Influence of processing factors on raw chicken meat quality and safety

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Abstract. The paper analyzes the latest researches and reviews the issues devoted to procurement of qualitative and safe food stock and food products of chicken meat. The authors consider various factors influencing the quality of primary food stock that is further used in human food ration. The use of additives in chicken feed enhances the nutrition value of chicken meat due to an increase in the content of proteins, fats, essential amino acids, unsaturated fatty acids, which, in turn, contributes to an increase in biological value of food stock. Feed additives containing selenium make it possible to receive meat enriched with this nutrient for use in dietary rations. Different ways of raw chicken meat processing are analyzed, including scalding, injection and treatment with different mixtures; their impact on nutrition value of chicken meat is studied with the purpose of using it in dietary rations and groups of consumers. The object of the research was to identify factors influencing the quality and safety of chicken meat.

1. Introduction
Provision of the population with quality food is a topical task for the Russian government; market supply of food staples and food products needs to be expanded. As many studies in this field show, due to economic instability and ecological situation in the country, there are noticeable changes in the quality of agricultural raw materials and food products. In particular, this concerns poultry industry of the country’s economy.

Chicken meat is one of the important components of diet-therapy and of healthy nutrition in general. Chicken meat is the absolute priority food for emaciated people, for those who underwent surgery, for people with low immune function. It is also an excellent preventive measure against heart attack and apoplectic attack; it normalizes metabolism and increases the nervous system tolerance [1]. Chicken meat is used, with wonderful results, in remedial ration of people suffering from ulcer, gastritis and other diseases related to hyperacidity.

2. Results and discussion
Chicken meat contains fibers, which absorb extra acid and prevent eroding of stomach walls. Besides, chicken meat contains a lot of magnesium which is necessary for normal functioning of memory, gives energy, helps to withstand stress and chronic fatigue, while phosphorus and zinc maintain the healthy
condition of bones, hair, teeth and nails [2]. According to numerous studies, chicken broth is irreplaceable for sick people. It has an excellent influence on the “lazy” intestine making it work actively, normalizes the work of the cardiac muscle. In addition, a hot and fresh broth is a top remedy for flu, acute respiratory diseases, bronchitis and other colds [3].

During the first stage it is necessary to turn special attention to biological and nutritional value of poultry products which depends on the share of complete proteins, essential amino acids, fat, polyunsaturated fatty acids, as well as macro- and microelements conditioned by initial slaughter factors, such as variations in feeding processes and food ration, conditions of chickens’ cages (area, temperature, lighting, improvement of conditions, etc.), muscular exercise, emotional state, catching and transportation, etc. Different technological and biological ways of meat processing also allow modeling of specified physiological properties of a food product, which, in its turn, forms the basis of functional and dietary food production [4].

One of the first factors having an impact on the quality (before slaughtering) is the fact that injuries and defects received during catching, from means of transportation, and due to high density of chicken landing, are discovered only after slaughtering chickens. The injuries later influence the organoleptic parameters of the final product quality and lead [5, 6, 7] to reduction in hen weight by 6%, chicken weight by 11%.

Lately, different methods have been used to refine the quality of meat products, which include the use of complex food additives of natural and synthetic origin. These food additives are introduced into the poultry food rations, syringed and injected into semi-finished products, directly applied onto the surface of a cooled or frozen product for adding improved taste and flavor properties, and for further long storage [8]. The introduced additives not only improve the organoleptic and processing qualities of the product, but also enrich the food with necessary nutrients.

To improve the quality of chicken meat, A.B. Ivanova et al. developed a probiotic preparation Vetom 3 based on Bacillus subtilis of strain VKPMV-7048 (BKIMB-7048) [9]. The preparation was researched and added to the food of broiler chickens in the amount of 75 mg/kg 2 times a day starting from the first day of life and during the whole period of growth. The analytical data on meat qualitative composition are given in table 1

As the data show [9], in the meat of chickens of the test group (15th day of life), the content of protein was by 18.8% higher, and the content of fat and water by 20.3 and 1.5% lower than in the meat of chickens of the control group; 30 days later, the maintenance of protein and water in chicken meat was higher by 0.9 and 0.8%, and of fat and ash lower by 17.4 and 10.0%, respectively. 45 days later, the maintenance in chicken meat of protein, fat and ash increased by 11.9, 38.8, and 25.0%, while the content of water decreased by 2.6% in comparison with the figures of the control group. Phosphoric-calcium metabolism in the meat of broiler chickens from the test and control groups was within normal limits. After 15 and 45 days, the maintenance of phosphorus in the chicken meat was lower by 4.2 and 5.3, while on day 30 it was higher by 22.9%; the maintenance of calcium in the meat of chickens from the test group aged 15, 30 and 45 days was higher by 1.8, 6.6 and 2.9%, respectively.

In the research the authors [9] determined the content of nonessential amino acids in muscular tissue of broiler chickens. They observed a small increase of 1.0 and 7.2% in the content of asparagine and cystine in 15-day-old chickens from the test group. 30-day-old chickens demonstrated an increase of 12.6% in proline, and 45-days-old chickens an increase of 0.4, 0.5, 0.9, 2.2 and 45.0 % in alanine, proline, asparagine, glycine and cystine, respectively, in comparison with the corresponding chickens from the control group in table 1.

Quantitative measurement of essential acids in muscular tissue of 15-day-old broiler chickens showed an increased content of valine, threonine, lysine and tryptophan – by 0.3, 1.1, 6.4, and 9.6%; in 30-days-old chickens the maintenance of isoleucine and methionine was higher by 0.6 and 10.0% in compare with the control group.
Table 1. Variations in the content of nutrient substances, non-essential amino acids, essential amino acids and polyunsaturated fatty acids in muscular tissue of broiler chickens

| Indices                  | 15 days          | 30 days          | 45 days          |
|--------------------------|------------------|------------------|------------------|
|                          | Control Experiment | Control Experiment | Control Experiment |
| nutrient substances      |                  |                  |                  |
| Water, %                 | 71.7±0.3     | 70.6±0.1     | 74.0±0.6     | 74.6±0.1     | 75.9±0.01   | 73.9±0.1   |
| Fat, %                   | 6.4±0.7       | 5.1±0.3       | 2.3±0.7       | 1.9±0.1       | 1.8±0.03   | 2.5±0.1   |
| Protein, %               | 20.8±0.1      | 24.7±0.1      | 22.5±0.4      | 22.7±0.2      | 20.1±0.4   | 22.5±0.3   |
| Ash, %                   | 1.2±0.1       | 1.2±0.3       | 1.0±0.3       | 0.9±0.3       | 0.8±0.1   | 1.0±0.7   |
| Phosphorus, mg/kg        | 0.48±0.73     | 0.46±0.70     | 0.48±0.70     | 0.59±0.10     | 0.75±0.33 | 0.71±0.1   |
| Calcium, mg/kg           | 0.54±0.02     | 0.55±0.14     | 0.45±0.70     | 0.48±0.30     | 0.69±0.70 | 0.71±0.3   |
| non-essential amino acids|                  |                  |                  |
| Alanine                  | 4.95±0.05     | 4.96±0.30     | 4.94±0.03     | 4.78±0.70     | 4.65±0.01  | 4.67±0.40  |
| Arginine                 | 3.93±0.07     | 3.43±0.20     | 4.46±0.11     | 4.25±0.01     | 2.12±0.03  | 1.84±0.50  |
| Asparagine acid          | 5.95±0.16     | 6.01±0.30     | 6.27±0.16     | 5.99±0.20     | 5.31±0.03  | 5.36±0.30  |
| Histidine                | 2.92±0.07     | 2.82±0.13     | 3.47±0.09     | 3.48±0.03     | 1.88±0.03  | 1.81±0.30  |
| Glycine                  | 4.19±0.15     | 4.19±0.21     | 4.13±0.10     | 3.65±0.40     | 3.23±0.02  | 3.30±0.30  |
| Glutamic acid            | 13.89±0.10    | 13.65±0.12    | 14.73±0.04    | 14.73±0.02    | 13.66±0.03 | 13.64±0.01 |
| Serine                   | 2.68±0.05     | 2.60±0.04     | 2.75±0.04     | 2.55±0.60     | 2.13±0.01  | 2.08±0.20  |
| Cystine                  | 0.55±0.09     | 0.59±0.20     | 0.81±0.08     | 0.59±0.20     | 0.22±0.01  | 0.32±0.70  |
| Proline                  | 3.07±0.09     | 3.23±0.07     | 2.94±0.08     | 3.31±0.60     | 4.19±0.01  | 4.21±0.60  |
| essential amino acids    |                  |                  |                  |
| Lysin                    | 9.54±0.34     | 10.15±0.84    | 8.37±0.17     | 7.81±0.17     | 7.93±0.08  | 8.62±0.20  |
| Threonine                | 2.82±0.07     | 2.85±0.12     | 3.02±0.06     | 2.84±0.02     | 2.57±0.01  | 2.64±0.20  |
| Valine                   | 3.29±0.07     | 3.30±0.10     | 3.27±0.05     | 3.04±0.03     | 2.85±0.01  | 2.88±0.20  |
| Methionine               | 0.76±0.06     | 0.57±0.20     | 0.90±0.50     | 0.99±0.01     | 1.03±0.02  | 0.96±0.70  |
| Isoleucine               | 1.40±0.09     | 1.24±0.19     | 1.65±0.04     | 1.66±0.30     | 2.10±0.01  | 1.98±0.10  |
| Oxyproline               | 0.31±0.02     | 0.31±0.21     | 0.33±0.01     | 0.28±0.90     | 0.27±0.01  | 0.28±0.20  |
| Tryptophan               | 7.91±1.01     | 8.67±0.33     | 6.74±0.19     | 6.02±0.08     | 5.83±0.08  | 6.52±0.30  |
| Leucine                  | 4.54±0.06     | 4.52±0.10     | 4.54±0.05     | 4.35±0.20     | 4.81±0.01  | 4.87±0.10  |
| polyunsaturated fatty acids|                   |                  |                  |
| Arachidonic              | 0.20±0.03     | 0.18±0.03     | 0.27±0.01     | 0.31±0.01     | 0.29±0.01  | 0.31±0.03  |
| Linoleic                 | 9.87±0.01     | 9.89±0.03     | 9.87±0.01     | 9.88±0.01     | 11.91±0.01 | 12.45±0.06 |
| Linolenic                | 0.67±0.02     | 0.64±0.02     | 0.67±0.02     | 0.70±0.02     | 0.72±0.03  | 0.74±0.03  |

The research showed that, in the final stage of the experiment (day 45), the maintenance of lysine, threonine, valine, oxyproline, tryptophan, leucine in the muscular tissue of chickens from the test group exceeded the same control group figures by 8.7, 2.7, 1.1, 3.7, 11.8 and 1.2%. It was also ascertained that the increase in the quantity of essential amino acids in muscular tissue of chickens from the test groups takes place during the final stage of the experiment, before slaughter, which ensures high content of amino acids in the meat. Thus, the research have proved a positive influence on amino acidic status of meat recommended for dietary nutrition.

The authors also studied the changes in the amounts of polyunsaturated fatty acids. At the age of 15 days, the maintenance of linoleic acid in muscular tissue of chickens from the test group was by 0.2% higher than the same figure for the control group; at the age of 30 days, the maintenance of linoleic,
linolenic and arachidonic acids was higher by 0.1, 4.4 and 14.8, %, respectively. At the age of 45 days, the maintenance of linolenic, linoleic and arachidonic acids was higher by 2.8, 4.5 and 6.8%.

So, the results received by the researchers [9] evidence that when using Vetom 3, the maintenance of protein, essential amino acids, fat, unsaturated fatty acids and ash in muscular tissue of broiler chickens grows, although insignificantly, which contributes to an increase in biological full-value of the food products.

In the research the authors [10,11] recommend Tzeokhol-Se (“Цеохол-Se”) additive containing selenium-modified hydrolyzate of connective tissue protein – elastin, adsorbed on zeolite in the ratio of 2:1. For modification of selenium elastin hydrolyzate, sodium selenite was used at the rate of 50-200 mcg of selenium per 1g of hydrolyzate, which made it possible to obtain a non-toxic food additive and to increase selenium accessibility.

During the test, the authors [10,11] used three groups of Dutch Leghorn chickens at the age of 9-10 months. The first group was a control group. The second group was a test (experiment) group, which received the developed food additive Tzeokhol-Se. The third group consisted of chickens, the ration of which included 0.001M solution of sodium selenite. The experiment was conducted for one month. After that, the authors determined the chemical composition and functional-processing qualities of the chicken meat. The results of the research are presented in tables 2.

**Table 2. Influence of selenium-containing food additives and functional-processing qualities on chemical composition of chicken meat**

| Groups       | Moisture, % | Protein, % | Fat, % | Ash, % | Selenium, micrograms/kg | MTC, % | WHC, % | FHC, % |
|--------------|-------------|------------|--------|--------|--------------------------|--------|--------|--------|
| Control      | 74.6±1.0    | 21.0±1.1   | 4.4±0.3| 1.1±0.1| 0.2±0.03                 | 68.4±2.3| 74.4±1.7| 75.3±1.3|
| Tzeokhol-Se | 76.0±0.9    | 21.2±1.2   | 4.1±0.2| 1.4±0.3| 0.4±0.1                 | 71.7±4.4| 75.6±0.9| 85.4±2.3|
| Na₂SeO₃     | 75.2±2.7    | 21.4±2.8  | 4.3±0.2| 1.2±0.1| 0.2±0.02                 | 70.6±7.8| 75.0±3.3| 81.7±2.2|

MTC – moisture-trapping capacity, %
WHC – water-holding capacity, %
FHC – fat-holding capacity, %

As the data received by the authors [10,11] demonstrate, there is an increase of 0.41 mcg/kg in selenium content in the chickens from the second group in comparison with the test samples (0.20 micrograms/kg), which is explained by the presence of bio-available selenium in the Tzeokhol-Se additive that improves its accessibility. The content of protein and fat in all groups equals the level of the control group.

As to the functional-processing qualities, such as moisture-trapping and water-holding capacities, no certain deviations were noted in comparison with the control group. The only exception was the fat-holding capacity (FHC) in the groups fed with selenium as an additive and sodium selenite salt. The authors explain the increase in FHC by the fact that selenium is a strong antioxidant averting oxidative processes and disruption of fats. Taking into consideration the above, it is possible to conclude that the selenium-containing food additive does not have a negative result on chemical composition and functional-processing qualities of chicken meat, while FHC increases and constitutes 85.4% in the second group and 81.7% in the third group (75.3% in the control group), which makes it probable to use chicken meat for production of various dietary foods.

The same authors [10,11] also suggest a selenium-based additive which contains sodium selenite adsorbed on clinoptilolite-containing tuff of the Kholinski deposit, which is a native zeolite. Sodium selenite is taken at a rate from 50 to 200 mcg per 1g of zeolite, which lets to enrich the product with mineral substances, enhances selenium availability for animals and poultry.
A number of experimental researches [12] showed that the use of these additives enriched chicken meat with such an essential mineral as selenium in an organic form which is the most digestible and accessible form for a human being. The content of selenium constitutes 41mcg per 100g of meat, which is within the recommended adequate level of selenium consumption.

In order to obtain dietary chicken meat [13], developed a recipe of a full-value complete feed with balanced content of nutritious and biologically active substances. They also developed a recipe of a vitamin-amino-acid complex obtained with the help of lactic-acid bacteria.

The Siberian Centre of Biotic Medicine received data on the use of the vitamin-amino acid complex in feeding chickens, which made it possible to produce dietary foods [14], e.g. liver and chicken meat. 100g of the liver makes up for 85.7% of human daily demand for selenium, 38.6% for phosphorus, 39.2% for iron. 100g of the dietary chicken meat makes up for 28.6% of human demand for selenium, 17.9% for phosphorous. The dietary eggs make up for 25.7% of an adult’s daily demand for selenium and 6.7% for potassium.

Estimation of poultry product quality and safety is related not only to initial factors, but also to processing of raw meat [15]. In Russia, one of the most significant technological chicken meat processing operations having an effect on the quality of processing and storage is scalding [7, 15]. During a “hard” scalding mode (water temperature is 58ºС, duration is 2-2.5 minutes), carcasses acquire a bright red color, by contrast to a “mild” mode (water temperature is 52ºС, duration is 3.5-4 minutes), when the surface of the carcass has natural mat appearance.

In order to increase storage life of raw meat, disinfectants are added during the process of scalding. Among these disinfectants are Dezibak NUK (“Дезинбак НУК”), whose active substance is acetic acid and Биопак-D (“Биопак-Д”) with polyhexamethylen guanidine hydro-chloride as active substance. This process helps decrease bacterial load of chicken carcasses and increase their storage life, but, at the same time, leads to saturating carcasses with water, which results in decreased nutritional value of processed meat [15]. Due to the use of disinfectants, it is necessary to introduce additional control over the products taking into account safety indicators.

Another important factor influencing the quality, safety, and storage life of chicken meat is the method of raw carcass processing [16]. Propose treatment of raw chicken carcasses with a mixture of lactic acid buffer solution, its sodium salt and acetic acid solution, which effects in improving the quality of chicken carcass processing, conservation the natural organoleptic properties of fresh products and enhancing the products’ storage life up to 7 days. The treatment was carried out at a temperature of 2-6ºС during 40-60 seconds by submerging into or by sprinkling with the solution of necessary concentration, which ensured formation of a protective surface layer with an anti-microbic effect. The results of these researches are shown in tables 3.

Other researchers propose a method of food product (mainly, poultry, pork, fish) disinfection by spraying the raw food and ready products with an aerosol comprising from 0.75 to 0.12% water solution of metal chlorates, e.g. NaClO₂, and lactic, apple, fumaric acid, or a mixture thereof, guarantying that the pH of the solutions equals 2.2-4.5 [17]. At that, one should not forget that the use of chlorine-containing substances could have a negative influence on the quality and safety of food.

In the research the authors researched the method of poultry carcasses (chicken, turkey) treatment with carboxylic acid buffer solution, pH 2.8-3.2, with the purpose of increasing quality and storage life. Additionally, a thickening agent was introduced into the buffer solution; the obtained water emulsion with a temperature from 30 to 45ºС was applied by spraying onto the surface of the poultry carcasses before their cooling and freezing [17, 18].

According to the above researches, the use of various substances can increase storage life of raw meat and products, but it should be combined with additional control over the safety of raw meat and semi-finished products.

To improvement the biological value of raw meat and finished products, poultry enterprises widely use food additives injected into semi-finished products. E. T. Clark et al. developed a composition of a complex food additive for injecting into semi-finished products of long-storage poultry meat [19], which
contains a soy conversion product (soy oil), a food emulgator, a sugar (dextrose), wheat starch, flavor active components, such as beef extract, chicken fat, sodium caseinate, tocopherol, salt and water.

Table 3. Results of organoleptic assessment of test, histological analysis and control poultry meat samples on the 7th day of storage

| Characteristics                             | Control                                                                                                                                           | Submersion and sprinkling                                      |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Muscles at a cut                            | Moist, leave a small moist pale pink spot on blotting paper                                                                                     | Analogue to control group                                    |
| Muscles’ texture                            | Solid, a recess formed by pressing recovers                                                                                                      |                                                             |
| Muscles’ odor                               | Tasty flavor specific to poultry meat, transparent broth with a small amount of fine flakes                                                      |                                                             |
| Broth transparency and flavor                | Tasty flavor specific to poultry meat, transparent broth with a small amount of fine flakes                                                      |                                                             |
| Micro-structural properties of poultry meat | Analogue to control group                                                                                                                      |                                                             |
| Condition of muscular fiber nuclei structure| Structure of muscular fiber nuclei is well-defined                                                                                            |                                                             |
| Condition of cross- and longitudinal striation in muscular fibers | Cross- and longitudinal striation is well defined. Nuclei in drying surface fibers differ from nuclei of deep-lying fibers by more hardness and pycnoticity. They are thinner and shorter than normal nuclei. | Analogue to control group                                    |
| Capacity of muscular fibers for coloring    | Muscular fibers’ color is bright and even                                                                                                       |                                                             |
| Localization and reproduction of microorganisms in muscular tissue | In loose connective tissue of surface fascia small patches of cocci can be found.                                                                  |                                                             |

In the research the authors [20] modified the composition of the complex food additive, in which soy isolate is used as a soy conversion product, glucose is used as a sugar, modified food starch as starch, volatile oils and/or oleoresins of spicy-aromatic plants, oleoresins of white, red, allspice, green and black peppers and lemon volatile oil as flavor active components. Additionally, the supplement contained ascorbic acid, lemon acid, sodium glutamate, E415 and food phosphate. E471 was used as a food emulgator. Volatile oils and oleoresins of spicy-aromatic plants in the injected supplement ensured uniform distribution of their taste and flavor in the whole product. E415, together with modified starch and soy isolate, contributed to the formation of a stable jellylike and solubilized system inside the semi-finished product, and ensured excellent water-holding capacities during the whole process of the product thermal processing.

Introduction of ascorbic acid into the complex additive allowed the authors not only to prolong storage life and improve quality, but also to increase the content of vitamins in the raw meat and, consequently, the physiological value of the product with the purpose of strengthening human immunity.

For treatment of frozen and chilled semi-finished poultry products with spices, [21] developed a technique which allowed impregnating dry spices into a poultry carcass under pressure. The disadvantage of this technique was a decrease in juiciness during culinary treatment of the product; while its advantage was a high content of spices, which positively influenced production of gastric juice and increased consumers’ appetite.

In order to make a quality product with a long-term storage life [22] and others proposed a technique for dry meat production by vacuum-sublimation dehydration until the final moisture content in the product was 1.5-1.8%, with further packing. This method includes preliminary treatment of white poultry meat (chicken, turkey, goose, duck, etc.) with an enzyme preparation, which leads to significant transformation of protein structures, restructuring of muscle fibers, and has a softening effect, thereby
contributing to improvement of the dry product texture after its rehydration. The authors conducted a study of the chemical composition, organoleptic, structural-mechanical and functional-processing properties of the dehydrated product depending on the concentration of the enzyme preparation and the chunk size. The corresponding analytic data are given in tables 4, 5.

**Table 4.** Qualitative characteristics, chemical and organoleptic assessment composition of dry white poultry meat products

| Enzymatic preparation concentration, % | Meat MTC, % | Water absorptio n factor | Shear stress Qav (kPa) | Water, % | Protein, % | Fat, % | Ash, % | Organoleptic assessment |
|---------------------------------------|-------------|--------------------------|-----------------------|----------|------------|-------|--------|-------------------------|
| Control                               | 48.0±0.2    | 2.1±0.3                  | 112.5±1.3             | 1.7±0.1  | 86.6±0.6   | 6.1±0.6 | 5.5±0.7 | 4.1                     |
| 0.03                                  | 53.0±0.4    | 2.6±0.3                  | 103.1±1.0             | 1.7±0.1  | 87.3±0.5   | 6.0±0.7 | 5.0±0.6 | 4.4                     |
| 0.05                                  | 58.8±0.4    | 2.8±0.2                  | 97.4±1.2              | 1.7±0.1  | 87.8±0.5   | 6.1±0.7 | 4.3±0.7 | 4.7                     |
| 0.06                                  | 59.8±0.4    | 2.7±0.2                  | 76.7±1.1              | 1.7±0.1  | 87.8±0.4   | 6.1±0.6 | 4.4±0.6 | 4.5                     |
| 0.07                                  | 58.3±0.3    | 2.6±0.1                  | 74.5±1.1              | 1.8±0.1  | 87.7±0.3   | 6.0±0.5 | 4.5±0.4 | 4.2                     |
| 0.08                                  | 57.9±0.3    | 2.5±0.1                  | 83.9±1.2              | 1.7±0.1  | 87.7±0.2   | 6.1±0.6 | 4.5±0.4 | 4.1                     |

| Minced chicken fillet                 |             |                          |                       |          |            |       |        |                         |
|---------------------------------------|-------------|--------------------------|-----------------------|----------|------------|-------|--------|-------------------------|
| Control                               | 51.8±0.8    | 3.0±0.3                  | 84.3±0.9              | 1.8±0.1  | 87.8±0.5   | 6.1±0.8 | 5.4±0.8 | 4.2                     |
| 0.03                                  | 60.7±0.5    | 3.8±0.2                  | 61.2±1.1              | 1.8±0.1  | 87.9±0.5   | 6.0±0.7 | 4.3±0.7 | 4.7                     |
| 0.05                                  | 59.5±0.6    | 3.9±0.1                  | 59.7±1.0              | 1.7±0.1  | 87.9±0.3   | 6.0±0.7 | 4.4±0.4 | 4.6                     |
| 0.06                                  | 59.0±0.5    | 3.8±0.2                  | 53.6±0.9              | 1.7±0.1  | 87.9±0.2   | 6.1±0.6 | 4.4±0.5 | 4.4                     |
| 0.07                                  | 58.7±0.5    | 3.8±0.2                  | 52.6±1.2              | 1.7±0.1  | 87.7±0.4   | 6.1±0.6 | 4.5±0.5 | 4.3                     |
| 0.08                                  | 58.2±0.3    | 3.7±0.2                  | 55.5±1.1              | 1.7±0.1  | 87.7±0.4   | 6.0±0.5 | 4.6±0.6 | 4.1                     |

**Table 5.** Oxidation variations in lipid fraction of dehydrated white poultry meat during storage

| Storage life, months | Acid number, mg KOH | Peroxide number, iodine % |
|----------------------|---------------------|---------------------------|
| Chicken fillet in cubes |                    |                           |
| 0                    | 0.0897              | 0.0022                    |
| 3                    | 0.1271              | 0.0025                    |
| 6                    | 0.2130              | 0.0030                    |
| 9                    | 0.3680              | 0.0034                    |
| 12                   | 0.4970              | 0.0043                    |

| Minced chicken fillet |                    |                           |
|----------------------|---------------------|---------------------------|
| 0                    | 0.0901              | 0.0020                    |
| 3                    | 0.1252              | 0.0021                    |
| 6                    | 0.2100              | 0.0024                    |
| 9                    | 0.3640              | 0.0031                    |
| 12                   | 0.4309              | 0.0037                    |

Other authors proposed a method of producing dry semi-finished meat by introduction into minced meat of a lactic-protein concentrate, natural casein or soy protein isolate and spices with further freezing or drying of the product by sublimation. The new types of products described by the authors will result in full or partial replacement of natural raw meat in food production with the purpose of enriching the products or developing special rations for certain consumers (the military, oil-industry workers, miners and others).

On the basis of the publications’ review, it is possible to infer that the quality and safety of chicken meat depend on the first stage of poultry growing at poultry farms, as well as the initial treatment and
further processing of raw meat. With the aim to produce food with specified physiological properties, it is possible to use food additives during the stages of feeding and processing, in particular, scalding and injecting.

3. Conclusion

Full-value nutrition determines human health, longevity and work efficiency. In case of any nutritional disorders, human ability to withstand unfavorable environmental effects, stresses, increased mental and physical workloads decreases. It is necessary to understand that it is the nutrition that enables the processes of human growth and development, physical and mental activity, moods, etc. The researched material and presented data will attract the attention of experts in poultry breeding and food producing to the quality and safety of raw chicken meat. Another significant factor that needs to be kept in mind is the nutritional value of a product, which influences consumer preferences.

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