

THE INFLUENCE OF “AVISTIM” PREMIX ADMINISTERED IN LAYING HENS DIET ON THE PRODUCTION PERFORMANCES AND EGG QUALITY

INFLUENȚA PREMIXULUI “AVISTIM” ADMINISTRAT ÎN HRANA GĂINILOR OUĂTOARE ASUPRA PERFORMANȚELOR DE PRODUCȚIE ȘI CALITĂȚII OUĂLOR

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The goal of this study was the knowledge of avistim's influence administered in laying hens diet on the production performances, egg quality and the carotene content of eggs. The researches have been made on a number of 162 laying hens, hybrid Isa Brown, assigned in 3 batches of 54 hens/batch. In the feed of batch 2 (E) was added avistim premix 1 % and in the feed of batch 3 (E) was added avistim premix 2 %. The experimental period was 5 weeks, representing the second laying stage (age 56-61 weeks) following: laying intensity, the average egg weight, the fodder consumption per egg. To establish egg's quality, at the end of trial had been determined: egg structure, egg-shell quality, intensity of yolk's color and the carotenes content (La Roche method). The use of avistim determined the improvement of laying intensity with 3.86% at batch 3E, the improvement of egg weight with 6.08% at batch 2E and 1.23% at batch 3E, the reduction of fodder consumption per egg with 3.72% at batch 3E. Also we recorded the improvement of the weight and thickness of the egg-shell at the experimental batches, the improvement of yolk's color and the improvement of carotene content at batches 2E and 3E. We recommend the use of avistim premix in laying hens diets for the improvement of the production performances and the yolk pigmentation, which can influence the commercial value of eggs.

Keywords: premix, laying hens, production performances, egg quality

Introduction

Avistim premix obtained by the Applied Biotechnology Centre - Proplanta Cluj - Napoca is a balanced mix of blossom powder (*Tagetes* sp.), dry beer yeast and vitamin C, recommended for animal diets in generally and laying hens and broiler chicken feeds especially.

Administered in bird feeds it has a colorant effect on yolk, broiler chickens carcasses and due to its content in carotene pigments it can be growth promoter, immunostimulant and antioxidant. Also it contains vitamin B complex (B₁, B₂, B₆), E, PP, micro and macroelements (K, Mg, Ca, Zn, P, Se, Mn). This product is used as a nutritive supplement for birds, through mixing with granulated fodder in a ratio of 0.8-1%.

Looking at avistim composition and its nutrient content, the addition of avistim in laying hens diet can improve the production performances, the yolk color and the eggs carotene content.

In this context must be remembered the researches made by Hasin et al, (2006) who shows that the addition of yellow flowers 4% and orange peels 4% in laying hens diet determines a greater pigmentation of yolk without negative effects on the eggs production and egg weight. Sikder et al. (1998), ascertain the intensification of yolk's color and an insignificant improvement of eggs production through the addition of a dry carrot supplement (4%) in laying hens diet.

The goal of this study was the knowledge of avistim's influence administered in laying hens diet on the production performances, egg quality, the carotene content of eggs and the intensity of yolk's color in the second laying stage in which, usually it can be seen a reduction of the production performances and eggs quality.

Materials and Methods

The researches have been made on a number of 162 laying hens, hybrid Isa Brown, belonging to the SDE Cluj- Napoca birds sector. The laying hens were in the second laying stage from the age of 56 weeks up to the age of 61 weeks. The laying hens, hybrid Isa Brown, had been assigned in 3 batches of 54 hens / batch. The laying hens had been maintained in the same microclimate conditions (BP-3 batteries), density, nourishment and alimentation. The laying hens were fed with granulated fodder with the same energetic and protean level (2750 Kcal EM/kg and 17 % CP).

The feed of batch 2 (E) was supplemented with avistim premix 1%. The feed of batch 3 (E) was supplemented with the same avistim premix 2%. We underline that during the making process of this specific premix for laying hens, there were no colorants for yolk pigmentation included in it.

The experimental period was 5 weeks and we followed: the laying intensity, the average egg weight and the fodder consumption per egg. To establish egg's quality, at the end of trial had been determined: egg weight, white and yolk weight and egg-shell weight. The structural components of egg had been determined on a 30 eggs test sample for each batch, taken randomized at the end of trial.

To establish the effects of avistim premix on eggs quality, at the end of trial we made the following determinations: egg-shell weight, egg-shell thickness and the egg-shell proportion from egg. Also, at the end of trial, on a 10 eggs sample/batch, we established the intensity of yolk color using La Roche scale,

which has 15 color test samples. Yolk's carotene content was determined through the doubling of note given by La Roche scale.

The experimental data have been analyzed with the "Student" test using WINSTAT, v. 05.

Results and Discussion

The effects of avistim premix administered in laying hens diet on the average values of production and consumption indices recorded at laying hens at the end of the experimental period are listed in table 1.

Table 1
The average values of production and consumption indices recorded at laying hens at the end of the experimental period

Issue		Experimental groups		
		L1 (Control)	L2 (premix 1%)	L3 (premix 2%)
Laying intensity (%)	absolute	84.12±1.61	84.49±1.55	87.37±2.91
	relative	100.00	100.44	103.86
The average weight of eggs	g	64.84±0.63	68.78±0.81 ^{XX}	65.64±0.79
	%	100.00	106.08	101.23
Daily average egg-weight production	g	54.54	58.11	57.35
	%	100.00	106.55	105.15
The average daily forage consumption (g)	g	130.00	130.00	130.00
The average daily forage consumption/ 100 g egg-weight	g	238.36	223.71	226.68
	%	100.00	93.85	95.10
The average forage consumption/ egg	g	154.54	153.86	148.79
	%	100.00	99.56	96.28

XX- P<0.01 distinct significant

Analyzing the results it can be seen the favorable influence of avistim premix on the laying intensity at batch 3E, the average egg weight at batches 2E and 3E and on the average fodder consumption/egg at the experimental batches 2E and 3E. The highest absolute laying intensity was recorded at batch 3E(87.37± 2.91%) followed by batch 2E(84.49± 1.55%) and the control batch (1M) (84.12± 1.61%), the differences between treatments being insignificant. The relative laying intensity was improved with 3.86% at batch 3E and with 0.44% at batch 2E comparative with the Control group, showing that avistim, due to its vitamin C content, improved the egg production of laying hens in the second laying stage.

Regarding the average egg weight it can be seen that the highest value was recorded at batch 2E, 68.78± 0.81 g, versus 65.64± 0.79 at batch 3E and 64.84± 0.63 at batch 1 M, the differences between batches 2E and 1M being distinct significant (P<0.01). This improvement of egg weight at batch 2E was 6.08% towards batch 1M, and 1.23% at batch 3E comparative with batch 1M.

The daily average egg-mass production is higher at the experimental batches comparative with the Control batch, with 6.55% for batch 2E and 5.15% at batch 3E. Avistim premix supplement administered in diet hasn't influenced the daily average fodder consumption but it influenced the average fodder consumption/100 g egg-mass and the specific consumption/egg. Analyzing the specific consumption/egg it can be seen that the experimental batches had a lower consumption than the Control batch. This dropping of specific consumption at batch 3E was 3.72% and 0.44% at batch 2E.

The average weight of the main structural components of egg is presented in table 2.

Table 2

Average weight of the main structural components of egg (g)

Issue	Group	n	X	±	sx	V%
The average weight of egg	1 (M)	30	64.51	±	1.02	4.99
	2 (E)	30	65.21	±	0.77	3.74
	3 (E)	30	65.35	±	0.84	4.06
The average weight of white	1 (M)	30	38.69	±	0.54	4.42
	2 (E)	30	39.46	±	0.68	5.45
	3 (E)	30	39.15	±	1.00	8.12
The average weight of yolk	1 (M)	30	17.27	±	0.56	10.31
	2 (E)	30	16.63	±	0.26	4.93
	3 (E)	30	16.92	±	0.41	7.74
The average weight of shell	1 (M)	30	8.54	±	0.21	7.73
	2 (E)	30	9.11	±	0.29	10.21
	3 (E)	30	9.27	±	0.31	10.79

From the data presented in table 2 it can be ascertained that the average egg weight, white and yolk registers values almost equals between the treatments, the differences between treatments being insignificant. The average egg-shell weight presents highest values at the experimental batches but the differences towards batch 1M are insignificant.

The relative data regarding the egg structure (table 3) show that related to the average egg weight, the yolk proportion, white and shell present values almost equals between the Control group and experimental batches.

Table 3

The proportion of the main structural components of egg (%)

Issue	n	Experimental groups		
		L1 (Control)	L2 (premix 1%)	L3 (premix 2%)
Average weight of egg	30	100.00	100.00	100.00
Average weight of yolk	30	26.77	25.51	25.90
The average weight of white	30	59.99	60.52	59.91
The average weight of shell	30	13.24	13.97	14.19

The average values of the quality parameters of egg-shell at the end of the trial are presented in table 4

Table 4

The average values of the quality parameters of egg-shell at the end of the trial

Issue	Group	n	X	±	sx	V%
Average weight of egg (g)	1 (M)	30	64.51	±	1.02	4.99
	2 (E)	30	65.21	±	0.77	3.74
	3 (E)	30	65.35	±	0.84	4.06
The average weight of shell (g)	1 (M)	30	8.54	±	0.21	7.73
	2 (E)	30	9.11	±	0.29	10.21
	3 (E)	30	9.27	±	0.31	10.79
The proportion of shell from the egg (%)	1 (M)	30	13.24	±	0.33	11.85
	2 (E)	30	13.97	±	0.35	10.63
	3 (E)	30	14.19	±	0.37	11.51
The thickness of egg-shell (mm)	1 (M)	30	0.43	±	0.01	9.30
	2 (E)	30	0.45	±	0.01	11.11
	3 (E)	30	0.50	±	0.02 ^X	12.00

X- P<0.05 significant

Regarding the shell weight it can be seen an improvement of it with + 0.730 g (10.80%) at batch 3E and +0.570 g (10.60%) at batch 2E versus batch 1M, the differences between groups being insignificant. The improvement of egg-shell weight at batches 2E and 3E was made by a more intense micro and macroelements (Ca, P, Zn, Mn) deposits assured in diet by avistim premix supplement.

Also, the proportion of shell from egg had higher values at the experimental batches comparative with the Control batch (batch. 3E, 14.19%; batch. 2E 13.97% towards 13.24% batch 1M).

Egg-shell thickness registered an improvement of 0.07 mm at batch 3E towards batch 1M and 0.05 mm towards batch 2E, the differences between groups being significant. (P<0.05).

The higher values regarding egg-shell weight and egg-shell thickness, registered at batches 2E and 3E show the role and input of some microelements (Zn, Mn), macroelements (Ca, P) and vitamin C existent in avistim premix in the development and improvement of egg-shell quality.

The results regarding the effects of “avistim” premix supplement on the yolk colour intensity and carotene content are listed in table 5.

Table 5.

The effects of “avistim” premix supplement on the yolk color intensity and the carotene content

Issue	UM	Experimental group					
		n	L1 (Control)	n	L2 (premix 1%)	n	L3 (premix 2%)
The yolk color intensity (La Roche scale)	Note given	10	7.3 ± 0.21	10	8.8 ± 0.32 ^{XXX}	10	9.5 ± 0.30 ^{XXX}
The carotene content of yolk	µg/ g yolk	10	15.6± 0.42	10	18.6 ± 0.65 ^{XXX}	10	20 ± 0.61 ^{XXX}

XXX- P<0.001 very significant differences

The intensity rating of yolk color expresses its content in carotene, being in the same time an important index of egg quality.

Analyzing the results at the end of trial it can be seen that batches 2E and 3E had a higher values for the notes accorded for the yolk color intensity (9.5± 0.30 at batch 3E, 8.8± 0.32 at batch 2E) comparative with batch 1M (7.3± 0.21), the differences between batches being very significant. (P<0.001).

Yolk color intensity at batches 2E and 3E is the consequence of carotenes accumulation in yolk, carotenes that exist in avistim premix.

Regarding the yolk carotene content it can be seen an improvement of it by +4.40 µg/ g yolk at batch 3E (avistim premix 2%) and +3.00 µg/ g yolk at batch 2E (avistim premix 1%) comparative with batch 1M, the differences between batches being very significant(P<0.001). This shows that the addition of avistim premix in laying hens diet can lead to the accumulation of carotenes in yolk.

Conclusions

1. The use of avistim premix 1% and 2% leads to the improvement of the production and consumption performances of laying hens in the second laying stage (age 56-61 weeks).
2. At the end of trial, the best results were recorded at batch 3E (avistim 2%), meaning an increase of laying intensity with 3.86%, an increase of average egg weight with 1.23% and a reduction of specific consumption/egg with 3.72%.
3. The use of avistim premix supplement in laying hens diet in the second laying stage led to the achievement of eggs whit superior quality shell at experimental batches comparative with those obtained from batch 1M, the shell weight registering a rise by +0.730 g at batch 3E and +0.570 g at batch 2E, and a shell thickness of +0.07 mm at batch 3E and +0.02 mm at batch 2E.
4. The higher values regarding egg-shell weight and egg-shell thickness, registered at batches 2E and 3E show the role and input of some microelements,

macroelements and vitamin C existent in avistim premix in the development and improvement of egg-shell quality.

5. Yolk carotene content registered a rise of +4.40 $\mu\text{g}/\text{g}$ yolk at batch 3E (avistim premix 2%) and +3.00 $\mu\text{g}/\text{g}$ yolk at batch 2E (avistim premix 1%) comparative with batch 1M

6. Knowing the effects of avistim premix supplement on the color intensity and carotenes content of yolk, we recommend the use of this premix for the yolk pigmentation and for its favorable influence on the commercial value of egg.

7. Based on the results registered in batch 3E (avistim 2%) we recommend the use of avistim supplement 2 % in in laying hens diet in the second laying stage, because it improves egg production, food conversion and egg quality.

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