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The Use of Oily Herbal Extract in the Production of Liver Pate.

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ABSTRACT

The possibility of using oil and herbal extracts of goldenrod and dragonhead as bioprotectors in oxidation processes and microbial spoilage liver pate. Introduction oil extracts of herbs and goldenrod and dragonhead in the compounding of liver pate reduces the oxidation rate of the fat fraction and stabilizes the system to microbiological spoilage processes. The results of the research can extend the shelf life of a new kind of pate.

Keywords: meat system, antioxidant, microflora, inulin, low fat product, the fat composition, liver pate

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INTRODUCTION

Vegetative raw materials of North Caucasian possesses a wide range of properties that are used in food production. This question is of particular relevance in solving the problem of creating environmentally friendly functional foods [7, 11].

In previous studies, we considered the possibility of using dried herbs dragonhead, goldenrod, vitex, and yield of barberry in minced meat systems as bioprotectors to the processes of oxidation of fat fractions and microbial spoilage [6, 8].

Later studied ether-oily extracts (EOE) such herbs as the dragonhead, goldenrod, and mixtures thereof. These extracts were tested as preservatives in the manufacture of new types of meat pates.

It is known that meat pastes contain a significant amount of fat, usually porcine, which is a determining factor in the prohibition of the consumption of such products. When creating new types of low-calorie meat products we used the ability of inulin as a fat substitute.

In this connection, the authors of this paper developed the composition and technology of preparation of the fat composition based on inulin brand Beneo ™ HP with refined deodorized sunflower oil with the addition of oil extracts of herbs and goldenrod canadensis and dragonhead moldovan. The emulsifier used in the mixture of whey protein concentrate «Milei 80» with a high emulsifying capacity and capable of stabilizing the emulsion. Preparation of fat composition were performed in a high speed mixer, which is subsequently discharged into a vessel and transferred to maturation at a temperature of 0-6 °C for 10 hours [1].

MATERIALS AND METHODS

The objects of the study were an ether-oily extracts, herbal extracts of goldenrod canadian and dragonhead moldovan, liver pate. The paper used the following methods: determining peroxide value as an indicator of fat oxidation in the food product according to all-Union State Standard (GOST) 51487-99; determination of microbiological parameters according to GOST R 10444.15-94; GOST R 31746-2012; GOST R 31747-2012 [2, 3, 4, 5].

RESULTS AND DISCUSSION

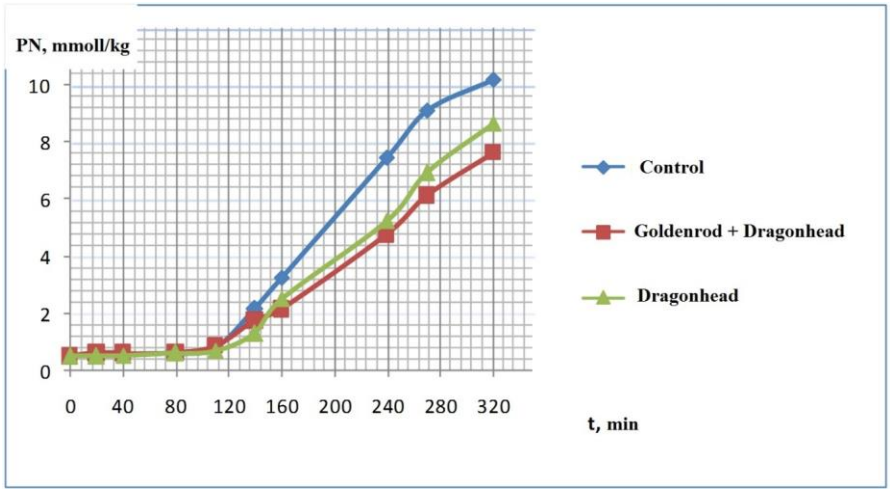

Figure 1: The accumulation of peroxides control and experimental samples EOE herbs (concentration 0,1%) in the oxidation of the vegetable oil

The use the EOE of herbs goldenrod canadian and dragonhead moldovan as due to the replacement of pork fat fat composition, which was introduced into the refined and deodorized sunflower oil.

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To determine the ингибиторы activity refined trademark "Oleina" sunflower oil was administered 0.1 мл EOE herbs dragonhead moldovan, and mixtures таковых with goldenrod canadian on 10 ml the oil and of autoxidation was carried out at a temperature of 70 °C. The results are presented in Figure 1.

As can be seen from the data, addition EOE reduces oil oxidation rate. This induction period is more significant for prototypes and is about 140-150 minutes. The graph shows that a synergistic effect is observed for the test samples, ie the rate of oxidation mixture goldenrod and dragonhead less than the sample extract of dragonhead and the particularly reference template.

Thus, samples and mixtures EOE dragonhead and goldenrod and possess antioxidant properties and can be used for the manufacture of meat systems containing significant amounts of fat or vegetable oils.

Later on, we evaluated the degree of oxidation processes that occur in the fat fraction paste for control and test samples with the addition of fat composition. To prepare a new type of paste we were used chicken liver, egg, skim milk powder, vegetable ingredients - pumpkin and carrots, onion. In the receipt of the test sample pig fat was completely replace with the fat composition based on inulin Beneo ™ HP with the addition of 0.3% EOE goldenrod and dragonhead. This is due to the results of previous studies, as well as the organoleptic characteristics of the future product. Pate production is carried out according to the traditional technological scheme of production meat and vegetable pastes cold procedure.

As shown by the data the addition of 0,3% of fat composition reduces the rate of accumulation of the oxidation lipid fraction paste for test sample products during storage at 0-4 °C. Significant accumulation of peroxides is observed in the control sample.

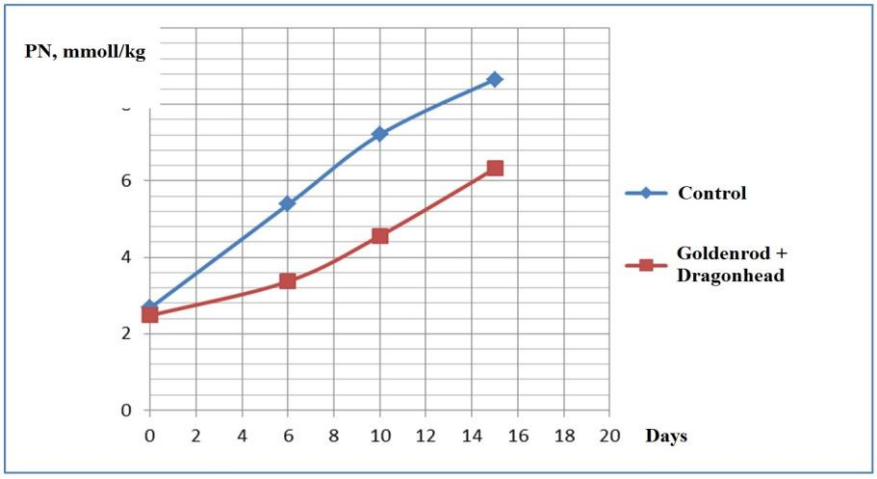

Figure 2: The accumulation of peroxides, control and test samples of pastes during storage for 15 days (t 0-4 °C)

In the range storage larger accumulation of peroxides was observed in control samples. Up to 6 days of storage in a control sample of the fat fraction of the oxidation rate was 1,5 times more intense compared to the test sample.

Up to 6 days of storage for test samples of paste is characterized by an induction period of oxidation of the lipid fraction. In the control samples in the initial period of accumulation of peroxides storage has the avalanche character that indicates the presence of the logarithmic phase oxidation. This is probably due to the substantial amount of heme pigments and other iron compounds in chicken liver, causing rapid oxidation of the fatty fraction.

After 6 days of storage accumulation of peroxides in the control and test samples is accelerated significantly. However, the rate of accumulation is more significant for the control samples. For 15 days the amount of peroxides in the control and test samples increases respectively of 3,2 and 2,6 times.

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Thus, the results of the research show that the EOE based on mixtures dragonhead and goldenrod have antioxidant properties and may be used to stabilize the lipid fraction in meat systems to extend the shelf life of the finished product.

Next, we carried out a study on the impact made by EOE researched herbs on the growth and development of putrefactive microflora, Escherishia coli, Staphulococcus composed pates [9, 10]. For this purpose were selected and inoculation the control and experimental samples studied pates on environment the MPA, Kessler, Endo, ISA, Saburo to determine total microbial count, coliform bacteria, mold, Staphylococcus, Proteus vulgaris. Results of the study of microbiological parameters are presented in table 1.

Table 1: Results of microbiological examination of control and test samples of pastes during storage in a refrigerated state at 0-4 °C for 15 days

Microbiological indicators	Requirements TR CU 021/2011	The index value is in storage day							
		control samples				test samples			
		0	4	7	15	0	4	7	15
Total microbial count	$5,0\times10^3$	$11,0\times10^2$	$11,7\times10^2$	$55,7\times10^2$	$111,8\times10^2$	$3,4\times10^2$	$44,0\times10^2$	$44,5\times10^2$	$7,3\times10^2$
Coliform bacteria, in 0,1 g	not allowed	not detected				not detected			
Yeast, CFU/g	not regulated	not detected				not detected			
Mould, CFU/g	not regulated	not detected				not detected			
Proteus, in 1 g	not regulated	not detected				not detected			
Staphylococcus, in 0,1 g	not allowed	not detected				not detected			

As the results of studies, test sample of pate were the most contaminated with microflora compared with control samples. The rate of total bacterial count in test samples was higher than three times than the control. This is probably due to the presence of the spore microflora in dry inulin, which was introduced in the test pate. During storage for 4 days at a temperature of 0-4 °C, there was a slight increase in the total count in the control and test samples. This indicates the existence of induction period for the development of microflora. Most brightly it is expressed for test samples (Figure 3).

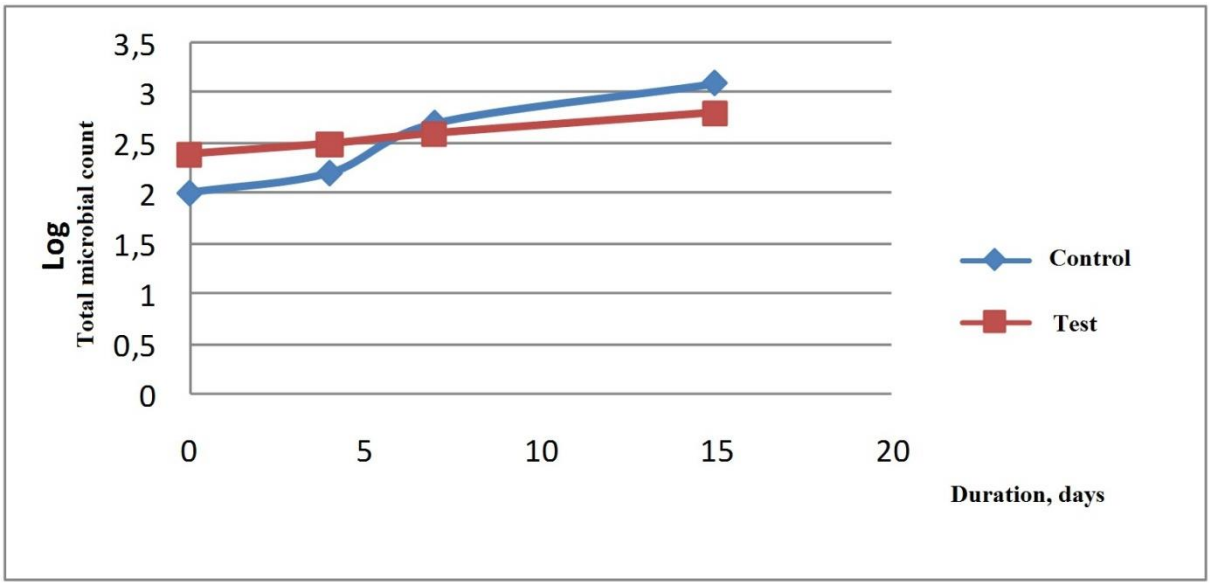

Figure 3: Evolution of microflora growth in the control and test samples of pastes during storage under refrigeration at a temperature of 0-4 °C, for 15 days

After seven days of storage in control samples microflora amount sharply increases 5,8 times, whereas in test samples only 1,4 times, which indicates the presence of extracts bactericidal effect due to their properties of phytoncide. This is probably due to the presence in the composition of herbs essential oils, tannins, alkaloids, flavonoids, saponins, resins, and other acids.

For fifteen days the number of microflora increased for prototypes 1,5 times, while the control samples, the figure has increased by an more appreciably.

Thus, the results confirm the presence of the bactericidal properties of used extracts. Throughout the contact period of storage are not found microorganisms of the genus Proteus vulgaris, yeast and mold, for the control and for the experimental samples.

CONCLUSION

Studies suggest the prospect of using oil extracts of goldenrod canadensis and dragonhead moldovan in the formulation of liver pate

REFERENCES

[1] Barybina L.I., Oboturova N.P., Kozhevnikova O.N., Smolko E.V. Prospects for the use of polysaccharides from plant extracts and raw materials in the production of fat compositions for meat products // The world of science through the eyes of today's youth: Proceedings of the Scientific Conference. - Stavropol: NCFU;2014. - 307 p.

[2] GOST 51487-99 Vegetable oils and fats. Method for determination of peroxide value.

[3] GOST R 10444.15-94 Food products. Methods for determining the number of mesophilic aerobic and facultative anaerobic microorganisms.

[4] GOST R 31746-2012 Food products. Methods for detection and quantity determination of coagulase positive staphylococci and Staphylococcus aureus.

[5] GOST R 31747-2012 foods. Methods for detection and quantity determination of coliform bacteria (coliform bacteria).

[6] Kozhevnikova O.N., Barybina L.I. Oboturova N.P., Kulikova V.V., Smolko E.V., Bogatyuk N.P., Danilova I.L. The antioxidant and antimicrobial bioprotectors from vegetable raw materials // Meat Industry;2015. - №2. - P. 25-27.

[7] Peschanskaya I.V. Biological characteristics of goldenrod canadensis at introduction into the conditions of the Stavropol height / Abstract of Candidate dissertation- Moscow, 2009.- 24 p.

[8] Sergeeva T.N., Kozhevnikova O.N., Barybina L.I., Kulikova V.V. Vegetable raw materials study of antioxidant activity of Stavropol and Crimea // Biodiversity, biological resources, biotechnology and health of the population of the North Caucasus region. Materials III-th annual scientific conference "University Science - region", dedicated to the 85th anniversary of the North Caucasus Federal University (14-30 April 2015). – Stavropol;2015 - 343 p.

[9] Suliz A.S., Kozhevnikova O.N., Smolko E.V., Barybina L.I. The use of vegetable raw materials to enhance the stability of systems for meat microflora // Biodiversity, biological resources, biotechnology and health of the population of the North Caucasus region. Materials III-th annual scientific conference "University Science - region", dedicated to the 85th anniversary of the North Caucasus Federal University (14-30 April 2015). – Stavropol;2015 - 343 p.

[10] Natal'ja Jur'evna Sarbatova, Vladimir Jur'evich Frolov, Olga Vladimirovna Sycheva and Ruslan Saferbegovich Omarov. Res J Pharm Biol Chem Sci 2016;7(2):534-538.

[11] Andrey Ashotovich Nagdalian, Natalya Pavlovna Oboturova, Roman Olegovich Budkevich, Magomed Aslanovich Selimov, and Egor Leonidovich Demchenkov. Res J Pharm Biol Chem Sci 2016;7(2):517-523.