

Bioeconomic Aspects of the Innovative Composition of Broiler Chicken Meat Production

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Abstract. Innovative composition of broiler chicken meat, in comparison with commercial mass production, contains higher levels of omega-6 and omega-3 fatty acids and carotenoids complex which positively influence human health and prevent risk factors causing different diseases. The research aim was to evaluate the possibility to obtain broiler chicken meat of innovative composition, and to evaluate the expenses of production in bioeconomic aspects by using feed that contains an increased amount of omega-6 and omega-3 fatty acids and additives of carotenoids. Feeding trial was carried with cross ROSS 308 broiler chicken in the age from 1 to 42 days (n=300). It was concluded that the best combination in broiler chicken feed for producing innovative composition meat was 1% flax seed oil, 1% rapeseed oil, and 2% soya bean oil and 0.1% additives of carotenoids complex. Using the mentioned oil and antioxidant composition the obtained broiler chicken meat contained the amount of omega-6 fatty acids of 27.4%, omega-3 fatty acids- 8.3% and carotenoids - 0.86 mg kg⁻¹, it is by 3.9%, 3.2% and 0.24 mg kg⁻¹ higher in comparison with commercial mass productions. Poultry organism metabolic processes are essential factors determining the levels of fatty acids and carotenoids in meat, therefore it is impossible to evaluate and calculate these physiological processes in organisms economically.

In trial the expenses of feed consumption per 1000 broiler chicken breeding were by 1.7% higher than commercial feed, while broiler chicken productivity was 7.9% higher, since the total income from sales of 1000 broiler chicken breeding amounted to LVL 293.47 or it was 15% higher than selling commercial mass production.

Key words: broiler chicken, vegetable oil, fatty acids, antioxidant, expenses.

Introduction

In Latvia poultry meat plays a significant role in the meat production sector. Consumers' demand for qualitative and healthy poultry meat products increases. Qualitative and healthy poultry meat is characteristic with high content of polyunsaturated fatty acids (omega-6 and omega-3), vitamins, anti-oxidants (carotenoids) and mineral substances, and low level of saturated fatty acids and cholesterol (Holub B.J., 2002, Bodnieks E., 2008). Hence the current goal for poultry meat production is not to increase the quantity of poultry output, but to increase the production of qualitative and innovative poultry products. Innovative food-stuff contains biologically active substances, which favourably influence vital functions of human body, reduce risk factors of different diseases and promote health preservation (Zariņš, Neimane, 2002). The necessity to produce innovative food products with appropriate content increases constantly. It shall be noted that the population of the world and Latvia mostly suffer from cardiovascular diseases (WHO, 2003). The shortage of omega group fatty acids (linolenic acid and linoleic acid) and antioxidants (carotenoids) in everyday food products is one of the cardiovascular diseases risk factors. Intake of omega group fatty acids and antioxidants with nutrients enables metabolism of cholesterol in human body, and averts risk factors causing cardiovascular, tumor, rheumatic, and other diseases (Aro, 2000). Fatty acids in human body

are more or less subjected to oxidation processes. Free radicles, which are neutralised by antioxidants, carotenoids, selenium, vitamin E etc. originate due to the oxidation process of fatty acids. Hence, producing fatty acid-rich products, the content of antioxidants, especially carotenoids shall be increased (Surai, 2002). It shall be specified that currently studies are being carried out on the production of innovative composition broiler chicken meat. Researchers in Estonia have studied possibilities on increasing omega-6 and omega-3 fatty acids in broiler chicken and quail meat and fat (Hämmäl J., etc. 2000, Tikk H., etc. 2002). Latvia has all the possibilities to develop production of innovative composition broiler chicken meat with an increased content of omega group fatty acids and antioxidants due to:

- 1) production of the necessary feeding stuff for production of innovative composition broiler chicken meat with an increased omega-6 and omega-3 content;
- 2) breeding of highly productive avian crosses;
- 3) annual growth tendency related to poultry consumption and production rate.

Unfortunately production of innovative composition poultry meat containing an increased omega group fatty acids and carotenoid level is not developed in Latvia. With the development of foodstuff production technologies innovative high-quality food products are supplied to the market, thus consumers may shape balanced and healthy everyday diet.

Innovative food production has attracted a pretty big attention (Mazza G., 1998) and it represents one of the growing food industry sectors in the world (Harris C., 2000). In the USA annual sales of innovative food equals to USD 50 billion due to the increase of innovative food production (Harris C., 2000). Production of innovative composition meat requires increased expenses, thus sales prices of such meat might be higher. Prices significantly differ in the UK; they are as high as the prices of poultry products obtained in the process of organic farming, which are usually twice higher than the prices of commercial products. Mainly the price difference is due to the costs of additional feeding stuff included into the avian feed (Michella S.M., 2000). Consumers believe that the price speaks on the quality of a product, while others perceive it as a symbol of social status, though some others consider that the price identifies a supplier's opinion on the value invested in a product (Upīte Ī., 2000). Consequently the prices of innovative composition poultry meat are higher than traditional content poultry meat, since the quality of innovative broiler chicken meat is higher and more favourable for human health. The price shall comply with the quality. A company working in the direct market sector (meat production) has an opportunity to set sales price of a product by means of better quality. Suppliers possess many possibilities of informing consumers on the quality and healthiness of innovative composition meat (Buģina V., 2007).

It actually determines the research topicality for the national economy of Latvia to enhance production of innovative composition broiler chicken meat containing an increased amount of omega-6 and omega-3 fatty acids, and carotenoids. Feed costs amounting to 73-76% of total costs constitute the majority of production costs related to broiler chicken meat production. An intense production of such innovative broiler chicken meat products requires an economic and scientific assessment. Therefore the following research **hypothesis** was advanced: production costs of innovative composition broiler chicken meat exceed production costs of commercial composition broiler chicken meat. The research **aim** is to assess economic aspects for production of innovative broiler chicken meat on trial conditions. The following **tasks** are defined to achieve the set aim:

- 1) to clarify the quality of available feeding stuff, doses and costs of avian feeding for the production of innovative composition meat;

- 2) to verify avian productivity and the quality of innovative composition broiler chicken meat as a result of practical trials;
- 3) to assess production costs and possible revenues of innovative composition broiler chicken meat.

Generally accepted economic research **methods** were used for the purposes of the study, like monographic method and method of comparative analysis and synthesis. Scientific literature on innovative food products and their significance in human health has been analysed (Holub B.J., 2002, Bodnieks E., 2008, Zariņš Z., Neimane L., 2002, Surai P.F. 2002, Mazza G., 1998, Harris C., 2000, Michella S.M., 2000, Upīte Ī., 2000). In the summer of 2009 a feeding trial was carried with cross ROSS 308 broiler chicken (n=300) in the vivarium of Physiology Block of the Research Institute of Biotechnology and Veterinary Medicine "Sigra", Latvia University of Agriculture (Table 3). The trial with broiler chickens lasted for 42 days. Broiler chickens were divided into 2 groups: Group 1 – control and Group 2 – trial. Broiler chickens from the two groups were fed with the basic feed (BF) of the same content. Feed content for production of innovative broiler chicken meat is shown in Table 3.

Results and discussion

1. Assessment of feeding stuff and doses by the content of fatty acids and costs

The production of innovative composition broiler chicken meat, which compared with conventional composition broiler chicken meat contains an increased omega-6 (linoleic acid) and omega-3 (linolenic acid) content requires avian feed that consists of fatty acid containing feeding stuff – seed oils (flaxseed, rapeseed, soya bean). Thus the content of omega-6 and omega-3, and costs per dose were assessed in locally produced (in Latvia) rapeseed and flaxseed oils. The content of these fatty acids in imported soya bean oil frequently used in poultry farming was analysed comparatively (Table 1).

The largest omega-3 fatty acid content was observed in flaxseed oil amounting to 55%, which 6-7 times exceeds the respective figures in rapeseed oil and soya bean oil; while the largest omega-6 amount is observed in soya bean oil amounting to 54%, if calculated in per cent of total lipid amount. It is 3-4 times higher than in rapeseed oil and flaxseed oil (Table 1).

One kilogram of flaxseed oil contained most omega-3 and omega-6 fatty acids, namely, 666 g/kg,

Table 1

Content and ratio of fatty acids in vegetable oils

Parameters	Omega-3 linolenic acid, %	Omega-6 linoleic acid, %	ω-6:ω-3 ratio
Flaxseed oil	55.0	13.0	0.2 : 1
Rapeseed oil	9.0	20.0	2.8 : 1
Soya bean oil	8.0	54.0	6.8 : 1

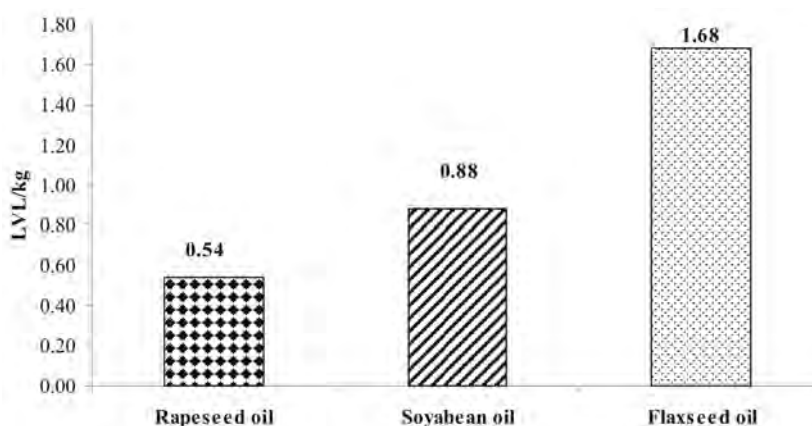
Source: made by the authors according to the trial data of the Research Institute "Sigra" (Vītiņa Ī., et al, 2009)

Table 2

Amount (g) of linolenic acid and linoleic acid per one kg of feeding stuff

Parameters	Flaxseed oil	Rapeseed oil	Soya bean oil
omega-3 linolenic acid, g	539	88	78
omega-6 linoleic acid, g	127	245	529
Total, g	666	333	607

Source: made by the authors according to the trial data of the Research Institute "Sigra"



Source: made by the authors according to the producers' sales prices

Figure 1. **Vegetable oils sales prices of "Iecavnieks" Ltd and "Rīgas kombinētās lopbarības rūpnīca" Ltd from December 1, 2009, LVL/kg**

while the least amount was detected in rapeseed oil, so the difference is 2 times (Table 2).

One kilogram of flaxseed oil contained 539 g of omega-3 and 127 g of omega-6 fatty acids. According to the total content of omega-3 and omega-6 fatty acids (Table 2) flaxseed oil was the most valuable feeding stuff, though it was also the most expensive one (Figure 1). Total content of omega-6 and omega-3 fatty acids in flaxseed oil is 666 g/kg and its price equals to 1.68 LVL/kg.

Out of the two analysed fatty acids in the composition of innovative products exactly omega-3 fatty acid has an especial physiological significance in a human body. The majority of conventional food products contain insufficient amount of omega-3 fatty acid, while the shortage of omega-6 fatty acid is not so expressed. Hence the content of omega-3 in the used feeding stuff is of great importance, and the larger the content of omega-3 in the used feeding stuff, the greater the possibility that the obtained innovative product contains larger content of these fatty acids. Consequently according to the content of omega-3 fatty acids the soya bean oil is less valuable than flaxseed oil. Rapeseed and soya bean oils are almost equivalent according to omega-3 content, but rapeseed oil contains less content of omega-6 fatty acids (Table 2).

The prices of vegetable oils supplied by "Iecavnieks" Ltd and "Rīgas kombinētās lopbarības rūpnīca" Ltd valid from December 1, 2009 are shown in Figure 1.

Locally produced flaxseed oil and rapeseed oil as well as imported sunflower-seed oil and soya bean

oil might be used for the production of innovative poultry products. The most economically profitable feeding stuff used for the production of innovative products is determined following the costs of fatty acids amount (kg) in oils, amount costs of the used doses and impact of this dose on poultry productivity and content of fatty acids in the obtained production. Therefore it is necessary to add oil blends containing both high omega-3 and omega-6 levels to feeding stuff to produce innovative broiler chicken meat.

Flaxseed oil contains the most balanced amount ratio of omega-6 and omega-3 fatty acids, i.e. 0.2:1. Consequently to produce more economically profitable innovative composition broiler chicken meat with higher content of omega-6 and omega-3 fatty acids and containing more optimum amount ration, the following oil blend shall be included into the feeding stuff fed to broilers: oil with the highest and cheapest level of omega-3 fatty acids and oil with the highest and cheapest level of omega-6 fatty acids. Out of analysed oils, a blend of rapeseed oil and flaxseed oil correspond to such a test.

The evaluated feeding stuff may be included into the poultry feed (according to the standards) only in a certain amount. The standards determine and practical poultry farming applies optimum feeding stuff doses admissible for avian organism, including also the studied oils that are allowed to add to the poultry feed in the amount of 2% - 4%.

The amount of fatty acids of feed has no proportional relation to the content of fatty acids in broiler chicken meat, as a certain transition stage of fatty acids from the amount of fatty acids in feed to

Table 3

Trial scheme for production of innovative composition broiler chicken meat (content of feed fed for chicken from 1 to 42 days of age)

Group	Feeding programme
Group 1-control	Basic feed content 4% soya bean oil
Group 2 - trial	Basic feed content 2% soya bean oil, 1% rapeseed oil, 1% flaxseed oil and 0.1% carotenoids Karotinas V

*the content complies with the standard requirements

Source: according to the unpublished data of the Research Institute "Sigra"

Table 4

Content and costs (LVL/100 kg) of full-value feed fed to broilers on average in all breeding periods

Parameters	Group 1 - control		Group 2 - trial	
	feed, kg	costs, LVL	feed, kg	costs, LVL
Wheat	34	3.74	33.9	3.73
Maize	25.5	3.83	25.5	3.83
Soya bean meal	18	5.58	18	5.58
Sunflower meal	6	0.9	6	0.90
Fish meal	3	1.86	3	1.86
Fodder yeast	6	0.9	6	0.90
Premix	0.5	0.19	0.5	0.19
Fodder chalk	3	0.18	3	0.18
Soya bean oil	4	3.52	2	1.76
Flaxseed oil	0	0	1	1.68
Rapeseed oil	0	0	1	0.54
Karotinas V (carotenoids additives)	0	0	0.1	0.86
Total:	100.0	20.70	100.0	22.00
± to control, LVL	-	x	-	1.30
% to control	-	x	-	6.28

Source: made by the authors according to the data of the Research Institute "Sigra" and calculated according to the producers' sales prices

the content of fatty acids in production output exists in an avian organism.

2. Trial results on innovative composition broiler chicken meat production, avian productivity and poultry meat quality

The difference between the trial groups is depicted in Table 3, when soya bean oil, flaxseed oil and rapeseed oil in various combinations and additive (Karotinas V) containing antioxidant carotenoids were included into the basic feed of broiler chicken. These oil blends contained high levels of omega-3 and omega-6 fatty acids.

The content of basic feed for broiler chickens of all groups is balanced in compliance with the requirements of cross ROSS 308 standards. Broilers of the control group (Group 1) were fed with basic feed containing 4% soya bean oil, while 2% soya bean oil, 1% rapeseed oil and 1% flaxseed oil, and

complex additives containing antioxidants with a purpose to increase the content of omega-3 and omega-6 fatty acids, and antioxidants carotenoids in feed doses were added to the feed of Group 2 broilers (Table 3).

Productivity of broiler chickens during the trial period was evaluated by accounting:

- live weight of broilers, weighting each bird individually at the age of 7, 14, 21, 28, 35 and 42 days;
- feed consumption – weighting feed every day by groups;
- survival – dead birds were counted every day.

The analysis comprised the amount of omega-3 and omega-6 fatty acids in broiler meat of 42 days old (sales age) broiler chickens. The analysis was carried at the accredited biochemistry research laboratory of the Research Institute of Biotechnology and Veterinary Medicine "Sigra", Latvia University of Agriculture

(Registration No. LATAK-T-038-06-99-A) according to the standard LVS EN ISOIIEC 17025-2005 (Testēšanas un kalibrēšanas..., 2005) by means of a gas chromatograph (HP 6890).

The costs of feed fed to broilers ("Iecavnieks" Ltd, JSC "Dobeles Dzirnavniesks" and "Rīgas kombinētās lopbarības rūpnīca" Ltd sales prices on December 1, 2009) are calculated per 100 kg feed and shown in Table 4.

The costs of 100 kg feed fed to broilers ranged between LVL 20.70 and LVL 22.00. Mix of oils included into the feed and costs of antioxidant doses were the factors determining the amount of feed costs. Difference in feed costs is LVL 1.30 or 6.3% compared with the first - base group.

Basic parameters of broiler productivity are as follows: live weight, live weight gain, food consumption and costs.

During the trial period broiler productivity is high. The average live weight for broilers of sales age ranged between 2822 -3044 g with the live weight gain per day equalling to 66.21-71.49 g (Table 5).

Feeding the broilers with feed enriched with omega-6 and omega-3 fatty acids and carotenoids, the live weight of broilers and live weight gain per day is higher by 7.87% and 7.98% respectively than for broilers of Group 1 (control group).

Each broiler chicken during the breeding period consumed on average the following feed amount: in Group 1 - 5.40 kg and Group 2 - 5.20 kg. Feed consumption for breeding one broiler in Group 2 was by 0.20 kg less than in Group 1. As a result also feed consumption for production of 1 kg live weight was by 10.47% less than in Group 1. Feed costs (0.38 LVL/kg) for production of 1 kg live

Table 5

Productivity of a broiler chicken

Parameters	Group 1 - control	Group 2 - trial
Feeding programme	Basic feed content 4% soya bean oil	Basic feed content 2% soya bean oil, 1% rapeseed oil, 1% flaxseed oil and 0.1% additives of carotenoids Karotinas V
Broiler chicken age daily live weight, g	41.3	41.3
Broiler chicken live weight at the age of 42 days, g	2822	3044
% to control	-	7.87
Live weight gain per day, g	66.21	71.49
% to control	-	7.98
Survival, %	98	99

Source: made by the authors according to the unpublished data of the Research Institute "Sigrā"

Table 6

Feed consumption and feed costs for trial broilers

Parameters	Group 1 - control	Group 2 - trial
Feeding programme	Basic feed content 4% soya bean oil	Basic feed content 2% soya bean oil, 1% rapeseed oil, 1% flaxseed oil and 0.1% additives of carotenoids Karotinas V
Feed consumption per one broiler during the breeding period, kg	5.40	5.20
Feed consumption for production of 1 kg live weight, kg	1.91	1.71
% to control	-	10.47
Feed price of 1 kg, LVL	0.207	0.220
Total feed costs for breeding one bird, LVL	1.12	1.14
% to control	-	1.79
Feed costs for production of 1 kg live weight gain, LVL	0.40	0.38
% to control	-	5.00

Source: made by the authors according to the unpublished data of the Research Institute "Sigrā"

Table 7

Index of broiler chicken productivity

Parameters	Group 1 - control	Group 2 - trial
Feeding programme	Basic feed content 4% soya bean oil	Basic feed content 2% soya bean oil, 1% rapeseed oil, 1% flaxseed oil and 0.1% additives of carotenoids Karotinas V
Productivity index	344.8	419.6
± to control	x	+74.8

Source: calculated and made by the authors according to Euribrid technical information..., 1998

Table 8

Quality indices of innovative composition of broiler chicken meat

Parameters	Group 1 - control	Group 2 - trial	± to control
Feeding programme	Basic feed content 4% soya bean oil	Basic feed content 2% soya bean oil, 1% rapeseed oil, 1% flaxseed oil and 0.1% additives of carotenoids Karotinas V	
Σ omega-6 (ω-6) fatty acids, % of total lipids	23.5	27.4	+3.9
Σ omega-3 (ω-3) fatty acids, % of total lipids	5.4	8.3	+3.2
Σ (ω-6) : Σ(ω-3)	4.3 : 1	3.3 : 1	-1.0 : 1
Σ total carotenoids, mg kg ⁻¹ (antioxidant)	0.62	0.86	+0.24

Source: made by the authors according to the unpublished data of the Research Institute "Sigra"

weight gain were smaller than for Group 1, mainly due to the fact that broilers of Group 2 had bigger live weight gain per day.

It is significant to evaluate broiler productivity according to the calculated productivity index. The calculation of productivity index comprises several parameters – sales live weight, age of broilers, survival, and feed conversion. It is the most complete characteristics of broiler productivity and breeding economy. The index is calculated according to the formula developed for all broiler crosses; in this case for breeding of ROSS-308 broilers after the recommendations of "Euribrid B.V." (the Netherlands) company (1):

$$\text{Productivity index} = \frac{\text{Average live weight (g)} \times \text{survival (\%)}}{\text{Time of breeding (in days)} \times \text{feed conversion kg/kg}} : 100 \quad (1)$$

Source: made by the authors according to Euribrid technical information..., 1998

Table 7 includes the comparison of broiler productivity index in both trial groups.

Broiler productivity index ranges between 344.8 - 419.6; and it is very high productivity of trial broilers. The bigger is the productivity index, the higher is broiler productivity. If productivity index is above 205.8, then productivity is considered high according to the Euribrid standards (Euribrid technical information..., 1998).

In the trial the productivity index of Group 2 broilers exceeded the productivity index of Group 1 broilers by 74.8 points. Hence it may be concluded that the use of improved feed enriched with omega-6 and omega-3 fatty acids, and carotenoids for feeding birds has increased their productivity index by 22%.

The research aim was to produce innovative composition broiler chicken meat with an increased amount of omega-3 and omega-6 fatty acids, and antioxidant carotenoids. The obtained data are shown in Table 8.

Feeding broilers with feed of conventional composition (Group 1) broiler meat contains 23.5% of omega-6 and 5.4% of omega-3 fatty acids as calculated in per cent of total fat (according to the chemical analyses). Adding 2% of soya, 1% of rapeseed oil, 1% of flaxseed oil, and 0.1% of carotenoids additives to the feed (Group 2), the level of omega-6 fatty acids increases to 27.4% (by 3.9% more than for Group 1) and the level of omega-3 fatty acids grows up to 8.3% (by 3.2% more than for Group 1), while the content of carotenoids increases by 0.24 mg kg⁻¹.

3. Economic calculations for production of innovative composition broiler chicken meat

Total results of the experiment and the possible economic profitability for the production of innovative broiler chicken meat is shown in Table 9.

Feed costs for breeding broilers are depicted in Table 6. In poultry farms costs for broilers feed

Table 9

Revenues and expenses for growing 1000 broilers for the production of innovative composition meat (according to the average trial data)

Parameters	Group 1 - control	Group 2 - trial
Feeding programme	Basic feed content 4% soya bean oil	Basic feed content 2% soya bean oil, 1% rapeseed oil, 1% flaxseed oil and 0.1% additives of carotenoids Karotinas V
Number of birds	1000	1000
Bird survival, %	98	99
Number of grown birds	980	990
Average live weight of broilers at the age of 42 days, g	2822	3044
Total live weight of grown broilers, kg	2765.56	3013.56
Total carcass weight of broilers, kg*	2184.79	2380.71
Carcass weight, kg ±vs. Group 1	x	195.92
Price of 1 kg carcass weight, LVL	1.60	1.60
Revenues for sales of carcass weight, LVL	3495.67	3809.14
Revenues, LVL ±vs. Group 1	x	313.47
Feed costs for growing 1000 broilers, LVL	1120.00	1140.00
Other costs (excluding feed costs), LVL	523.33	523.33
Total costs, LVL	1643.33	1663.33
Difference between revenues and expenses, LVL	1852.34	2145.81
Profit, LVL ± vs. Group 1, LVL	x	293.47

Source: according to the data of the Research Institute "Sigra", 2009

*Live weight of broilers results into 79% of carcass weight (according to the standards)

consumption constitute approximately 73%-76% of total costs. Costs for food consumption and other costs related to breeding of broilers were mathematically calculated based on the mentioned fact.

Costs for the production of innovative composition meat were calculated to economically justify the developed variants of feed content enriched with fatty acids and profitability of their application (Table 9). The calculations included the productivity of trial group broilers, sales price of a broiler carcass (sales price of broiler chickens of JSC "Putnu fabrika Ķekava" is 1.60 LVL/kg (December 1, 2009), feed costs (sales prices of "Iecavnieks" Ltd and "Rīgas kombinētās lopbarības rūpnīca" Ltd, December 1, 2009), and other costs.

The figures included into Table 9 reflect one particular technology for breeding and feeding of trial broilers, resulting in production of innovative composition meat on certain trial conditions with a particular feed content and certain costs that are shown in Tables 4, 5 and 6. The costs will differ on other feeding and keeping conditions and using other feed content.

Feeding broilers with feed enriched with fatty acids the carcass weight of innovative composition broilers was 195.92 kg bigger (calculating per 1000 broilers) than the carcass weight of broilers fed with conventional composition feed (Group 1). Nevertheless the costs of new feed for breeding 1000 broilers were LVL 20 higher than in a standard variant, revenues from sales of innovative composition meat were LVL 293.47 larger (calculating per 1000 broilers) than from the sales of Group 1 broilers. These better financial results are obtained thanks to a poultry survival indicator and mainly thanks to the larger total live weight of grown broilers. It shall be noted that meat of Group 2 broilers is characteristic with the highest content of omega-3 fatty acids and the most optimum ratio of ω -6 : ω -3 fatty acids. Meat of Group 1 broilers has the highest quality and the highest broiler live weight at the age of 42 days. Thus a more valuable and healthier product is obtained even at an equal sales price of broilers, besides total producer's revenues might be 15% higher than in case of feeding standard broiler chickens.

Conclusions, proposals and recommendations

1. The research hypothesis - production costs of innovative composition broiler chicken meat exceed production costs of commercial composition broiler chicken meat - has been proved in the research. Feed costs for production of innovative composition broiler chicken meat are 6.28% higher than in a standard feeding variant, though feed consumption per 1 broiler is less.
2. Fatty acids containing feeding stuff available also in Latvia, like flaxseed oil and rapeseed oil, shall be included into the poultry feed content for the production of innovative composition broiler chicken meat.
3. Omega-3 and omega-6 fatty acids and carotenoids are the main feed parameters that shall be considered producing innovative broiler chicken meat. The largest content of omega-3 fatty acids was observed in flaxseed oil, i.e. 55%, which 6-7 times exceed the respective indicators in rapeseed oil and soya bean oil. The largest amount of omega-6 fatty acids is in soya bean, i.e. 54%, if calculated in per cent of total amount of lipids. These vegetable oils in certain ratios were used in a practical experiment.
4. It is recommended to feed broiler chickens with feed containing 2% of soya bean oil, 1% of rapeseed oil, 1% of flaxseed oil, and 0.1% of carotenoids additives to produce innovative composition broiler chicken meat containing an increased amount of omega-3 and omega-6 fatty acids and carotenoids,
5. The complex indicators of broiler chickens – productivity index is by 22% higher in the experimental group of broilers, where birds were fed with feed enriched with fatty acids and carotenoids.
6. Qualitative poultry meat healthier for human nutrition, since it contains an increased content of fatty acids and carotenoids, was also obtained as a result of an experiment.
7. Economic calculations on the possible economic profitability of broiler chicken meat production carried during the experiment lead to the conclusion that based on higher bird survival indicators and productivity, also the potential profit at presently equal poultry sales price is LVL 293.47 or 15% higher in case of innovative composition broiler chicken meat production when calculated per 1000 broilers.
8. A poultry farming company shall change neither production technology nor bird crosses to produce innovative composition broiler meat. It is necessary to popularise this idea in Latvian poultry companies to encourage them to initiate production of innovative composition broiler chicken meat containing an increased content of omega-3 and omega-6 fatty acids and antioxidant carotenoids in feed.
9. Similarly also consumers' education shall be provided on positive features related to the use of such innovative composition broiler chicken meat in diet.

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