THE PRODUCTIVE EFFECT OF AN ACIDIFYING OVER THE PRODUCTIVE PERFORMANCES AT BROILER CHICKEN

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Abstract

To determine the productive effect of a mixture of acids over the broiler chicken, two experimental batches were formed (LE1 and LE2), of 50 chicken each, together with a control lot (LM), containing 50 chicken. The chicken in the experimental batches received 2%, respectively 2.5% of experimental factor in the drinking water, in the 1-21 days of life period, and 1%, respectively 1.25% in the 22-35 days of life period. The use of this acidifying at the broiler chicken had profitable results, especially in the first week of life, determining production increases of 3.2-4.08% in the experimental batches over the control one. The specific food consumption was fairly influenced, the differences being insignificant. The state of health was corresponding, the loses in the overall number being registered within normal limits for this category of poultry.

Key words: broilers, food, acidifier

INTRODUCTION

Acidification of feed or water consumption by animals, using organic acids, represent a frequent practice used in aim to control digestive micro-flora, improving feed capitalization, production development and maintaining the health state of animals [4], [6], [7]. Acidifier usage in animal nutrition is mainly based on the following reasons:

- enrichment of endogen quantity of acid from stomach;
- by reducing pH value in digestive tract could prevent multiplication of some pathogen germs, such as *Salmonella*, *Clostridium*, *Staphylococcus* or *E. coli*, being favourable for multiplication of some useful microorganism, such as acid-lactic bacteria or some yeasts;
- organic acids could improve the usage of mineral substances from intake feed;
- for palatability improvement of some fodders [9], [11], [12].

A lot of research were made on pigs, showing that youth pigs have a favourable response at decreasing of ratio pH value, when lactic acid is mainly used, by improving growth speed and feed conversion, respectively by decreasing of *E. coli* number from the small intestine, mainly in the period just after weaning [1], [8].

Also many research put in light the positive influence of feed or drinking water acidification at birds, both on productive performances and also on health state (especially at hen and turkey hen broilers are recorded weight grow at selling, decrease of specific fodder consumption and mortality decreasing) [1], [3].

At birds' usage of lactic acid lead at on inhibition of lactic bacteria and of other useful microbial species from digestive tract, effect due to formation of hydrogen peroxide and causing an inhibitor substance called acid-line [10].

Organic acids more used in pre-biotic aims are forming acid, propionic acid, lactic acid, citric acid, fumaric acid, sorbic acid; also are used the salts of this acids: propions (ie. of Ca), citrats, etc. [5].

MATERIAL AND METHOD

Experiment was conducted at Feeding and Nutrition Biobase from University of Agricultural Sciences and Veterinary Medicine Iaşi on a total number of 150 chicken broilers divided in three batches,

from which a control batch (LM) and two experimental ones (LE1 and LE2) (table 1).

The aim of this experiment was to establish the effect of tested acidifier on growth performance, feed capitalization and health state of HUBBARD FLEX broiler chickens.

The administrated feed was elaborated by FNC AviTop Tomeşti, on three periods, as follows: 1-14 days, starting period, 15-28 days, growing period and 29-35 days, finishing period.

Table 1. Experimental scheme

Batches	Experimental time period (days)	Number of chicken/batch	Experimental factor*
LM	35	50	-
LE1	35	50	2‰ – 1-21 days 1‰ – 22-35 days
LE2	35	50	2.5‰ – 1-21 days 1.25‰ – 22-35 days

*Note: * acidifier administrated in water.*

The structure and nutritive characteristics of the mixed fodders administrated are presented in table 2.

The tested product was made a mixture of formic, lactic and acetic acid. This acid mix has a selective action on some bacteria such as: *Campylobacter* and *Salmonella*, reducing the ph from stomach and small intestine; fact which generates a good health state and a good capitalization of feed.

This product does not be used during the period in which antibiotics are used.

RESULTS AND DISCUSSIONS

The usage of the product was very good especially in the first period (1-7 days), when weight gains were higher with comparison with LM batch (table 3).

In the period 7-14 days the results were different, so LE1 batch accused a decrease of weight with 1.38% while LE2 batch had a growth of 0.79% face to control batch.

In the period 14-28 days the results obtained at experimental batches were lower that at LM batch, fact which show that in this period the product haven't any favourable effect.

Starting with the 22nd day the used doses of acidifier were cut at half (1‰ at LE1 and 1.25‰ at LE2).

In the last week LE1 batch recorded a gain of +0.6% in comparison with LM batch, while LE2 batch had an inferior gain with 0.57% face to LM fact which could be considered irrelevant.

We appreciate that the product had a positive visible effect in the first period of age having a stimulate role on enzymatic secretion but mainly on synthesis of gastric and pancreatic lipase [2], [5], [13].

Table 2. Structure and nutritive characteristics of mixed fodders

Raw materials (%)	*Starting period*	*Growing period*	*Finishing period*
Corn	46.22	49.45	40.21
Soybean grist	30.00	22.00	12.97
Soybean full fat	10.00	17.53	26.67
Corn gluten	5.00	4.50	4.00
Barley	-	-	10.00
Fish flour	3.72	-	-
Melasse	-	2.00	2.00
Monocalcic phosphate	1.65	1.74	1.46
Calcium carbonate	1.16	1.39	1.26
Wafolin	0.70	-	-
Premix	0.50	0.50	0.60
Rhodimet	0.29	0.20	0.39
L-Lizine	0.24	0.14	0.03
Salt	0.18	0.27	0.18

Coline 50%	0.12	0.10	0.08
BioPlus 2B	0.10	0.05	-
Sodium bicarbonate	-	-	0.10
Cycostat	0.06	-	-
Cygro	-	0.06	-
Kemzyme Ms dry	0.05	0.05	0.05
L-Treonine	0.02	-	-
Sodium bicarbonate	-	0.02	
Nutritive characteristics			
EM kcal/kg n.f.	3215.41	3249.00	3225.00
Crude protein %	24.00	21.00	20.00
Crude fat %	7.06	7.15	7.89
Crude fibber %	3.82	3.43	3.90
Ca %	1.00	0.94	0.85
Available P %	0.50	0.45	0.42
Ca/P	2.00	2.10	2.02
L%	1.44	1.15	1.05
M+C%	1.09	1.06	0.96
Treonine %	0.93	0.79	0.75

Table 3. Evolution of body mass (weight)

Batches	Mean weight at the beginning of period (g)	Mean weight at the end of period (g)	Weekly DMG (g)	Cumulative gain (g)	± % face to LM
	1-7 days				
LM	42.35	164.32	17.42	121.97	-
LE1	41.19	167.06	17.98	125.87	+3.20
LE2	41.05	167.99	18.13	126.94	+4.08
	7-14 days				
LM	164.32	435.12	38.68	392.77	-
LE1	167.06	432.58	37.93	391.39	-1.38
LE2	167.99	436.92	38.41	395.87	+0.79
	14-21 days				
LM	435.12	842.73	58.23	800.38	-
LE1	432.58	817.23	54.95	776.04	-3.04
LE2	436.92	816.69	54.25	775.64	-3.09
	21-28 days				
LM	842.73	1329.67	69.56	1287.32	-
LE1	817.23	1327.91	72.95	1286.72	-0.60
LE2	816.69	1273.78	65.29	1232.73	-4.24
	28-35 days				
LM	1329.67	1856.49	75.26	1814.14	-
LE1	1327.91	1866.21	76.90	1825.02	+0.60
LE2	1273.78	1762.74	81.58	1803.79	-0.57

Feed capitalization was higher at all experimental batches fact due to the remarkable quality of the used mixed fodders, the differences between the three batches being insignificant (table 4) [2], [5], [13].

Health state was good, the recorded loses being in normal limits for these category of birds, but we observe small increase mortality at control batch face to the experimental ones (table 5).

Table 4. Feed consumption

Batches	Total consumption of mixed fodder (kg/batch)	Number of chicken/batch	Mean daily consumption/capita (g)	DMG (g)	FCR (kg n.f./kg gain)	± % face to LM
LM	79.61	48	94.77	60.09	1.577	-
LE1	83.21	50	95.10	60.45	1.573	-0.25
LE2	79.25	49	94.34	59.74	1.579	+0.12

Table 5. Evolution of loses

Batches	Number at the beginning of experiment (chicken)	Number at the end of experiment (chicken)	Loses (chicken)	%
LM	50	46	4	6
LE1	50	50	0	-
LE2	50	48	2	4
Total loses		4%		

CONCLUSIONS

1. We can conclude that the influence of acidifier was mainly in the influence of acidifier was mainly in the first week of age, when gains were with 3.24 - 4.08% higher at experimental batches face to control.
2. Feed specific consumption was less influenced by the tested prebiotic, the differences being insignificant.
3. Health state was good, loses being into the normal limits for this category of poultry.

REFERENCES

Articles from journals:

[1] Chapman D.J.: Probiotics, acidifiers and yeast culture: a place for natural additivies in pig and poultry production. Proc. of Alltech's Fourth Ann. Symp., Nicholasville, 1988, USA.

[2] Choudhari A., Shinde S., Ramteke B.N.: Prebiotics and Probiotics as Health promoter. Veterinary World, 2008, vol.1, No.2: 59-61.

[3] Guererro G. şi col.: Direct fed microbials and acidifiers for poultry. Proc. of Alltech's Seventh Ann. Symp., Nicholasville, 1991, USA.

[5] Patterson J.A., Burkholder K.M.: Application of prebiotics and probiotics in poultry production. Poultry Science, 2003, 82:627–631.

[8] Rosen G.D.: Feed Additive Nomenclature. Poultry Int., 1996, vol.35, nr.5.

[10] Simon, O., Jadamus A., Vahjen W.: Probiotic feed additives effectiveness and expected modes of action. J. Anim. Feed Sci., 2001, 10:51–67.

[13] Tellez, G., Petrone V. M., Excorcia M., Morishita T.Y., Cobb C.W., Villasenor L.: Evaluation of avian-specific probiotics and Salmonella enteritidis, Salmonella typhimurium, and Salmonella heidelberg-specific antibodies on cecal colonization and organ invasion of Salmonella enteritidis in broilers. J. Food Prot., 2001, 64:287–291.

Books:

[4] Halga P. şi col.: Nutriţie şi alimentaţie animală. Editura Alfa, Iaşi, 2005.

[6] Pop I.M.: Aditivi furajeri. Editura Tipo Moldova, Iaşi, 2006.

[7] Pop I.M. şi col.: Nutriţia şi alimentaţia animalelor. Editura Tipo Moldova, Iaşi, 2006.

[9] Simeanu D.: Biostimulatori în alimentaţia păsărilor. Ed. Alfa, Iaşi, 2004.

[11] Stan Gh. şi Pop I.M.: Alimentaţia şi nutriţia animalelor. Ed. Junimea, Iaşi, 1997.

[12] Stan Gh. şi Simeanu D.: Nutriţie animală. Ed. Alfa, Iaşi, 2005.