The Effects of Enzymatic Complex Allzyme SSF and Organic Selenium on some Growth and Consumption Indices of Broiler Turkey

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Abstract
The researches had been made on a number of 150 broiler turkey juveniles, the Big 6 hybrid, assigned in 3 batches of 50 juveniles/batch for a period of 56 days (the growth stage). In the feed of batch 2(E) was added Allzyme SSF complex 0.02% and in the feed of bach 3(E) was added the organic Selenium (Sel-Plex) 0.03 %. The turkey broilers of the three batches were weighted at the beginning (at the age of one day) and each week following: the evolution of body mass, the daily average body gain, the daily average consumption and the specific consumption. The use of Sel-Plex in the feed of batch 3(E) and the use of Allzyme SSF in the feed of batch 2 determined the increase of the body weight at the end of experiment with 15.35 % at batch L3(E) and 8.00 % at batch L3(E), the increase of daily average body gain with 15.52 % respective 18,08% and the allowance of the specific consumption with 19.07 % at batch L3(E) and 14.88 % at batch L2(E) with low energy reformulated food comparative with batch L1(M) and batch L3(E). The results obtained confirm the positive influence of Sel-Plex and Allzyme SSF enzymatic complex on the main production and consumption parameters of broiler turkey juveniles.

Keywords: alimentation, Allzyme SSF, enzymatic complex, organic Selenium, turkey juveniles

1. Introduction

With the interdiction of antibiotics growth promoters in U.E. (1 January 2006) it was necessary to find some natural alternatives for them to be used in poultry and broiler chickens alimentation.
Researches made worldwide on poultry proved that Allzyme SSf multienzymatic complex and organic Selenium (Sel-Plex) have improved the body weight gain, feed conversion rate (FCR) and the survival percent. The use of fodder enzymes in broiler chickens to complete their digestive enzymatic equipment had been well studied in the last years [1-4]. Among those fodder enzymatic products, in the last years, a great importance had been showed for Allzyme SSF which is characterized by a 21% CP, 2,6 % Fat, 18 % CelB and 7 types of enzymes (proteases, amylases, xilanases, beta-glucanases, pectinases, cellulases, phitases). The feed in which this product can be used can be reformulated through the reduction of its energy value by 75 kcal and the reduction of its Ca and P content by 0,1 % thus reducing its production cost and maintaining in the same time its production performances at a high level [1]. Clave [3] reported that broiler chickens food must be reformulated through the reduction of its energy content by 60 kcal/kg combined fodder when Allzyme SSF is used.
Ramesh and Devegowda [1] reported a significant improvement of broiler chickens body weight (2165 g versus 2086 g) and a reduction of feed conversion factor (1,81 kg versus 1,88 kg) as a result of Allzyme SSF use. Also Allzyme SSF led to a significant reduction of casualties and to a intestinal viscosity reduction [1].
Regarding the organic minerals like Sel-Plex, they have a much higher bioavailability and biological

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activity than their inorganic forms. The results reported by [5] showed the positive effects of turkey broiler chickens feed supplementation with organic Selenium on yeast support, due to yeast capacity to favor the formation of Selenium tissular deposits improving thus the health status and the preservation time of meat. The use of Sel-Plex has some advantages: the improvement of feed conversion factor and the improvement of the specific growth rhythm in stress conditions [6-9].

The use of organic Selenium in turkey broiler chickens nutrition has significant advantages both in broiler chickens growth technology and human health as a result of turkey enriched with Selenium meat consumption.

The objective of this research was to evaluate the effect of Allzyme SSF multienzymatic complex and organic Selenium Sel-Plex adiminstered in turkey broiler chickens food on the production performances (body weight, growth rhythm, fodder consumption, fodder conversion) of turkey broiler chickens.

2. Materials and methods

Research have been made on a number of 150 turkey broiler chickens hybrid Big 6 [10] divided in 3 group, 50 turkey broiler chickens/group (25 males + 25 females). The turkey broiler chickens have been raised in the same environmental conditions (microclimate, density, maintenance, alimentation). Experimental period was 56 days meaning the growth phase. The turkey broiler chickens were fed ad libidum with combined fodder with the same energetic and protean level:

- control group fodder: corn, soybean, fish meal, vegetal fat, minerals, synthetic aminoacids and zoofort.
- experimental group 1 fodder: corn, soybean, fish meal, vegetal fat, minerals, synthetic aminoacids and zoofort plus Allzyme SSF 0,02 %. This modification reduces the energetic value of the combined fodder with 60 kcal and it reduces the cost production, fact mentioned also by others researchers [1] [3] [11].
- experimental group 2 fodder: corn, soybean, fish meal, vegetal fat, minerals, synthetic aminoacids and zoofort plus organic Selenium, Sel-Plex 0,03 %.

The fodder administered assured 2935 kcal. E.M./kg and 28,23 % CP in 0-4 weeks period (table 1) and 2915 kcal. E.M./kg and 25,43 % CP in 5-8 weeks period (table 2). Allzyme SSF and Sel-Plex had been purchased from Alltech Inc. USA.

Table 1. Structure and nutritional value of the combined fodder used in turkey broiler chickens alimentation, phase I (0-4 weeks)

Issue	Control L1	L2 (E) – SSF enzyme	L3 (E) – Sel-Plex
Combined fodder structure (%)			
Corn	43.95	44.95	43.95
Soybean groats	39	39	39
Fishmeal	10	10	10
Vegetal fat (oil)	3	2	3
Ca carbonate	0.74	0.74	0.74
Monocalcic phosphate	0.25	0.25	0.25
Zoofort	3	3	3
L-lysine HCl	0.04	0.04	0.04
Dl-methionine	0.02	0.02	0.02
SSF enzyme	-	0.02	-
Sel-Plex	-	-	0.03
Total	100.00	100.00	100.00
Nutritional characteristics			
Issue	Control L1	L2 (E) – SSF enzyme	L3 (E) – Sel-Plex
E.M. (Kcal/kg)	2935.6	2875.6	2935.6
Crude Protein (%)	28.23	28.23	28.23
Lisyine (%)	1.80	1,80	1.80
Methionine (%)	0.75	0.75	0.75
Methionine + Cistyne (%)	0.95	0.95	0.95
Ca (%)	1.35	1.35	1.35
P (%)	1.00	1.00	1.00

Table 2. Structure and nutritional value of the combined fodder used in turkey broiler chickens alimentation, phase II (5-8 weeks)

Issue	Control L1	L2 (E) – SSF enzyme	L3 (E) – Sel-Plex
Combined fodder structure (%)			
Corn	48.93	49.93	48.93
Soybean groats	31	31	31
Sun-flower groats	5	5	5
Fiah meal	8	8	8
Vegetal fat (oil)	3	2	3
Ca carbonate	0.95	0.95	0.95
Monocalcic phosphate	-	-	-
Zoofort	3	3	3
L- lisyine HCl	0.12	0.12	0.12
SSF enzyme	-	0.02	-
Sel-plex	-	-	0.03
TOTAL	100.00	100.00	100.00
Nutritional characteristics			
Issue	Control L1	L2 (E) – SSF enzyme	L3 (E) – Sel-Plex
E.M. (Kcal/kg)	2915	2855	2915
Crude protein (%)	25.43	25.43	25.43
Lisyine (%)	1.61	1.61	1.61
Methionine (%)	0.69	0.69	0.69
Methionine + Cistyne (%)	0.86	0.86	0.86
Ca (%)	1.30	1.30	1.30
P (%)	0.88	0.88	0.88

During the experiment were followed: the body weight evolution, the average daily body weight gain, the average daily consumption, the specific consumption and the food conversion rate.
The experimental data have been analysed with the "Student" test and GraphPad InStat 2000, ver. 3.05.

3. Results and discussion

The data regarding the evolution of the body weight throughout the experimental period is presented in table no. 3:

Table 3. Body weight evolution throughout the experimental period

Issue	UM	L_1 (M)	L_2 (E) SSF enzyme 0.02%	L_3 (E) Sel-plex 0.03%
At population date	g	54.44±0.64	55.64±0.66	56.12±0.63
	%	100.00	102.20	103.09
At 7 days	g	140.28±1.98	136.46±2.29	145.86±1.72**
	%	100.00	97.28	103.98
At 14 days	g	303.54±5.13	309.67±4.77	324.36±5.28*
	%	100.00	102.02	106.86
At 21 days	g	578.07±8.86	609.85±9.39*	629.92±11.31**
	%	100.00	105.50	108.97
At 28 days	g	978.85±16.93	1024.57±17.19	1000.42±17.85
	%	100.00	104.67	102.20
At 35 days	g	1458.35±30.06	1548.80±23.44*	1563.68±26.59*
	%	100.00	106.20	107.22
At 42 days	g	2126.12±40.91	2267.32±39.16*	2373.37±43.57***
	%	100.00	106.64	111.64
At 49 days	g	2816.62±41.70	2988.62±53.05*	3209.87±55.79***
	%	100.00	106.11	113.96
At 56 days	g	3928.62±64.73	4242.87±86.06**	4531.50±77.46***
	%	100.00	108.00	115.35

* – p < 0,05 significant ** - p < 0,01 distinctly significant; *** - p < 0,001 very significant

Analyzing the results it can see that the performances of batches L2 E (SSF enzyme) and L3 E (Sel-Plex) were better then the results of Control batch, L1M. The final body weight of the batch L2 E was 15,35 % higher at group L3(E) and 8,00 % higher at batch L2 (E), the the differences being very significant for group L3(E) and significant for group L2(E) comparative with group L1(M).

Regarding the average daily body gain, the highest value has been recorded at batch L3 (E), 79,92 g, followed by batch L2 (E) - 74,77 g and the Control group L1(M) had an average daily body gain of just 69,18 g (table 4). In relative values, the average daily body gain of batch L3 (E) was 15,52 % higher then the Control group and 7,44 % higher then batch L2 (E). The average daily body gain of batch L2 (E) was 8,08 % higher then the Control group 1 (M).

Table 4. Average daily body gain evolution throughout the experimental period

Issue	UM	L_1 (M)	L_2 (E) SSF enzyme 0.02%	L_3 (E) Sel-plex 0.03%
week 1	g	12.26	11.54	12.82
(1 – 7 days)	%	100.00	94.13	104.57
week 2	g	23.32	24.74	25.50
(8 – 14 days)	%	100.00	106.09	109.35
week 3	g	39.22	42.88	43.65
(15 – 21days)	%	100.00	109.33	111.29
week 4	g	57.25	59.25	52.93
(22 – 28 days)	%	100.00	103.49	92.45
week 5	g	68.50	74.89	80.49
(29 – 35 days)	%	100.00	109.33	117.50
week 6	g	95.40	102.65	115.67
(36 – 42 days)	%	100.00	107.60	121.25
week 7	g	98.64	103.04	119.50
(43 – 49 days)	%	100.00	104.46	121.15
week 8	g	158.86	179.18	188.80
(50 – 56 days)	%	100.00	112.79	118.85
The average value throughout	g	69.18	74.77	79.92
the experimental period	%	100.00	108.08	115.52

From the data presented in table 5 it can be observed that from the point of view of the average daily fodder consumption, the obtained values were relatively closed, the lower consumption being registered at batch L2 (E), followed by batch L3 (E) and batch L1(M).

Table 5. Evolution of the average daily fodder consumption throughout the experimental period

Issue	UM	L_1(M)	L_2 (E) SSF enzyme 0.02%	L_3 (E) Sel-plex 0.03%
Phase I	g	60.00	58.95	60.00
0-4 weeks	%	100.00	98.25	100.00
Phase II	g	250.00	224.15	228.30
5-8 weeks	%	100.00	89.66	91.32
The average value throughout	g	149.41	136.69	139.20
the experimental period	%	100.00	91.49	93.17

From the table 6 it results that once with the advancement in age of juveniles, they consumed a variable amount of fodder to gain one kilogram of body mass. The average feed conversion rate was lower at group L3 (E) 1,74 kg comparative with 1,83 kg at group L2(E) and 2,15 at group L1(M). In relative values, the feed conversion indices is with 19,07 % lower at group L3 (E) and with 14,88 % at group L2 (E) comparative with group L1 (M). Also, the feed conversion indices is with 4,19 % lower at group L3 (E) comparative with group L2 (E). Those results can be compared with the ones reported by [1] [11].

Table 6. Evolution of feed conversion indicesof broiler turkey chicks throughout the experimental period

Issue	UM	L_1(M)	L_2 (E) SSF enzyme 0.02%	L_3 (E) Sel-plex 0.03%
Phase I 0-4 weeks	kg	1.81	1.70	1.79
	%	100.00	93.92	98.90
Phase II 5-8 weeks	kg	2.37	1.95	1.81
	%	100.00	82.28	76.37
The average value throughout	kg	2.15	1.83	1.74
the experimental period	%	100.00	85.12	80.93

Analyzing the production indices registered throughout the experimental period (table 7) it can be observed that the broiler turkey chicks performances from groups L3 (E) and L2 (E) were superior to the ones registered at group L1 (M), having a final body weight with 15,35 % and 8,00 % higher than the Control group; an average daily fodder consumption lower at experimental groups with 8,51 % at group L2 (E) and 6,83 % at group L3 (E) comparative with the Control group; the lowest feed conversion indices was registered at group L3(E), 1,74 kg N.C./ kg gain, followed by group L2(E) with 1,83 kg N.C./ kg gain and 2,15 kg N.C./ kg gain group L1(M).

The results obtained confirm the positive influence of organic Selenium (Sel-Plex) and multienzymatic complex Allzyme SSF on the broiler turkey chicks production performances [1-3] [8] [11].

Summarizying all the data mentioned before it can be said that the highest gains with the lowest consumption indices and the higher economical efficiency were realised by the broiler turkey chicks from the experimental groups especially from those in group L3 (E) (Sel-Plex 0,03%).

Table 7. The average results obtained by broiler turkey chicks throughout the entire experimenatl cycle (0-8 weeks)

Issue		L_1(M)	L_2 (E) SSF enzyme 0.02%	L_3 (E) Sel-Plex 0.03%
Body weight (g)	Initial (g)	54.44	55.64	56.12
	Final (g)	3928.62	4242.87	4531.50
	Final %	100.00	108.00	115.35
Average daily gain	g	69.18	74.77	79.92
	%	100.00	108.08	115.52
Average daily consumption	g	149.41	136.69	139.20
	%	100.00	91.49	93.17
Conversion indices	kg	2.15	1.83	1.74
	%	100.00	85.12	80.93

4. Conclusions

1. The use of organic Selenium (Sel-plex) and of multienzymatic complex Allzyme SSF leads to the improvement of the main production and consumption indices of broiler turkey chicks.

2. At the end of the experiment the highest values regarding the final body weight had been registered at groups L3(E) (4531,50 g/specimen) and L2 (E) (4242,87 g/specimen), group L1 (M) having an average body weight of 3928,62 g/specimen.

3. The use of organic Selenium (Sel-plex) and of multienzymatic complex Allzyme SSF 0,02 % in the combined fodder structure lead to an increase of average daily gain with 15,52% at group L3(E) and with 8,08% at group L2(E) comparative with the Control group.

4. The reduction of food conversion indices with 19,07% at L3 (E) and 14,88% la L2 (E) comparative with group L1 (M) and the accumulation of a superior body mass at the chicks from the two experimental groups show the improvement of the bioconversion degree of food as a result of organic Selenium (Sel-plex) and of multienzymatic complex Allzyme SSF administration.

5. By using multienzymatic complex Allzyme SSF the receipt was restructured through the replacement of a vegetal fat percent (1 % oil) with one corn percent which reduces the energetic value of the combined fodder with 60 kcal and the reduction of the production cost, fact mentioned by other researchers too.

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