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EFFECT OF THE PLANT SUPPLEMENT XTRACT UPON EGG-LAYING PERFORMANCE AND EGG HATCHABILITY IN DIFFERENT BREEDS OF CHICKENS

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ABSTRACT

White and Barred Plymouth Rock chickens, divided into three groups: group I – control, group II – fed diet supplemented with 0.01% Xtract and group III – supplemented with 0.02% Xtract, as well as layers from the Gy-ling and New Hampshire breeds divided into two groups: group I – control, group II –fed diet supplement with 0.01% Xtract, have been studied.
It was found out the supplementation of the diet of White Plymouth Rock hens with 0.01% and 0,02% Xtract increased the egg-laying performance with 6.2% and 9.7%, that was important with regard to broiler production. In t his breed, the egg hatchability percentage from fertilized eggs increased up to 98.21% when the diet was supplemented with 0.02% Xtract.
IN the other studied breeds, the egg-laying performance decreased. For egg hatchability, no dose-dependent alterations were established that was probably related to the productive type of investigated poultry breeds.

Key words: chicken breeds, egg-laying performance, egg hatchability, feed additive Xtract

INTRODUCTION

Poultry farming is an important and major branch of animal husbandry that is developing most intensively during the last decades. On the basis of contemporary methods of breeding and selection, breeds and hybrids characterized with rapid growth and development, high egg-laying performance and low feed conversion ratio (Vanchev et al., 1989; Donchev et al., 1997, Kaytazov et al., 2000; Semerdjiev, 2006).

The consumer's demand fir ecologically pure production as well as the forbidden use of antibiotics as growth promoters, led to the widespread use of new, non-antibiotic additives, composed of natural ingredients.

Probiotics, prebiotics, symbiotics, vegetable oils and extracts are alternatives after the interruption of the use of antibiotics (Macfarlane and Cummings, 1999).

XTRACT is a multifunctional feed additive containing the substances of plant origin capsaicin, cinnaldehyde and calvacrol, that have multiple in vivo activities: antimicrobial, antimycotic, antioxidant etc. It is a combination of natural extracts of the species Origano, Cinnamon and Pepper, fortified with their active substances.

The insufficient data about the productivity resulting from the use of the plant additive in hens necessitated the further, more detailed investigations with specific criteria on XTRACT efficacy.

The present study aimed to establish the effect of XTRACT supplemented to compound poultry feed, upon the egg-laying performance and egg hatchability of hens from different breeds.

MATERIALS AND METHODS

The experiment was performed with 60 hens from each of White and Barred Plymouth Rock breeds and 40 hens from each of New Hampshire and Gy-ling breeds, divided into groups of 20 hens. One cock was provided per 10 hens. The birds were reared under optimal microclimatic parameters, equal for all groups. The feed and water were given ad libitum. All groups were fed a standard poultry feed for layers, produced by Provimi- Stara Zagora, with uniform composition and the following energy and nutrient content: metabolizable energy – 11.5 MJ/kg, crude protein – 16.1%, crude fat – 4.6%, crude fibres – 3.9%, calcium – 3.8%,

digestible phosphorus – 0.34%, lysine – 0.75%, methionine+cysteine – 0.7%. This diet, in the experimental groups I from the different breeds, was supplemented with Xtract at the dosage recommended by the manufacturer: 0.01%, whereas the diet of experimental groups II from the White and Barred Plymouth Rock breeds was supplemented with a double dose (0.02%).

The experimental design was as followed:

Breed	XTRACT supplementation, %		
	Without addition of Xtract	Experimental group I	Experimental group II
White Plymouth Rock	control	0.01	0.02
Barred Plymouth Rock	control	0.01	0.02
New Hampshire	control	0.01	-
Gy-ling	control	0.01	-

The duration of the experiment was 58 days (April-May 2004) and it took place in the experimental base of the Department of Animal Husbandry, Faculty of Veterinary Medicine, Trakia University – Stara Zagora.

The laid eggs were counted and weighed on a daily basis. At the end of the experimental period, the egg-laying performance of hens and the hatchability of incubated eggs were calculated.

The data were statistically processed.

RESULTS AND DISCUSSION

The egg-laying performance of chicken breeds is presented in Table 1. In White Plymouth Rock hens, the laying capacity increased by 6.2% and 9.7% vs controls for experimental groups I and II respectively, whose diet was supplemented with 0.01% and 0.02% Xtract.

Table 1: *Egg-laying performance in the different groups of chicken breeds.*

№	Group	n	Number of eggs	Average egg weight (g)	Egg-laying performance (%)	Statistical significance
White Plymouth Rock						
1	Control	20	660	63.84	57.80	abc
2	I experimental	20	722	62.78	63.30	defg
3	II experimental	20	786	62.98	68.90	hij
Barred Plymouth Rock						
4	Control	20	774	59.84	67.80	kl
5	I experimental	20	562	59.28	49.30	dhmnopr
6	II experimental	20	732	60.79	64.24	mst
New Hampshire						
7	Control	20	856	57.27	75.08	aen
8	I experimental	20	728	58.55	63.85	nov
Gy-ling						
9	Control	20	942	62.39	82.63	bfikpsv
10	I experimental	20	906	64.27	79.47	cgjlrtw

Statistical significance between means:

d, j, l	$p < 0.05$
e, m, o	$p < 0.01$
a, b, c, f, g, h, i, k, n, p, r, s, t, v, w	$p < 0.001$

The supplementation of layer feed with the plant additive Xtract resulted in increased egg-laying performance in Barred Plymouth Rock hens by 1.6 and 2.9% vs control birds, the differences being statistically insignificant ($p > 0.05$).

The addition of 0.01% Xtract to the feed of New Hampshire and Gy-ling layers resulted in insignificantly decreased egg-laying performance – by 3.3 and 1.7% for both breeds, respectively. The average weight of laid eggs however, exhibited the opposite tendency – increase by 2.2 and 3.0% respectively.

The hatchability of incubated eggs is presented in Table 2. In the White Plymouth Rock breed, the hatchability of incubated, respectively of fertilized eggs in the first experimental group was lower compared to the control one. In the second experimental group, a trend towards increased hatchability from fertilized eggs was presented, that reached 98.21%. The lower rate of fertilization of eggs could be compensated for with a higher number of cocks within the groups.

Table 2: *Egg hatchability in the different groups of chicken breeds*

Groups	Incubated eggs	Number of fertilized eggs	Rate of fertilization (%)	Non-fertilized eggs	Early embryonic death (up to the 6th day)	Number of hatched chickens	Egg hatchability (%) in:	
							incubated eggs	fertilized eggs
White Plymouth Rock								
Control	148	122	82.73	26	2	118	79.72	96.72
I experimental	154	132	85.71	22	6	120	77.92	90.90
II experimental	162	112	69.13	50	2	110	67.90	98.21
Total	464	366	78.87	98	10	348	75.00	95.08
Barred Plymouth Rock								
Control	146	138	94.52	8	4	118	80.82	85.50
I experimental	128	118	92.18	10	4	108	84.37	91.52
II experimental	156	140	89.74	16	4	128	80.76	90.00
Total	430	396	92.09	34	12	352	81.86	88.88
New Hampshire								
Control	190	170	89.47	20	-	168	88.42	98.82
I experimental	144	140	97.22	4	2	130	90.27	92.85
Total	334	310	92.81	24	2	298	89.22	96.12
Gy-ling								
Control	212	206	97.16	6	-	180	84.90	87.37
I experimental	180	172	95.55	8	2	170	94.44	98.83
Total	392	378	96.42	14	2	350	89.28	92.59
TOTAL	1620	1450	89.50	170	26	1348	83.20	92.96

In Barred Plymouth Rock hens, the addition of 0.01% Xtract increased considerably the hatchability of eggs from both incubated and fertilized eggs. The dose of 0.02% had a lesser stimulating effect on the hatchability of fertilized eggs (90.0%).

The data obtained with New Hampshire hens were various. In them, Xtract applied at 0.01% decreased the hatchability of eggs whereas in Gy-ling hens it was found to be considerably higher.

The results reported from experiments with this plant supplement in layer hens and broiler chickens, are not unidirectional.

Laurence et al. (2005) observed a statistically significantly higher egg-laying performance in Hy-line W98 layers by 2.3% and a higher egg mass by 3.6% after adding Xtract at a dose of 100 g/t feed, compared to control layer hens (given feed without Xtract).

According to Laurence et al. (2005), the inclusion of Xtract at 100 g/t in laying hen feed allowed the statistically significant improvement of the following parameters: laying performance, feed conversion ratio, egg mass, dirty egg percentage. Similar results are reported by получени от Mazuranok (2004).

In trials in broiler chickens (Ganchev et al., 2004), the supplementation of diets with 200 ppm XTRACT has neither shown any positive effect upon the productive traits of birds.

The analysis of available literature showed rather conflicting results, which could be attributed to the various conditions and experimental designs, season, microclimate, level of nutrition in the basic diets, dose of tested additives and the composition of herbal extracts.

CONCLUSIONS

1. The addition of 0.01% and 0.02% Xtract in the diet of White Plymouth Rock increased the egg-laying performance with 6.2% and 9.7% ($p<0.05$) respectively, with simultaneous reduction of egg weight by 1.7 % and 1.3%.
2. The supplementation of the poultry diet with the plant additive Xtract at doses of 0.01 and 0.02% did not influence significantly the weight of eggs for all studied breeds.
3. In White Plymouth Rock hens, the percentage of hatchability of fertilized eggs increased to 98.21% when the feed was supplemented with 0.02% Xtract. In the other studied poultry breeds, there were no dose-dependent changes that were probably related to their productive type.

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