Annals of the University of Oradea, Fascicle: Ecotoxicology, Animal Husbandry and Food Science and Technology, Vol. XVI/B 2017

Analele Universitatii din Oradea, Fascicula: Ecotoxicologie, Zootehnie si Tehnologii de Industrie Alimentara, Vol.XVI/B 2017

RESEARCH REGARDING THE OBTAINED RESULTS FOR SLAUGHTERING OF BROILER POULTRY FEED WITH FOOD SUPPLEMENTED WITH A GROWING BIO-STIMULATOR BASED ON B12 VITAMIN

Simeanu D.*, Mierliță-Pantea D., Chereji I.****

*University of Agricultural Science and Veterinary Medicine "Ion Ionescu de la Brad" from Iași, 3, Mihail Sadoveanu Alley, Iași, 700490, Romania, e-mail: dsimeanu @uaiasi.ro
**University of Oradea, Department of Animal Science, 1 University Street, 410087 Oradea, Romania

Abstract

Research regarding utilization of growing bio-stimulators and especially of vitamin formulas in feeding of poultry broilers to increase their productive performances is a practice often used in the last period of time at world level. In this context is also our research regarding utilization of FA growing bio-stimulator, based on B12 vitamin, which was utilised in feeding of poultry broilers. In the research were utilized 250 poultry broilers which were divided in 5 batches, one control batch (Lc) and 4 experimental batches (LE1–LE4), each batch being formed by 50 heads. In feeding of studied chickens were utilised complete mixed fodders specific for each growing period mentioning that into the mixed fodders for experimental batches was added a bio-stimulator obtained in the fabrication process of B12 vitamin, in variable doses: LE1–50 ppm, LE2–100 ppm, LE3–150 ppm and LE4–200 ppm. At the end of growing period, 42 days, were slaughtered 10 individuals (5♂ and 5♀) from each batch, and the resulted carcasses were cut in component parts (breast, lower thighs, superior thighs, wings and back). After cutting of carcasses was observed that at experimental batches (LE1–LE4) were obtained superior results face to control batch for all cut portions, so breast weight was with 12.07-30.39% higher, lower thighs weight with 1.39-20.96%; superior thighs weight with 11.17-15.28%; wings weight with 5.15-16.01% and back weight with 8.04-23.23%. FA growing bio-stimulator had a good influence not only on the size of carcass but also on the other cut parts of it which contribute to assure of a favourable meat/bones ratio.

Key words: bio-stimulator, B12 vitamin, broiler, carcass, cutting

INTRODUCTION

In a world in a continuous development and industrialization, peoples' health and assuring of some real quantities of animal protein for consumption necessary at world level represent those two great strategies accentuated function of demographic priority and economic development of country (Vacaru-Opriş et al., 2000, 2002).

Industry of poultry meat is the most spread one at world level from perspective of animal protein consumption, that one having technology for slaughtering/processing vertically integrated due to the ethics regarding assuring of birds' welfare during slaughtering process, exploitation industry

showing the necessity of imposing of active and productive side to assure a positive image among the final consumers (Guerrero-Legarreta and Hui, 2010).

From the many factors, which are involved in realisation of poultry meat production nutrition plays an important role and impose the approach of poultry meat quality concept from perspective of a continuous correlation between slaughtering technology ethics and assuring of some suitable technological parameters for respecting the ethics but also favourable for obtaining of a demanded quality for meat (Radu-Rusu R.M. et al., 2013; Simeanu D., 2016). Also, is necessary to optimize the technological parameters involved in operations on the industrial slaughtering flow and final processing of chickens for limitation, counter measuring or elaboration of some viable technological solutions for obtaining of carcasses or anatomical cut parts from carcass composition which could be economically capitalized on basis of some microbiological, physical, technological, sensorial and chemical properties (Marcu N. et al., 2008; Radu-Rusu R.M. et al., 2006).

In feeding of birds reared for meat, especially for hen broiler chickens are utilised numerous bio-stimulating substances with beneficial effects on birds' health and implicit on productive performances and from all of those vitamins had an important role (Simeanu D., 2001, 2004; Şara A. and Mierliţă D, 2003).

MATERIAL AND METHOD

Experiment was organized on a batch of 250 individuals which were distributed in 5 batches each of them with 50 chickens. So were 4 experimental batches LE1–LE4 and a control batch Lc (tab. 1).

Table 1

Experimental design scheme

Batches	Nr. of chickens	Nr. of days	Administrated food in period of			Supplementary food**	Goals:
			start	growing	finishing		
Lc	50	42	MF*	MF*	MF*	-	- mass of cut portion in carcass
LE1	50	42				50 ppm	
LE2	50	42				100 ppm	
LE3	50	42				150 ppm	
LE4	50	42				200 ppm	

*Note: *M.F. = mixed fodder*

***FA growing bio-stimulator*

For chickens' feeding were used mixed fodders, composed by cereals, protein fodders with animal origin, protein fodders with vegetal origin and

synthesis amino acids. Nutritive characteristics of administrated mixed fodders were similar with the demands of utilised hen commercial hen hybrid.

Mixed fodders destined to experimental batches (LE1-LE4) were supplemented with 50, 100, 150, 200 ppm FA growing bio-stimulator. This is an indigenous product, made by S.C. „Antibiotice" S.A. Iaşi; being in fact a by-product resulted at processing of B_{12}vitamin, obtained after filtration of a culture environment, operation necessary for extraction of that vitamin. Together with the main product, B_{12}vitamin, result also a fine powder, with a dark brownish colour, which contain micro-organisms and their culture environment. The utilised micro-organisms for elaboration of B_{12}vitamin are: *Bacillus megaterium, Streptomyces griseus, Streptomyces aureofaciens, Streptomyces olivaceus* and*Streptomyces fradiae*, and the culture environment, on which develops, it is composed by molasses and mineral salts.

At the end of growing period, 42 days, were slaughtered 10 individuals (5♂ and 5♀) from each batch, with a corporal mass very close to batch mean and the resulted carcasses were cut in component parts (breast, lower thighs, superior thighs, wings and back). The resulted data after weighting of cut parts were statistically processed and discussed.

RESULTS AND DISCUSSIONS

The live mass of chickens which will be slaughtered, for analysis of cut parts rate in composition of carcasses, oscillated between 1725 g (at batch Lc) and 2072.5 g (at batch LE2). Homogeneity of batches was very good.

Table 2

Corporal mass of studied chickens

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	1725±23.35	1735±23.45	2072.5±41.16	1871.2±38.1	1898.7±29.9
V%	3.82	4.21	5.61	5.75	6.08
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=54.5; $\hat{F}$> $F_{0.1\%}$ (***)				

Tukey test $W_{5\%}$=127.55 $W_{1\%}$=278.24	LE2-Lc	347.50	***
	LE2-LE1	337.50	***
	LE2-LE3	201.25	***
	LE2-LE4	173.75	***
	LE4-Lc	173.75	***
	LE4-LE1	163.75	***
	LE4-LE3	27.50	n.s.
	LE3-Lc	146.25	**
	LE3-LE1	136.25	**
	LE1-Lc	10.00	n.s

*Note: Fisher test: * - significant; ** - distinct significant; *** - very significant.*
*Tukey test: n.s. – insignificant; ** - significant; *** - very significant.*

Testing of difference signification between batches shown the fact that are very significant statistical differences between batches LE2-Lc; LE2-LE1; LE2- LE3; LE2- LE4; LE4-Lc; LE4- LE1; distinct significant between batches LE3-Lc and LE3-LE1 and insignificant between batches LE4-LE3 and LE1-Lc.

After slaughtering of chickens which were above appreciated were recorded data regarding mass of resulted carcasses (tab. 3). Homogeneity of batches was very good (V%<10) atbatches Lc and LE1and medium at the other experimental batches.

Table 3

Mass of obtained carcasses

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	1298.1±44.1	1312.5±26.7	1591.8±69.1	1420.0±58.5	1454.4±68.5
V%	9.61	5.75	12.27	11.65	13.32
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=4.58; $F_{1\%}$<$\hat{F}$> $F_{0.1\%}$ (**)				
Tukey test $W_{5\%}$=226.94 $W_{1\%}$=278.24	LE2-Lc		293.75		***
	LE2-LE1		279.37		***
	LE2-LE3		171.87		n.s.
	LE2-LE4		137.50		n.s.
	LE4-Lc		156.25		n.s.
	LE4-LE1		141.87		n.s.
	LE4-LE3		34.37		n.s.
	LE3-Lc		121.87		n.s.
	LE3-LE1		107.50		n.s.
	LE1-Lc		14.37		n.s.

*Note: Fisher test: * - significant; ** - distinct significant; *** - very significant.*
*Tukey test: n.s. – insignificant; ** - significant; *** - very significant.*

At this analysed parameter were observed very significant differences between batches LE2-Lc and LE2-LE1 and between the other batches were

discovered insignificant statiscally differences.

Regarding breast mass, it could be observed (tab. 4) that batches had a good homogeneity only in case of control batch and for first experimental batch, while the other batches had medium homogeneities.

Very significant differences were recorded between batches LE2 and Lc; significant differences were observed between LE2 and LE1; between the other batches weren't observed significant statistically differences.

Breast had a participation rate in carcass composition of 20.97% at Lc; 21.61% at LE1; 22.30% at LE2; 21.48% at LE3 and of 21.46% at LE4. Rating the mass of breast at live mass of studied broiler hen chickens could be affirmed that those one represented 15.78-17.12%.

Table 4

Breast mass

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	272.25±9.36	283.75±9.83	355.00±14.94	305.12±21.1	312.12±16.52
V%	9.72	9.80	11.90	19.55	14.96
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=4.52; $F_{1\%}<\hat{F}>F_{0.1\%}$ (**)				
Tukey test $W_{5\%}$=61.09 $W_{1\%}$=74.89	LE2-Lc		82.75		***
	LE2-LE1		71.25		**
	LE2-LE3		49.88		n.s.
	LE2-LE4		42.88		n.s.
	LE4-Lc		39.87		n.s.
	LE4-LE1		28.37		n.s.
	LE4-LE3		7.00		n.s.
	LE3-Lc		32.87		n.s.
	LE3-LE1		21.37		n.s.
	LE1-Lc		11.50		n.s.

*Note: Fisher test: * - significant; ** - distinct significant; *** - very significant.*
*Tukey test: n.s. – insignificant; ** - significant; *** - very significant.*

The recorded values for mass of inferior thighs (tab. 5) show a good homogeneity only at batch LE1and at the other batches those one being medium.

By application of those two statistically tests were observed very significant differences between batches LE2-LE1 and LE2-Lc; statistically differencesonly in case of batches LE2-LE4, and between other batches weren't observed significant statistically differences.

Participation rate of inferior thighs in carcass composition was of 13.18% at Lc; 11.84% at LE1; 13.00% at LE2; 12.79% at LE3 and of

11.92% at LE4.

For mass of superior thighs batches Lc and LE1 had a good homogeneity while the other experimental batches had medium homogeneities (V%>10) (tab. 6).

At this parameter weren't founded significant statistically differences between batches. Participation rate of superior thighs in carcass composition was of 15.02% atcontrol batch; 15.8% at LE1; 14.21% at LE2; 15.27% at LE3 and at LE4 was 15.15%.

Table 5

Mass of inferior thighs

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	171.12±7.71	155.50±5.02	207.00±8.33	181.62±7.37	173.50±6.57
V%	12.74	9.13	11.38	11.47	10.72
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=7.09; $\hat{F}$> $F_{0.1\%}$ (***)				
Tukey test $W_{5\%}$=28.86 $W_{1\%}$=35.38	LE2-Lc		51.50		***
	LE2-LE1		35.87		***
	LE2-LE3		33.50		**
	LE2-LE4		25.37		n.s.
	LE4-Lc		26.12		n.s.
	LE4-LE1		10.50		n.s.
	LE4-LE3		8.12		n.s.
	LE3-Lc		18.00		n.s.
	LE3-LE1		2.37		n.s.
	LE1-Lc		15.62		n.s.

*Note: Fisher test: * - significant; ** - distinct significant; *** - very significant.*
*Tukey test: n.s. – insignificant; ** - significant; *** - very significant.*

Table 6

Mass of superior thighs

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	195.0±6.3	207.4±7.3	224.8±11.1	216.8±8.9	220.4±11.7
V%	9.17	9.95	13.92	11.62	15.09
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=2.64; $\hat{F}$< $F_{5\%}$ Aren't significant statistically differences				

Rating the mass of superior thighs at corporal mass of analysed broiler hen chickens was observed that those ones participate in a rate of 10.85% (at LE2) up to 11.95% (in case of LE1).

Batches' homogeneity, speaking of wings mass for studied chickens

was good only in case of batch LE4 (V%<10) while at the other experimental batches were established mean homogeneities (V%>10) (tab. 7).

Wings participation at carcass mass was in a rate of 11.06% at Lc; 9.97% at LE1; 10.46% at LE2; 10.97% at LE3 and of 10.38% at LE4.

Regarding the mass of back could be observed from table 8 that batches Lc, LE1 and LE3 had a good homogeneity and at batches LE2 and LE4 were observed medium homogeneities.

Table 7

Mass of wings

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	143.6±5.42	130.8±5.60	166.6±7.02	155.8±6.09	151.0±5.00
V%	10.67	12.11	11.91	11.05	9.36
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=5.21; $F_{1\%}<\hat{F}>F_{0.1\%}$ (**)				
Tukey test $W_{5\%}$=23.85 $W_{1\%}$=29.24	LE2-Lc		35.75		***
	LE2-LE1		23.00		n.s.
	LE2-LE3		15.62		n.s.
	LE2-LE4		10.75		n.s.
	LE4-Lc		25.00		**
	LE4-LE1		12.25		n.s.
	LE4-LE3		4.87		n.s.
	LE3-Lc		20.13		n.s.
	LE3-LE1		7.38		n.s.
	LE1-Lc		12.75		n.s.

*Note: Fisher test: * - significant; ** - distinct significant; *** - very significant.*
*Tukey test: n.s. – insignificant; ** - significant; *** - very significant.*

Table 8

Mass of back

Specification	Experimental batches				
	Lc	LE1	LE2	LE3	LE4
n	10	10	10	10	10
$\bar{x} \pm s_{\bar{x}}$	507.0±15.49	520.8±8.45	624.8±28.59	547.8±19.59	558.6±27.62
V%	8.64	4.59	12.94	10.11	13.98
Fisher test	$F_{5\%}$=2.65; $F_{1\%}$=3.94; $F_{0.1\%}$=5.91; $\hat{F}$=4.59; $F_{1\%}<\hat{F}>F_{0.1\%}$ (**)				

Tukey test $W_{5\%}$=86.81 $W_{1\%}$=106.43	LE2-Lc	117.87	***
	LE2-LE1	104.00	**
	LE2-LE3	77.00	n.s.
	LE2-LE4	66.25	n.s.
	LE4-Lc	51.62	n.s.
	LE4-LE1	37.75	n.s.
	LE4-LE3	10.75	n.s.
	LE3-Lc	40.87	n.s.
	LE3-LE1	27.00	n.s.
	LE1-Lc	13.87	n.s.

*Note: Fisher test: * - significant; ** - distinct significant; *** - very significant.*
*Tukey test: n.s. – insignificant; ** - significant; *** - very significant.*

By application of those two statistically tests were observed very significant statistically differences between batches LE2-Lc; significant differences between batches LE2-LE1 and between the other batches were established insignificant differences.

Participation of back in carcass composition was of 39.05% at Lc; 39.68% at LE1; 39.25% at LE2; 38.58% at LE3; and at LE4 was 38.40%.

Rating the back mass at corporal mass of analysed broiler hen chickens was observed that those one represent 29.39% from live mass at Lc; 30.02% at LE1; 30.15% at LE2; 29.27% at LE3; and at LE4 29.42%.

CONCLUSONS

At experimental batches (LE1 and LE4) face to control one (Lc), the rate of main cut portions in carcass composition (breast, lower thighs, superior thighs, wings and back) was superior. FA growing bio-stimulator had a good influencenot only on carcass size, in its ensemble, but also on those cut parts from carcass which contribute in a great way at assuring of a favourable rate meat/bones (breast and thighs); so the breast mass was with 12.07-30.39% higher; mass of inferior thighs with 1.39-20.96%; mass of superior thighs with 11.17-15.28%; wings mass with 5.15-16.01%, and back mass with 8.04-23.23%.

REFERENCES

1. Georgescu Gh. și col. 2000 - Tratat de producerea, procesarea și valorificarea cărnii. Editura Ceres, București.
2. Guerrero-Legarreta I., Hui Y.H., 2010 - Handbook of Poultry Science and Technology vol. 1: Primary Processing, John Wiley & Sons Publisher Inc., Hoboken, New Jersey, USA
3. Fisher C., 1993 - The impact of amino acids on carcass quality in broilers. Degussa Technical Symposium, Feyetteville, Arkansas, September 14-16.
4. Marcu N., Mierliță D., Ludu O., 2008 – Materii prime animale. Editura Digital Data, Cluj-Napoca
5. Radu-Rusu R.M., Teușan V., Vacaru-Opriș I., 2006 - Comparative researches concerning some histometric features of the miocytes in somatic musculature of the domestic chicken and waterfowl: (II). Wing and thigh muscles. Lucrari Stiintifice - Universitatea de Stiinte Agricole si Medicina Veterinara, Seria Zootehnie, 50, 107-114.
6. Radu-Rusu R.M., Prisacaru A.E., Hussen T.S., Hoha G.V., 2013 - Certain textural properties of chicken meat, investigated through histology and photonic microscopy techniques. Food and Environment Safety Journal, 12(1), 005-011.
7. SîrbulescuV., Vacaru-Opriș I., Stăncescu V., Vintilă Cornelia, 1983 – Tehnologia și valorificarea produselor animaliere. Ed. Didactică și Pedagogică, București
8. SImeanu D., Vacaru-Opriș I. and Stan, Gh., 2001 - Researches regarding the influence of a new bio-growth promoteur (F.A.) on the basis of vitamin B12 on the production of meat at the hen broiler. 52nd Annual Meeting of the European Association for Animal Production, Budapest, Hungary, August 26-29, pag. 116.
9. Simeanu D., 2004 – Biostimulatori în alimentația păsărilor. Editura Alfa, Iași
10. Simeanu D., Stan Gh., Bucșan A., 2015– Effect of productive and economic efficiency of broiler nutrition supplement with ”growth bio stimulator FA”. 7thInternational Euro-alimentSymposium, Galați, România, 24-26 septembrie 2015. Galați University Press, pag. 107-109
11. Simeanu D., 2016 – Producții animaliere. Ed. Ion Ionescu de la Brad, Iași
12. Șara A., Mierliță D., 2003 – Nutriția și alimentația animalelor de ferma. Ed. AcademicPres, Cluj-Napoca
13. Vacaru-Opriș I. și col., 2000 - Tratat de avicultură, vol. I.Editura Ceres, București
14. Vacaru-Opriş, I. şi col.,2002 - Tratat de avicultură, vol. II.Editura Ceres, București.