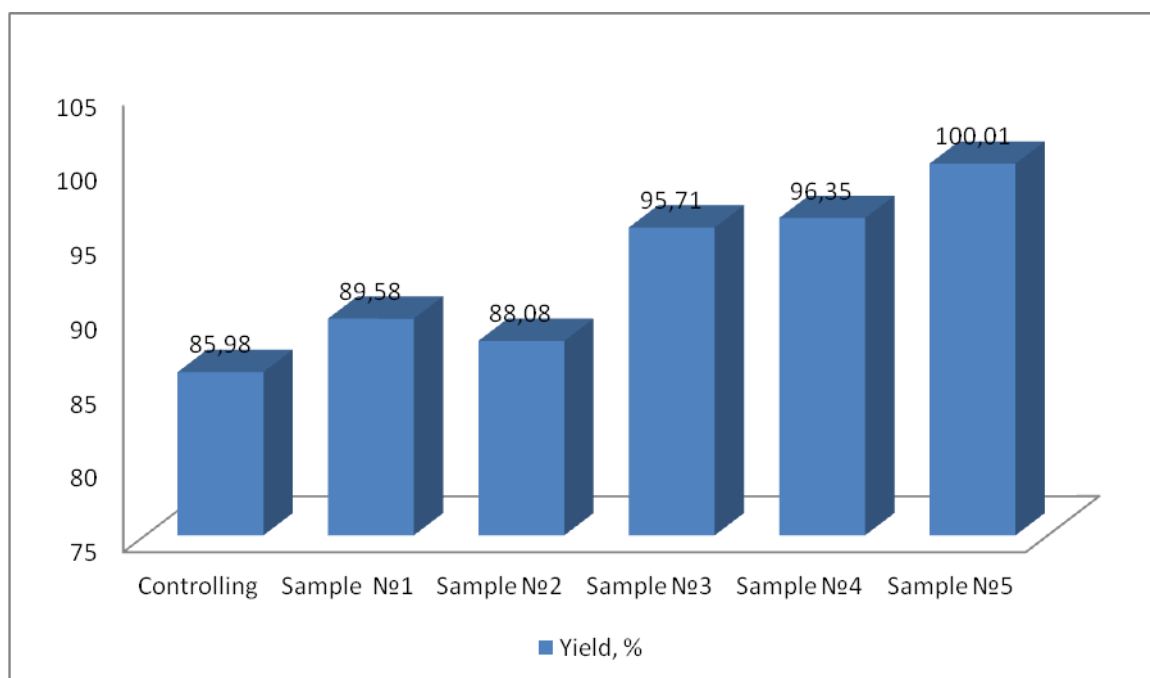


Fig. 2. The result of meat ground semi-cooked products,%

## CONCLUSION

The including of food fibres into the recipes of meat ground semi-cooked products needs to arrange a lot of researches taking into considerations their different impact on the product. In the era of globalisation & fast food the consumption of food fibers can be necessary for human's health. During our research we defined the optimal amount of the cellular tissue into the recipe. It was proved the aptitude of using of Psyllium cellular tissue & chia seeds flour as a structure-making adding for meat ground semi-cooked products. On the base of sensor estimation it was found the appropriate amount of Psyllium adding substitution with alternative structure-makers. The developed recipes allow to enrich the product with ballast materials, to widen the range of meat ground semi-cooked products which directed to the healthy lifestyle.

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