

THE INCUBATION EGGS SANITATION INFLUENCE ON THE OBTAINED PERFORMACE IN THE GROWTH OF THE HATCHED CHICKENS FROM TREATED EGGS

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Abstract

The research was done on a batch of 1344 incubation eggs, descending from the meat chicken commercial hybrid „COBB-500”; out of these eggs, 1008 were decontaminated, in 3 work modules(A, B and C), each containing 336 eggs. The decontamination of the mineral shell of the studied eggs was made with a new substance, named Sodium dichloroisocyanurate. For the A module a 0.6g ‰ a.s. solution was used, for the B module a 0.4 g ‰ a.s. solution and for the C module a 0.2 g ‰ a.s. solution. The decontamination technique of the eggs contained four work stages: water wash, for the removal of impurities on the mineral shell; water rinsing; decontamination; the temporary holding of eggs at a 18°-19°C temperature. The hatched chicks from the treated eggs were studied over all the growth period, from day 1 to day 41, determining their quality, weight growth dynamic, food consumption, losses from the effective and the resulted meat production. The hatched chickens in A module became la L1exp. batch (279 heads) the ones from the B module – L2exp. batch (279 heads), and the ones from the C module – L3exp.(279 heads) in addition a control batch was formed – Lc(279 heads), with hatched chickens from untreated eggs. Incubation egg sanitation with Sodium dichloroisocyanurate, 0,4g ‰ a.s., proved to be the one with the best results in the growth of hatched chicks from the eggs treated this way (average live weight at 42 days - 2572,64 g; IC kg nc/kg gain – 1.84; losses in the effective 1.78%).

Key words: sanitation, incubation, broiler chicken

INTRODUCTION

Performance achievement in poultry husbandry is conditioned by the existence of a powerful hatching sector, which should be able to valorise the results from breeder farms and provides best health status to new hatched chicks – a warranty for high poultry production achievement [1], [2], [3], [4], [7].

Among the factors that could decisively influence the eggs hatching performances and chicken rearing ones, sanitation of incubation eggs is a key factor, providing high levels at hatching and viability to obtained day old chickens [5], [6].

Our researches focused on the same problems, the efficacy of eggs decontamination being assessed when a new decontaminant substance, of Romanian origin, was tested.

MATERIAL AND METHODS

Researches have been carried out on “COBB-500” chickens, hatched from certain eggs treated with *sodium dichloroisocyanurate* solution, prepared at different concentration, as well as from untreated eggs. 4 experimental groups were set up: 1 control group – Lc and 3 experimental treatments: L₁exp. group, which comprised chickens hatched from eggs treated with *sodium dichloroisocyanurate* solution, 0.6g ‰ a.s.; L₂exp. group, which consisted of chickens hatched from eggs treated with *sodium dichloroisocyanurate* solution, 0.4g ‰ a.s. and L₃exp. group, which included chickens hatched from eggs treated with *sodium dichloroisocyanurate* solution, 0.2g ‰ a.s.

Climate controlled halls and permanent litter were used within the S.C. “AVI-TOP” S.A Iași, for fowl rearing till slaughtering (41 days).

Chickens were fed with certain mixed feed recipes, presented in table 1.

Table 1. Mixed feed recipes used in experiment

STARTER (1 – 6 days)		GROWER (7 – 25 days)		FINISHER (26 – 41 days)	
Feedstuff name	%	Feedstuff name	%	Feedstuff name	%
Corn (8% CP)	45.76	Corn (8% CP)	37.29	Corn (8% CP)	40.94
Soybean meal (42% CP)	35.10	Fullfat soybean (34% CP)	37.00	Fullfat soybean (34% CP)	35.00
Fullfat soybean (34% CP)	10.00	Soybean meal (42% CP)	15.30	Barley (10.5% CP)	10.00
Fish meal (72% CP)	3.00	Barley (10.5% CP)	5.00	Soybean meal (42% CP)	9.10
Soybean oil	1.95	Monocalcium phosphate	1.85	Monocalcium phosphate	1.65
Monocalcium phosphate	1.60	Calcium carbonate 38.0	1.45	Calcium carbonate 38.0	1.30
Calcium carbonate 38.0	1.40	Soybean oil	0.90	Soybean oil	0.95
Premix PT-S	0.50	Premix PT-S	0.50	Premix PT-F	0.50
Salt	0.25	Salt	0.35	Salt	0.35
L-Lysine HCl ADM	0.10	Rhodimet	0.15	Rhodimet	0.11
Avizyme	0.10	Avizyme	0.10	Avizyme	0.10
Probios	0.10	Cygro	0.06		
Rhodimet	0.08	Probios	0.05		
Cycostat	0.06				
NUTRITIONAL FEATURES					
Notice	Value	Notice	Value	Notice	Value
Volume %	100.0	Volume %	100.0	Volume %	100.0
Moisture %	11.02	Moisture %	10.67	Moisture %	11.15
Dry matter %	88.98	Dry matter %	89.33	Dry matter %	88.85
ME poultry kcal/kg	3012.06	ME poultry kcal/kg	3175.34	ME poultry kcal/kg	3225.97
Crude protein%	24.00	Crude protein%	22.49	Crude protein%	20.00
Crude fat%	6.50	Crude fat%	9.47	Crude fat%	9.42
Ashes %	3.90	Ashes %	3.45	Ashes %	3.14
Gross fiber %	3.93	Gross fiber %	4.38	Gross fiber %	4.24

The analysed traits were: weight gain dynamics, feed consumption, flock casualties and their reasons, meat yield and its quality.

Working methods were specified by scientific literature.

RESULTS AND DISCUSSIONS

Weight gain dynamics

At day old, chickens hatched from untreated eggs weighted 42.21 g (Lc group). In experimental groups, variation limits were comprised between 42.20 g in L₁exp. and 42.63

g in L₃exp. High homogeneity was recorded for the studied trait (V%=6.659-7.612). No statistical significance occurred between the studied groups (1.6278 (F) < 0.005).

During slaughtering (41 days), achieved live weights were different among groups. Thus, highest weight was found in L₂exp. group (2572.64 g), while the lowest occurred in Lc group (2522.40 g). L₁exp. was situated close to control, with an average of body weight of 2523.40 g, while L₃exp. (2558.44 g) was found closer to L₂exp. group (tab. 2).

Table 2.

Average live weights of chickens slaughtered at 41 days old (♂+♀)

Group	n	$\bar{X} \pm s_{\bar{x}}$ (g)	s	V%	Min. (g)	Max. (g)
Lc2	50	2522,40±32,96	233,12	9,24	2120	3000
L ₁ exp.	50	2523,40±34,79	246,03	9,75	2120	3020
L ₂ exp.	50	2572,64±38,08	269,28	10,46	2150	3070
L ₃ exp.	50	2558,44±37,58	265,76	10,38	1880	3120

Fisher test: 0.4959 (F) < F_{0.05} (3; 196) n.s

Compared to Lc group, live weights of experimental groups chickens were higher, + 1.99% in L₂exp.; +1.43% in L₃exp. and +0.04% in L₁exp group.

Variation coefficients values indicated poor to average homogeneity (V%=9.242-10.467). Differences between means were not statistically significant.

Assessment of average live weight recorded by each gender did not reveal displacements of groups succession for females. However, L₃exp. and L₂exp. pullets proved to be the heavies when they reached 41 days [6].

Average daily weight gain

The average daily weight gain reached different values across the entire

experimental period: 60.49 g in L_c group; 60.52 g in L₁exp group; 61.72 g in L₂exp group and 61.36 g in L₃exp group. Therefore, this trait was 2.03% higher in L₂exp group, 1.44% higher in L₃exp group and 0.05% higher in L₁exp group, compared to control.

Feed intake

Table *tab. 3* reveals the feed conversion rate values (kg feed/kg gain). Highest conversion value was calculated in L_c group – 1.86, followed decreasingly by L₂exp group-1.84; L₃exp group – 1.83 respectively by L₁exp group, with a value of 1.79.

Table 3.
Feed consumption in studied chicken broilers

L ₁ exp. Feed conversion rate (FCR)-for feeding recipes and overall			
Recipe type	Weight gain-kg	Feed intake-kg	FCR
Starter	456	1100	2.41
Grower	1637	2600	1.58
Finisher	700	1300	1.85
Overall	2793	5000	1.79
L ₂ exp. Feed conversion rate (FCR)-for feeding recipes and overall			
Recipe type	Weight gain-kg	Feed intake-kg	FCR
Starter	4220	11000	2.6
Grower	14890	24000	1.61
Finisher	6050	11300	1.86
Overall	25160	46300	1.84
L ₃ exp. Feed conversion rate (FCR)-for feeding recipes and overall			
Recipe type	Weight gain-kg	Feed intake-kg	FCR
Starter	4000	10800	2.7
Grower	14690	23500	1.59
Finisher	4110	7500	1.82
Overall	22800	41800	1.83
L _c Feed conversion rate (FCR)-for feeding recipes and overall			
Recipe type	Weight gain-kg	Feed intake-kg	FCR
Starter	4405	11700	2.65
Grower	14630	23500	1.6
Finisher	6320	12000	1.89
Overall	25355	47200	1.86

Flock casualties and their reasons

Analysis of flock casualties revealed very low values, comprised between 1.78% in L₂exp. group and 2.23% in L_c. Accidental situations occurred as reasons

Resulted meat yield

Slaughter efficacy

This is a very relevant trait for meat production assessment. Live weight (g) and carcasses weight (g) were considered when slaughtering efficacy (dressed weight) was calculated on fresh and refrigerated (24 hours post slaughtering) carcasses. This parameter was separately calculated for each gender. In cockerels, its values varied between 68.07% (L_c) and 69.92% (L₃exp.) for fresh carcasses, respectively from 66.82% (L_c) till 68.12% (L₃exp.) for refrigerated carcasses (V%=6.178-14.752).

Dressed weight on fresh pullets carcasses oscillated between 69.62% in L₂exp. and 71.72% in L₃exp. group, while refrigerated carcasses dressed weight reached the minimal value of 68.41% in L₁exp. group and the maximal one of 70.73%, in L_c group. No statistical significance occurred for the components used in slaughtering efficacy computation, for any gender.

Trenched parts participation in carcasses formation

Certain anatomic parts were studied in our investigations: breast, thighs and shanks, wings and remnants, the acquired data being presented in *tab. 4*.

Small differences occurred between groups for males values. They were statistically different only for thighs weight (5.1298 (F)>F_{0.01} (3; 36) 4.51**).

Table 4.
Participation of trenched parts in carcasses formation at males and females

Notice	Experimental groups	n	males		females	
			$\bar{X} \pm s_{\bar{x}}$ (g)	V%	$\bar{X} \pm s_{\bar{x}}$ (g)	V%
Carcass weight (g)	Lc	10	1989.80±28.146	4.473	1606.00±34.950	6.120
	L ₁ exp.	10	1987.40±26.409	4.202	1676.80±20.633	3.891
	L ₂ exp.	10	2020.40±23.230	3.636	1785.20±34.291	6.074
	L ₃ exp.	10	1966.20±24.806	3.990	1784.20±36.045	6.389
Breast (g)	Lc	10	704.00±19.146	8.600	624.80±14.908	7.311
	L ₁ exp.	10	679.60±13.379	6.226	593.60±12.256	6.529
	L ₂ exp.	10	714.80±15.147	6.701	632.20±10.606	5.305
	L ₃ exp.	10	683.60±12.757	5.901	621.60±11.014	5.603
Thigh (g)	Lc	10	335.00±4.415	4.167	290.60±10.185	11.083
	L ₁ exp.	10	338.20±5.815	5.437	274.60±6.922	7.971
	L ₂ exp.	10	341.60±6.167	5.709	299.60±9.347	9.865
	L ₃ exp.	10	314.20±5.219	5.253	277.00±4.910	5.606
Shank (g)	Lc	10	253.80±3.339	4.161	216.60±7.820	11.418
	L ₁ exp.	10	261.80±3.633	4.388	205.40±3.591	5.528
	L ₂ exp.	10	267.00±4.435	5.252	221.00±5.027	7.193
	L ₃ exp.	10	256.00±5.586	6.900	206.60±5.963	9.127
Wings (g)	Lc	10	226.60±2.548	3.556	209.40±3.819	5.767
	L ₁ exp.	10	226.80±2.969	4.140	194.00±2.309	3.764
	L ₂ exp.	10	225.00±2.704	3.800	278.20±5.370	7.783
	L ₃ exp.	10	230.00±3.451	4.745	277.60±18.325	15.016
Remnants (g)	Lc	10	465.20±12.304	8.364	427.40±8.105	5.860
	L ₁ exp.	10	475.20±10.036	6.679	409.80±6.229	4.806
	L ₂ exp.	10	462.60±9.295	6.354	430.40±14.232	10.457
	L ₃ exp.	10	476.40±9.847	6.536	430.60±12.365	9.081

In females, significant statistical differences occurred for carcass weight: $3.3062 (F) > F_{0.05}(3; 36) 2.9200^*$ and breast weight: $3.1367 (F) > F_{0.05}(3; 36) 2.9200^*$.

Similar as males, in females were found heavier trenched parts in L₂exp. group than in other groups. Closer to L₂exp. were consecutively found the Lc, L₃exp. and L₁exp. groups, with certain little exceptions.

Thus, breast weight represented 632.20 ± 10.606 g in L₂exp. group, followed by other groups: Lc, with 624.80 ± 14.908 g; L₃exp. with 621.60 ± 11.014 g and L₁exp., with 593.60 ± 12.256 g (V%=5.305 – 7.311).

CONCLUSIONS

1. When chickens hatched from treated and untreated eggs were slaughtered (41 days) it was found that highest average live weight occurred in L₂exp. group (2572.64 g), while the lowest one in Lc group (2522.40 g). Close to Lc group was situated the L₁exp. group (2523.40 g), while L₃exp. group – 2558.44 g – was closer to L₂exp group. Percentage differences, compared to Lc group (=100%), were +1.99% in L₂exp. group; +1.43 in L₃exp. group and +0.04% in L₁exp group.

2. Highest feed conversion rate value (kg feed/weight gain) was recorded at Lc group (1.86), followed by L₂exp (1.84), L₃exp (1.83) and L₁exp (1.79) groups.

3. Flock casualties represented 2.23% in Lc; 2.16% in L₁exp.; 1.78% in L₂exp. and 1.96% in L₃exp.

4. Slaughter efficacy values were not statistically significant between groups. Efficiency calculated for refrigerated meat varied between 66.82% (Lc) and 68.12% (L₃exp.) at males, while for females, ranged from 68.41% (L₁exp.) till 70.73% (Lc).

5. Sanitation of incubation eggs, using *sodium dichloroisocyanurate* 0.4g ‰ a.s., proved to provide best results in rearing the chickens hatched from eggs treated in such manner.

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