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INFLUENCE OF THE USE OF FOOD WITH ADDITION OF MINERAL ADSORBENTS ON ECONOMIC RESULTS IN CHICKEN FATTENING

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Summary

The aim of the research is to identify whether the mineral adsorbents added to the food of fattening chicken have impact on the cost-effectiveness of the fattening. The research was conducted on 400 fattening chicken, Cobb 500 provenience, divided into 4 groups, depending on the level of added mineral adsorbent: control group K (100 chicken, no mineral adsorbent added, 0,0%); experimental group O-I (100 chicken, with 0,5% of mineral adsorbents), experimental group O-II (100 chicken, with 0,2% of Processed mineral adsorbents) and experimental group O-III (100 chicken, with 0,3% of processed mineral adsorbents). Diet experiment lasted for 42 days. Results of the research show that chicken from O-I group had the best production results, followed by O-III, O-II and K as the poorest group. Calculations conducted during the work, it has been established that the addition of mineral adsorbents into the fattening chicken diet had very good effects on production and economic results.
***Key words**: fattening chicken, mineral adsorbents, economic results*

Introduction

Chicken 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 hybrids are fattened, that are characterized by intensive growth, good food utilisation, fast feather growth, excellent carcass conformation, wide and long chest muscles and short leg muscles. Diet consists of fodder mixtures with significant energy and protein values. In approximately 6 weeks, fattening hybrid

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reaches live body mass of 1,8 to 2,1kg, with food consumption 1,8 to 2kg per kilo of weight gain. Meat of slaughtered and processed fattened chicken falls into high quality diet food. Easily digestible, chicken meat is widely accepted as the main protein source in human diet. Chicken meat proteins have all necessary essential amino acids. Apart from that, due to the significant content of B group vitamins and numerous minerals, especially of iron, as well as to beneficial ratio between the saturated and unsaturated fatty acids, chicken meat is irreplaceable in the diet of children, patients in recovery, chronic patients and all those who tale care about their diet (Gančić, M., 2000).

The aim of these researches was to verify data about the influence of different levels of mineral adsorbents on production and economic results of fattening chicken.

It is assumed that different levels of mineral adsorbents added to the diet of fattening chicken have different and varying effects on: consumption and conversion of the food; body mass weight gain; final body mass; slaughter and meat quality characteristics; health condition of fattening chicken and economic effects.

Material and the work method

Examining of the influence of different levels of mineral adsorbents in the fattening chicken diet on: weight gain, food conversion, food consumption and economic results was conducted by the nutrition experiment. One day old chicken of the COBB 500 provenience were used in order to test the production qualities of chicken and the effect of mineral adsorbents-zeolite on them. The experiment was conducted with 400 chicken altogether.

Within the experiment, chicken divided in groups were fed meals of the same ingredient and chemical composition. The only difference was the kind and the level of zeolite added to the food. Chicken were kept in a floor system. Standard procedure of chicken fattening was used, lasting 42 days.

The experiment lasted 42 days. In this trial, chicken were divided according to the group-control system, by the scheme of completely random classification into four groups (100 chicken in group): control (K), experimental I (O-I), experimental II (O-II), and experimental III (O-III). Chicken in the control group (K) and all three experimental groups (O-I, O-II and O-III) were fed mixture of the same composition. The difference was only in the level and the kind of zeolite added to the food: K- 0,0%; O-I= 0,5% classic mineral adsorbents, O-II= 0,2% processed mineral adsorbents; O-III= 0,3% processed mineral adsorbents. Mathematical-statistical data analysis (parameters of descriptive statistics, variance analysis and LSD-test) done in Microsoft STATISTICA,ver.5.0.,StatSoft Inc. (1995), on the threshold of significance 0,01 and 0,05.

Research results and discussion

During the fattening, positive influence of the mineral adsorbents was identified. Also, it is apparent that in lower concentrations, less than 0,3% Processed mineral adsorbents has poorer effect compared to classic Mineral adsorbents (Table 1).

Table 1. Average body mass of chicken (g) by oldage in days

Oldage	Group			
	K group	O-I	O-II	0-III
1 day	$39,59^{A,B,C}$	$41,18^{A}$	$40,83^{B}$	$41,20^{C}$
15 days	$546,49^{D,E,F}$	$576,39^{D,g}$	$567,38^{E,g}$	$572,90^{F}$
30 days	$1284,97^{H,I}$	$1381,05^{H,J,K}$	$1296,52^{J,I}$	$1322,22^{I,K,I}$
42 days	$1950,93^{M,n,o}$	$2084,44^{M,P,Q}$	$1901,80^{n,P,R}$	$2013,62^{o,Q,R}$

A, B,C, D, E, F, H, J, K, M, P, Q, R, $p<0,01$
g, l, n, o, $p<0,05$

At the measuring on 30th day, regardless of the mineral adsorbents source, its addition positively influenced body mass, since the average values were statistically significantly smaller in the first group compared to groups O-I and O-III.

In this period, better influence of classic mineral adsorbents form was observed, since the results in the group O-I were better compared to all other groups, in terms of statistical significance in differences of average masses.

When examining the effect of the dosage of processed mineral adsorbents, one can find that the average body mass is statistically significantly bigger with higher concentration of Processed mineral adsorbents.

At the end of the experiment, the best results were accomplished in the group eating food with addition of the classic mineral adsorbents, and those differences are statistically very significant. The effect of the added mineral adsorbents, regardless of its form, leads to the statistically significant increase in chickens' body mass at the end of the experiment, whereby in terms of differences due to the processed mineral adsorbents concentration in food there is statistically very significant difference, since the results are much better with the concentration in the amount 0,3% compared to concentration 0,2%.

Although the body mass is a good indicator, is considered that the daily weight gain is more reliable indicator of the food quality, and especially of the hygienic propriety and health of animals.

During the firs 15 days of the experiment, all treatments using mineral adsorbents gave positive effect, since statistically very significantly higher weight gain was achieved than in chicken not consuming any form of mineral adsorbents. In the period 15-30 days of the experiment, chicken that were consuming food with classic Mineral adsorbents added have shown the biggest weight gain, with statistically high significance, while the use of processed mineral adsorbents had no effects. The question remains, and leaves room for future research regarding the use of possibly higher doses of Processed mineral adsorbents (Table 2).

Table 2. Average daily weight gain (g)

Oldage	Group			
	K group	O-I	O-II	O-III
Average 1-15 days ,gr	33,79^{A,B,C}	35,67^{A}	35,16^{B}	35,45^{C}
Average 15-30 days,gr	49,24^{D}	53,59^{D,E,F}	48,61^{E}	49,95^{F}
Average 30-42 days,gr	55,50^{g,H}	58,71^{g,I}	50,37^{H,I,J}	57,62^{J}

A, B,C, D, E, F, H, I, J, p<0,01
g, p<0,05

The expenditure of food during the entire period of chicken fattening is shown in the next Table. Namely, chicken from the control group were consuming slightly larger quantities of food compared to experimental groups. It is known that the Negative effects on chicken food consumption (*Scheffer, 1993*) are manifested even in the smallest quantities of microtoxins (0,02mg/kg BM ili 0,15mg/kg food), which increase proportionally to the quantity of toxin present in the food or duration of the intake of the contaminated food. Negative effects disappear very quickly upon the exclusion of the contaminated food, thus in such a case positive effects of the mineral adsorbents can not be expressed.

Table 3 Concentrate consumption /gr/broiler/

Mixtures	Group			
	K group	O-I	O-II	O-III
Mixture I	1.095	918	1.043	1.006
Mixture II	1.596	1.379	1.442	1.417
Mixture III	1.439	1.209	1.196	1.308
Total	**4.131**	**3.507**	**3.681**	**3.730**

Calculation of the expenses for the mixtures used iz derived according to the composition of each of the mixtures and is given in Table 4.

Table 4. Expenses of materials for the preparation of particular mixtures (€/kg)

Mixtures	Group			
	K group	O-I	O-II	O-III
Mixture I	0,3056	0,3080	0,3074	0,3083
Mixture II	0,2471	0,2495	0,2489	0,2498
Mixture III	0,2062	0,2086	0,2081	0,2090

According to the realised expenditures of each mixture and material expenses for each individual mixture, the calculation of food expenses has been derived (Table 5).

Tablea 5. Food expenses (€/broiler)

Mixtures	Group			
	K group	O-I	O-II	O-III
Mixture I	0,33	0,28	0,32	0,31
Mixture II	0,39	0,34	0,36	0,35
Mixture III	0,30	0,25	0,25	0,27
Total	**1,03**	**0,88**	**0,93**	**0,94**

Apart from the food expenses, that present the largest part of the expenses in fattening broilers production, other expenses are of great importance too. Calculation of other expenses is derived in accordance with previous researches and given in table 6.

Table 6. Other expenses of broiler breeding (€)

Expense category	Amount
Expenses of the building and equipment	0,32
Mat	0,04
Vaccination	0,02
Vitamins	0,01
Revaccination	0,02
El. Power	0,06
Gas	0,10
Salaries	0,21
Total	**0,78**

In addition to the expenses that were made, financial results were also influenced by the moratlity during the fattening, regardless of the fact that broilers were not manifesting clinilac symptoms that would point to the specific influence of microtoxines during the experiment. Highest mortality was seen in the control group (/), while the experimental groups had significantly lower mortality rate (O-I and O-II 3 broilers, O-III 2 broilers). Acccording to the achieved production results and market prices of fattening chicken, calculation was derived for total expenses, overall income and calculated cost prices (Table 7).

Table 7. Total expenses of broiler breeding (€) and cost price (€/kg)

Mixtures	Group			
	K group	O-I	O-II	O-III
One day old chicken	0,35	0,35	0,35	0,35
Nutrition expenses	1,03	0,88	0,93	0,94
Other expenses	0,78	0,78	0,78	0,78
Total expenses	**2,16**	**2,01**	**2,06**	**2,07**
Incomes /minus mortality/	**1,90**	**2,48**	**2,16**	**2,28**
Gain	-0,26	0,47	0,10	0,21
Cost price €/kg	**1,19**	**0,99**	**1,12**	**1,05**

Displayed results show significant differences in achieved economic effects between certain groups. Control group achieves negative financial result, whereby the total cost price surpasses the market value. Experimental groups, on the other side, materialise positive financial effect, wherein the observed differences are most pronounced in the case of O-I group, where 0,5% mineral adsorbents were added in the food.

Conclusion

At the end of the experiment, it is possible to deduce that the use of mineral adsorbents in concentrate mixtures can be very advantageous solution. Thus, the use of mineral adsorbents has been proven as reasonable. Obtained results are in compliance with bibliographic data of Prior et al. (1979) and Ayed et al. (1991) who ascertained significantly lower daily weight grow in broilers fed mixtures without adsorbents.

Since the calculation of economic effects is derived on a relatively small sample, such data indicate further research is needed in regard of examining concentrations and results that can be achieved with the use of mineral adsorbents in the nutrition of fattening chicken and kinds and other categories of live stock.

Although according to the presented results use of mineral adsorbents in chicken fattening gives better production and economic results, full effects of mineral adsorbents can be expected only with the differentiation of the chicken meat market and building up of customers' willingness to pay for products according to their quality.

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