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Effectiveness Of Effect Of Antioxidant Of New Generation On Oxidizing Processes In The Containing Collagen Raw Materials Of The Poultry-Processing Industry.

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ABSTRACT

The effectiveness of the use of dihydroquercetin as an antioxidant, which contributes to the increase in the duration of storage of collagen-containing poultry processing raw materials, is shown in the work. Addition of dihydroquercetin to the emulsified skin of broiler chickens, at a rate of 0.50; 0,75 and 1,00 kg per 100 kg of raw materials, the way to achieve a significant level of their oxidative damage. Samples of raw materials containing dihydroquercetin, during their 28 days, were exposed to the least oxidative changes. Their acid number over the period of the experiment was 1.3-1.7 times lower, and the peroxide number 1.8-3.6 times lower than in the control samples stored without the addition of an antioxidant. The received results convince in high efficiency of application of dihydroquercetin as an active antioxidant that provides an opportunity of its use together with available analogues.

Keywords: antioxidant, oxidation, quality of meat, broiler

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INTRODUCTION

At deep processing of carcasses of broilers invaluable, in the food relation, products are recommended to be used mainly for preparation of soup kits and jelly which are not in great demand at the population and besides are not subject to the long-term storage. Many enterprises use these proteinaceous raw materials on development of dry feeds of animal origin. At the same time it should be noted a lack of theoretical researches and, as a result, validity of approaches in the solution of the modern technical tasks in the field of processing of secondary raw materials of the poultry-processing industry [1].

Though nutritionists do not recommend eating this type of raw materials because of the high content of fat, you should not forget about its useful properties. It is known that skin of broilers contains the significant amount of a collagen. At high concentrations in compounding of products from fowl a collagen can affect on the functional properties of myofibrillar proteins. A collagen can cause decrease of the sizes (contraction) of products from the crushed meat, especially at high-temperature processing and also can influence binding of pieces of meat in the formed products.

The specified properties are used in compounding of the new developed products from fowl which part skin of broilers is. The purpose of creation of such products is, first of all, expansion of the range of food and improvement of their quality [2].

When developing such products addition of antioxidant of dihydroquercetin can provide the significant increase in duration of terms of their storage and will allow to give the functional orientation to products.

Recently considerably interest in phytomedicines as they are safe and more physiologic for a human body, than synthetic additives habitual to the modern medicine extended. Medicines of a phyto-genesis are most widely presented by flavonoids. The most significant representative of this class of connections - dihydroquercetin (DHQ). It is the fissile antioxidant, a unique natural acceptor of the free radicals, a hepatoprotector and aradioprotector, the medicine having the anti-inflammatory and anesthetizing properties. Due to the DHQ high complexing properties brings out of an organism heavy metals, including radionuclides [3].

Today, dihydroquercetin is reference antioxidant, and works in an organism at the level of cell-like membranes. Antioxidatic effect of dihydroquercetin exceeds the level of effect of widely known vitamins such as A, C and E. In general, it is possible to tell about dihydroquercetin that it is native, (with undisturbed natural structure) a flavonoid of antioxidant group of P-vitamins that today it is the strong known natural antioxidant in the world.

And the main thing - dihydroquercetin is a unique immunomodulator. Taking into account the modern living conditions of people, dihydroquercetin is the substance necessary for a general population as therapeutic means on already developed illnesses and for their prophylaxis as medicine which will allow keeping health and activity for many years [4].

Development of new products provides use of ecologically safe raw materials, and addition of dihydroquercetin will provide increase in duration of terms of their storage by 2-4 times, due to high antioxidant activity and will increase biological value. It will allow giving the functional orientation to products and will create conditions for prophylaxis of a number of diseases, thanks to the maintenance of DHQ possessing to kapillyaroprotekturny, anti-inflammatory, radio tire-tread, disintoxication and hepatoprotective properties [5].

The release of these products will promote the quickest response to inquiries of consumers, updating of the range and its orientation, including to specialized groups of consumers. It is bound to specifics of the technology capable it is easy to modify process, to use secondary raw materials of the poultry-processing industry, ways of its preparation and application. Therefore production of products with use of secondary raw materials remains the most dynamically developing sector both on the outputs, and on the range and price categories [6].

MATERIALS AND METHODS

Laboratory researches on definition of the acid and peroxide numbers demonstrating formation of products of oxidizing decay of fat in skin from carcasses of broilers within 28 days of storage were conducted. As the experimental exemplars served raw materials in the cooled state.

According to a goal, objects of a research served:

- skin from the cooled meat of broilers of 1 grade in accordance with GOST P 52702-2006;
- the Dihydroquercetinum dietary supplement according to technical specifications 9100-241-21428156-11, according to the recommendations of the State sanitary and epidemiologic rationing of the Russian Federation No. 2.3.1.1915-04 of 2004 [7].

Medicine dihydroquercetinum was added to test pieces of the skin of broilers finely crushed, homogenized in number of 0,50; 0,75; and 1,00 kg on 100 kg of raw materials. In 7, 14, 21 and 28 days of storage of exemplars at a temperature of 3±1 °C, definition, in 3-fold frequency, contents in control and test pieces of oxidates on acid and peroxide numbers, according to the practical reference standards was carried out. The received results are processed by methods of mathematical statistics.

RESULTS AND DISCUSSION

The comparative analysis and complex assessment of content of oxidates in control and test pieces objective confirms effectiveness of the inhibiting effect of dihydroquercetin on intensity of oxidizing processes in the containing collagen raw materials of the poultry-processing industry.

Increase in acid number demonstrates education in raw materials of the free fatty acids which are formed as a result of hydrolytic decay of fats. In the studied exemplars of an emulsion of chicken skin, in 7 days of storage (fig. 1), this index the largest size had in a control specimen, free of antioxidant medicine - 0,30 mg the KOH/g which in 28 days of storage, naturally increased to 0,40 mg the KOH/g.

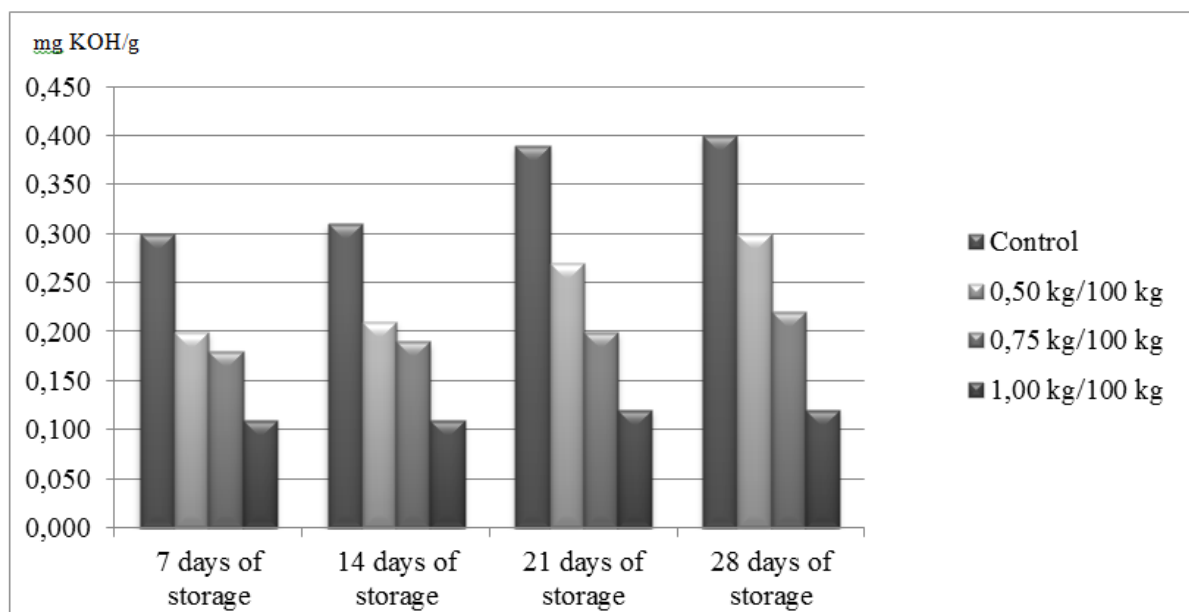


Figure 1: Influence of dihydroquercetinum on change of acid number of raw materials

Addition of dihydroquercetinum in test pieces of raw materials promoted essential decrease in extent of its oxidizing decay. At introduction of antioxidant at the level of 0,50 kg / 100, in 7 days of storage, acid number was raw materials kg below monitoring for 33%, at addition of 0,75 kg / 100 raw materials kg, respectively, for 40%, and at concentration of 1,00 kg / 100 the raw materials kg – is 63% less than this index in

a control specimen. Similarly, in 28 days of storage, acid number, respectively, was 25 lower; 45 and 70% on the studied concentration of DHQ.

In general, it was established that in 28 days of storage the exemplars containing the highest concentrations of DHQ were subject to the least oxidizing changes. Acid number during experience increased in them only by 9-22%, against 33% in monitoring. At the same time, the value of this index in a control specimen reached the KOH/g level of 0,40 mg characterizing it in a condition of decay in 28 days of storage in the cooled state. At the same time the exemplars containing antioxidant in all studied concentration met the requirements of the specifications and technical documentation that testifies to its high performance.

When studying antioxidatic activity of dihydroquercetin, in parallel with acid number, peroxide value - the index characterizing amount of primary oxidates of lipids (hydroperoxides and peroxide compounds) in the containing collagen raw materials (fig. 2) was defined.

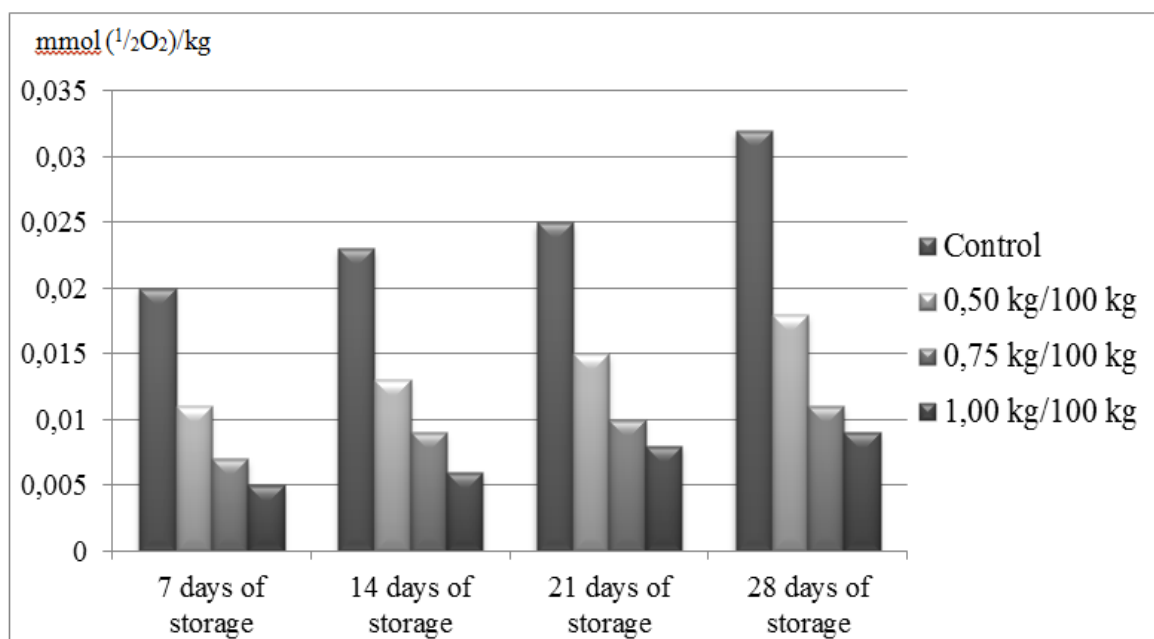


Figure 2: Influence of dihydroquercetin on change of peroxide value of raw materials

In a control specimen, is more narrow in 7 days of storage of raw materials, the value of peroxide value reached the indicator characterizing it as to the fresh, but not subject storage (0,020 mmol ($1/2O_2$)/kg) while the exemplars containing DHQ were estimated as fresh and liable to storage. At introduction of dihydroquercetin to raw materials test pieces, its influence on peroxide value it was positive and objective. So, at addition of antioxidant in number of 0,50 kg / 100, in 7 days of storage, peroxide value in an exemplar was nearly 1,8 times lower than raw materials kg, in comparison with monitoring. At the content of dihydroquercetin in exemplars at the level of 0,75 and 1,00 kg / 100 kg of the containing collagen raw materials, peroxide value in these exemplars was even lower – respectively in 2,9 and 4 times. And in 28 days of storage this index in test pieces relatively in 1,8 monitorings was lower; 2,9 and 3,6 times, respectively. For this period, the least intensity of accumulation of peroxide compounds is noted in a test piece with concentration of antioxidant 0,75 kg / 100 in kg of the containing collagen raw materials. The peroksidny number increased in it by 57%, - it is 7% lower than intensity of accumulation of peroxides in the first test piece (0,50 kg / 100 kg) and 23% below than in a test piece with the highest concentration of antioxidant (1,00 kg / 100 kg).



CONCLUSION

The received results objective demonstrate efficiency of effect of antioxidant of dihydroquercetinum at the level of its concentration of 0,75 kg / 100 kg, in the containing collagen raw materials of the poultry-processing industry, on formation of oxidates at storage and allow to consider it optimum.

Therefore, dihydroquercetinum shows high antioxidatic activity, interfering with accumulation of oxidates, and promotes the significant increase in shelf-lives of the containing collagen raw materials [8].

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