

THE IMPACT OF PROBIOTICS ADDITIVES ADDED INTO DIET ON ECONOMIC RESULTS OF BROILERS PRODUCTION

Djordje Okanović^{1*}, Radmilo Čolović¹, Tatjana Tasić², Vladislav Zekić², Predrag Ikonić²

¹University of Novi Sad, Institute of Food Technology,
Bulevar cara Lazara 1, 21000 Novi Sad, Serbia

²University of Novi Sad, Faculty of Agriculture,
Trg Dositeja Obradovića 8, 21000 Novi Sad, Serbia

*e-mail: djordje.okanovic@fins.uns.ac.rs

Abstract

Production of broiler practically presents the most intensive branch of the animal husbandry. The reproduction process is relatively short, which enables faster turnover of the engaged resources.

The influence of phytogetic additives addition in broiler diet on the economic results of the production was examined in present paper.

The experiment was conducted on broilers hybrid ROSS (n = 16480) divided in two groups. First group (control, C) was fed with commercial broiler feed mixture, while in experimental group (E1) probiotics were included, respectively. Fattening of broilers lasted for 40 days. Food and water were provided *ad libidum* in the floor fattening system.

Research of the economic results of the production of broilers is based on the determination of the total production cost, value of the production and the financial result. Calculation of these economic categories is based on the data gathered on the selected farm.

It was concluded that the diet enriched with probiotics had beneficial effect on the majority of monitored economic parameters: total benefit (2 601,96 : 1 870,30 €), benefit per broiler (0.32 : 0.23 €), economy (1.10 : 1.08) and profitability (3.61 : 2.61%).

Key words: Broilers production, Phytogetic additives, Cost.

1. Introduction

Animal husbandry presents the most intensive branch of agriculture and has multiple significances, for both producers and consumers. The increase in the production of the meat, milk, eggs, among others is the foundation for the improvement of the nutrition structure of the population with highly valuable animal proteins [1, 2].

Broilers fattening, as a final phase in the production line of chicken meat within the modern intensive poultry production based on industrial principles, is the fastest and the most rational way of producing poultry meat. In a floor system and on a deep mat, mainly heavy type proveniences are fattened, that are characterized by intensive growth, good food utilization, excellent carcass conformation, wide and long breast muscles and short leg muscles [3, 4, 5, 6].

But, in order to achieve gains, efficient and economical production, safety and quality, beside necessary nutrient, in the last few decades, antibiotics have been added to poultry diets. The extensive use of antibiotics in animal production has increased the risk of development of resistance in human and animal pathogens [7]. Because of concerns about potential negative human health consequences, as well as satisfying consumer demand for a food chain free of drugs, use of antibiotics as growth promoters is forbidden in the European Community [8].

The ban on antibiotic usage in Europe lead to increasing researchers interest in finding alternatives to antibiotics for poultry production such as enzymes, organic or inorganic acids, herbs, essential oils, immunostimulators, microelements, probiotics and prebiotics [9].

Probiotics beneficially affect the host animal by improving its intestinal balance. They create gut conditions that suppress harmful microorganisms and favor beneficial ones, reduce disease risk, boost immune function and increase resistance to infection. Beyond the maintenance of health, they have been shown to improve the growth performance of poultry [10, 11, and 12].

Probiotics are individual microorganisms or groups of microorganisms which have favorable effect on host by improving the characteristics of intestinal micro-flora. Their effect on production results reflects in

reduction of risk of diseases, they improve the function of the immune system and exhibit significant influence on morpho-functional characteristics of intestines [13]. These effects lead to growth of broiler, improvement of feed conversion and reduced mortality [14].

Thus, the aim of this study was to determine the influence of probiotic additives on the economic aspects of broiler production.

2. Materials and Methods

The experiment was carried on 16480 broilers, provenience ROSS. Broilers were divided in two groups, control group (C) and experimental group (E) and fed under the same conditions for 40 days. Broilers from control group fed with commercial mixtures, while in broilers diet from experimental group E probiotic Poultry star ME were added. During whole fattening period, water and feed were provided *ad libidum*.

Calculation of the expense for feed mixtures has been derived according to the standard of expenses for the preparation of animal food, based on market prices of certain kinds of food and experience normative. The expense for other material has been calculated according to the expenditure made on the observed farm and market prices. Investments into buildings and the equipment have been calculated based on standard investments in objects and equipment. Expenses of the buildings and equipment amortization have been derived based on the assumed lifetime of the utilized means [15]. Expenses for salaries were calculated in accordance to realized expenses. Expenses for the energy consumption were calculated on the basis of realized expenditure of the electrical power and fuel. Apart from that, the calculation includes expenses of veterinary

and selection services. Calculation of the income was based on clarification of total income from the above mentioned production, whereby the financial result presents the income from the overall production [16].

3. Results and Discussion

During the analysis of the observed production, production results have been followed closely. The main production indicators are given in the Table 1.

If we take a look at the Table 1 one can draw a conclusion about the almost minor expenditure of food in group fed with diet with the addition of probiotic additives. Also, the same group has bigger number of broilers and average carcass mass at the end of the fattening and achieves higher value of the production.

The second factor of significance for the overall production and the achieved economic result is the feed conversion ratio. The calculation of the achieved conversion shows that the group fed with the diet with addition of probiotics achieves better conversion whereby, on the level of the overall fattening makes 1.748 g of forage mixture per kilogram of weight gain. Feeding with the forage mixture, the achieved conversion of the food is 1.770 kg per kilogram of the weight gain.

The main economic indicators, calculation of the total expenses and the price and benefit calculation from control and experimental group of broilers, are given in the Table 2.

The analysis of the overall economic indicators of the observed production starts from the assessed investment into the farm, in other words investment into the buildings for breeding with the following equipment. According to the assessment, the investment into the buildings and equipment amount is up to 370,800.00 €.

Table 1. Basic production results from control (C) and experimental group (E) of broilers

Category	C			E		
		price, €	total, €		price, €	total, €
Chickens	8 240	0.4018	3 310.71	8 240	0.4018	3 310.71
Produced broilers	7 796			7 862		
Produced broilers, kg	18 788.40	1.4286	26 840.57	19 497.80	1.4286	27 854.00
kg/broiler	2.410			2.480		
Total feed consumption	33 560			34 090		
Starter	5 100	0.4020	2 050,02	5 110	0.4052	2 070.46
Grover	19 900	0.3967	7 894,26	19 540	0.3999	7 814.26
Finisher	8 560	0.3613	3 093,06	9 060	0.3646	3 441.39
Feed conversion ratio, kg/kg	1.770			1.748		
Average daily gain, kg/day	0.060			0.062		

Table 2. Calculation of the total expenses and the price and benefit calculation from control (C) and experimental (E) group of broilers, €

Expense category	C (€)	E (€)
Feed expense	16 348.06	16 636.82
Amortization	3 708.00	3 708.00
Salaries	2 158.10	2 158.10
Expenses for energy	1 925.12	1 925.12
Expenses of other and additional materials	824.00	824.00
Total	24 963.28	25 252.04
Total income	24 963.28	25 252.04
Total expenses	26 840.57	27 854.00
Benefit	1 877.3	2 601.96
Benefit per broiler	0.23	0.32
Benefit per kg	0.10	0.13
Economy	1.08	1.10
Profitability, %	2.61	3.61

Calculation of other expenses (energy, work and additional materials) of the production has been derived per turnus. In the distribution, they were divided proportionally to the starting number of chickens, e.g. two equal groups. In accordance to the derived calculations, establishing of the total expense and the price of the fattening chicken has been derived.

Calculation of the income includes the incomes that farm achieves and it is based on the sale of broilers. On sale, the price that was achieved was 1.43 €/kg. In the accordance to the number of fattening broilers, average weight reached and the sale price, the calculation of the total income was made.

Based on that the benefit was calculated as the difference between the income and expense.

The profit achieved per one turnus amounts to 2,601.96 € for the group fed with the diet with addition of probiotics and 1,877.30 € for the group fed by standard forage mixtures, e.g. 0.32 € and 0.23 € per produced broiler.

If the realized benefit is calculated per kilogram of produced broilers, we get 0.13 €/kg for the group fed with the diet with addition of probiotics, and 0.10 €/kg for the group fed with standard diet. The economy calculated from the ratio of total income and total expenses is 1.10 for the group fed with the mixture with probiotics and 1.08 for the group fed by the standard feeding system.

Profitability of the production is obtained from the ratio of realized benefit and total investment. Total investment includes investments into the buildings and equipment and investment into the unfinished production within the fattening. Thereat, in total five or six turnuses are foreseen per year. Binding of means in the

form of debits has not been calculated; instead the calculation has been derived with an assumption of advance payment. Profitability of the overall production process in the observed case is not difficult to calculate, since the production is concentrated and monophasic. Realized profitability for the group fed with the mixture with addition of probiotics was 3.61% and 2.61% for the group fed with standard forage mixtures.

4. Conclusions

Lucrativeness and profitability of the production are the most important principles and the basis of rational business in the market economy, which is all and more becoming an imperative for our production too. Economic results of the production of broilers have in the paper been analysed and what can be concluded is the following:

- The profit achieved per one turnus amounts to 2,601.96 € for the group fed with the diet with addition of probiotics and 1,877.30 € for the group fed by standard forage mixtures, e.g. 0.32 € and 0.23 € per produced broiler.
- Economy calculated from the ratio of total income and total expense makes 1.10 for the group fed with the mixture with addition of probiotics and 1.08 for the group breed by standard feeding system.
- Detailed analysis of economic indicators shows good profitability of the production. The realized profitability of the production makes only 3.61% for the group fed with the mixture with addition of probiotics and 2.61% for the group breed by standard forage mixtures.
- Regardless of that, all presented indicators point out the justifiability of the usage of probiotic in the preparation of feed.

Acknowledgement

The experimental work represented in this paper is a part of Integrated and Interdisciplinary Research Project funded by Serbian Ministry of Education Science, Project No: III 46012.

5. References

- [1] Tica N., Okanović Đ., Zekić V., Filipović S. (2009). *The effect of extruded corn on the economic results of broilers production*. Food Processings, Quality and Safety, 36, 3-4, pp. 59-64.
- [2] Okanović Đ., Zekić V., Filipović S., Tica N. (2011). *Influence of the feeding system on the economic results in the production of fatty poultry*. Macedonian Journal of Animal Science, Vol. 1, No 1, pp. 245-250.
- [3] Džinić N., Okanović Đ., Jokanović M., Tasić T., Tomović V., Ikonić P., Filipović S. (2011). *Carcass and breast meat quality of broilers feed with extruded corn*. Biotechnology in animal husbandry, Vol. 27, 4, 1697-1703.
- [4] Dagher N. J. (2009). *Nutritional strategies to reduce heat stress in broilers and broiler breeders*. Lohmann information, 44, pp. 6-15.
- [5] Cmiljanić R., Pavlovski Z., Trenkovski S., Lukić M. (2005). *Novi trendovi u ishrani živine*. Biotechnology in Animal Husbandry, 21, 5-6, pp. 241-245.
- [6] Karovic D., Djermanovic V., Mitrovic S., Radovic V., Okanovic Dj., Filipovic S., Djekic V. (2013). *The effect of mineral adsorbents in poultry production*. Worlds Poultry Science Journal, World's Poultry Science Association, 69, 2, pp. 335-342.
- [7] Witte W. (1998). *Medical consequences of antibiotic use in agriculture*. Science, 279, pp. 996-997.
- [8] Council Regulation 98/2821/CEE (1998). *Regulation amending, as regards withdrawal of the authorisation of certain antibiotics, Directive 70/524/EEC concerning additives in feedingstuffs*. Official Gazette of European Community, No. L 351.
- [9] Ao T., Cantor A. H., Pescatore A. J., Ford M. J., Pierce J. L. & Dawson K. A. (2009). *Effect of enzyme supplementation and acidification of diets on nutrient digestibility and growth performance of broiler chicks*. Poultry Science, 88, pp. 111-117.
- [10] Perić L., Milošević N., Žikić D., Bjedov S., Cvetković D., Markov S., Mohnl M. Steiner T. (2010). *Effects of probiotic and phytogenic products on performance, gut morphology and cecal microflora of broiler chickens*. Archiv Tierzucht, 53, pp. 350-359.
- [11] Okanović Dj., Džinić N., Filipović S., Tasić T., Karovic D. V., Radovic V., Ikonić P. (2013). *The effects of mineral adsorbents added to broilers diet on breast meat quality*. Acta Periodica Technologica, Vol 44, pp. 95-102.
- [12] Ristić M., Damme K., Freudenreich P. (2005). *Influence phytogenic feed additives on the quality of poultry meat (in Serbian)*. Tehnologija mesa, 46, 1-2, pp. 51-55.
- [13] Andersen H. J., Oksbjerg N., Young J. F., Therkildsen M. (2005). *Feeding and meat quality - a future approach*. Meat Science, 70, pp. 543-554.
- [14] Yang Y., Iji P.A., Choct M. (2009). *Dietary modulation of gut microflora in broiler chickens: a review of the role of six kinds of alternatives to in-feed antibiotics*. World's Poultry Science Journal, 65, pp. 97-114.
- [15] Marko J., Jovanović M., Tica N. (1998). *Calculations in agriculture (in Serbian)*. Poljoprivredni fakultet, Novi Sad, Serbia.
- [16] Andrić J. (1998). *Costs and calculations in agricultural production (in Serbian)*. Poljoprivredni fakultet - Zemun, Beograd, Serbia.