

THE EFFECT OF OREGANO ESSENTIAL OIL (*ORIGANUM VULGARE* L) ON BROILER PERFORMANCE

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Abstract

Beneficial effects of botanical additives in farm animal may arise from activation on feed intake and digestive secretions, immune stimulation, antibacterial, coccidiostatical, antihelmintical, antiviral or antiinflammatory activity. This study was conducted in order to determine the use of oregano oil in broiler nutrition as a natural growth promoting substances instead of antibiotics. Different levels of oregano oil added to standard diet, to determine its effect on weight gain, daily weight gain, and feed conversion ratio compared to control group. Two hundred day-old broilers (Ross-308) were divided into groups of fifty chicken each, and randomly assigned to based diet. Experimental groups were as follow: LM control group without additive, L1 a 0.3% oregano oil group, L2 a 0.7% oregano oil group, L3 a 1% oregano oil group. The highest weight gain was observed on the L3 (2484 g), and followed by L2 (2463 g), L1 (2401 g) and LM (2365 g). The addition of oregano oil on the diets improved daily live weight by approximately 1.5% (L1), 4.1% (L2) and 5% (L3) compared to the control group. As a general conclusion from all groups with oregano results were better than the group without, but the addition of 1% oregano oil to the diet improved feed conversion ratio by approximately 4 % compared to the control group. In conclusion the results show that essential oil of *Origanum vulgare* L. could be considered a potential natural growth promoter for poultry.

Key word: essential oil, oregano, alternatives, natural, safe, broilers

INTRODUCTION

In the new century antibiotics growth promoters as feed additives has been banned. Antibiotics have been in animal feed for improving growth performance, preventing some disease and increasing some useful microorganism in intestinal microflora. After the use of most antibiotic growth promoters as feed additives has been banned by the European Union because of the secondary effects like bioresistance and the renaissance of trace antibiotics in tissues; scientists have researched for alternatives to antibiotics. Herbs spices and plant extracts have received increasing attention as possible antibiotics alternatives. The plants and extracts have been used traditionally in the therapy of some diseases for a long time in the world, and they have a significant role in maintaining human health. Plants and extracts especially essential oils were used research in broiler nutrition to see their effects on broiler performance. The effect of essential oils is widely known in human and animal use. Essential oils are volatile oils, natural vegetable

products obtained from extracted by steam and/or water distillation plants. Most essential oils consist mixtures of compounds such as phenolics and polyphenols, terpenoids, saponins, quinines, esters, flavones and flavonoids, tannins, alkaloids and nonvolatile residues; and their chemical composition and concentration of compounds is variable. These components have many effects as antimicrobial, stimulating animal digestive systems, antioxidants, anticoccidial, increase production of digestive enzymes and improve utilization of digestive products by enhancing liver functions. Some aromatic plants and their essential oils have research on the broiler performance the addition to the feeds or water improved feed intake feed conversion ratio, carcass yield action (Saricoban et al 2004, Hernandez et al., 2004; Lee et al., 2004, Ciftici et al., 2005, Ertas, et al., 2005, Zhang et al., 2005). *Origanum vulgare* L is the species is a genus of aromatic plants of the family Lamiaceae, it is a herbaceous plant, perennial, aromatic, grow spontaneously throughout

Europe, in the hill up to the mountain by dry and sunny places. Aerial parts harvested at flowering have a varying amount of volatile oil from the plant 0,18-0,45% 0,32-1,02% in fresh and dried plant (Istudor, 2001; Robu, 2004). The farmacodynamic action of the oregano is bioactive components, acting synergeticall, has as main actions the salt secretive, antispasmodic, diuretic, stomachic, anti-broad spectrum (bactericidal, fungicidal, virulicid, parasiticide) imunomoduloar. In this study, we aimed to use oregano oil in broiler nutrition as a natural additive as an alternative to antibiotics. For this purpose different level of oregano oil were added in standard diet, and studied soas to determine the effect on performance compared to control group.

MATERIALS AND METHODS

One hundred day-old broilers (Ross-308) were divided into four groups of 50 chickens

each, and randomly assigned to based diet. The presence and levels of oregano oil in standard diet were the main factors tested. Three different levels of oregano oil were added to standard diets to generate the other four treatment groups. Experimental groups were as follow: L control group, L1 a 0.3% oregano oil group, L2 a 0.7% oregano oil group, L3 a 1% oregano oil group. Oregano oil was dissolved in vegetable oil and were mixed in a standard diet every day. The ingredients and chemical composition of the diet are present in Table 1. Chicks were given starter diet for 14 day (23% CP and 2995 kcal ME), a grower diet 28 day (20% CP and 3100 kcal ME), thereafter a finisher diet to 42 day (18% CP and 3153 kcal ME). The diets and water were provided ad libitum. The broilers were housed in battery cages. The lighting regime provided 24 hours of continuous light per day.

Table 1 Structure and nutritional composition of standard diets

Feed ingredients	UM	Starter 0-14 day	Grower 15-28 day	Finisher 29-42 day
Corn	%	61.00	65.00	65.00
Soybean meal	%	28.00	23.00	23.00
Full-fat soybean	%	2.00	4.00	7.00
San flowers	%	1	-	-
Gluten de porumb	%	1.00	1.00	-
Fish meal	%	400	3.50	-
Vegetable oil	%	-	0.50	1.50
L-Lysine	%	0.05	0.10	0.05
DL- methionine	%	0.20	0.20	0.20
Calcium	%	0.45	0.45	0.75
Dicalcium phosphate	%	1.10	1.00	1.15
Salt	%	0.15	0.20	0.30
Vitamin and minerals premix	%	1.00	1.00	1.00
Kemzyme VP dry	%	0.05	0.05	0.05
Total	%	100	100	100
Analysis				
kcal /kg		2995	3100	3153
Crude protein	%	23	20	18
Crude fiber	%	3.25	3.33	3.01
Eter extract	%	4.51	4.01	6.01
Ash	%	6.12	6.05	6.33
Lysine	%	1.36	1.17	1.00
Methionine +Cistine	%	1.00	0.90	0.82
Ca	%	1.03	0.95	0.91
P	%	0.76	0.66	0.61

The body weights of the bird were measured individually a 1, 14, 28 and 42 day of the experiment. Feed intake was recorded biweekly. Feed conversion efficiently was

calculated at the end of the 42 day experimental period. Oregano essential oil was purchased from Hofigal a Romanian company. The data results were to statistical

analysis of variance and were significant differences were observed. The results were considered as significant when p values were less than 0.05 and 0.01. It also has to be mentioned that research has been carried out in an isolated space where a reduced number of persons had access, and the chickens were not previously vaccinated.

RESULTS AND DISCUSSIONS

The results of this experiment towards the goal up for to determine the effect of oregano oil on broiler performances. The research on the effects of the oregano oil has revealed a

series of results to be presented as follows. Mean live body weight (LBW) and body weight gain (BWG) of broilers during the experimental period are summarised and presented in Table 2. The best average body weight was noticed at broilers from group L3, which at the age of 42 days had an average weight of 2484g, with the best daily live weight of 59.14g. Compared to the control group, the other groups treated with various levels of savory oil had daily average intakes higher with 1.5% (L1), 2 % (L2) and 4.1 % (L3) (p <0.05).

Table 2 The effect of different dietary concentrations of oregano on the live body weight and body weight gain

Results	LM -	L1 0.3% oregano oil	L2 0.5% oregano oil	L3 1% oregano oil
Live body weight (g)				
0-14 days	415	431	440	441
15-28 days	864	875	880	894
29-42 days	1086	1095	1143	1149
0-42days	2365 ^a	2401	2463	2484 ^b
Body weight gain g/bird/day				
0-14 days	29.64	30.78	31.42	31.50
15-28 days	61.71	62.50	65.85	63.85
29-42 days	77.57	78.21	81.64	83.50
0-42days	56.30	57.16	58.64	59.14

• ^{a,b} means withing same column having different letters are significantly different (p<0.05)

The effect of the oregano oil was different from that of the control group and had an impact over the feed intake and its

conversion, registering significant differences (p <0.05) (table 3).

Table 3 The effect of different dietary concentrations of oregano oil on the daily feed intake of broilers (g/bird/day)

Results	LM -	L1 0.3 % oregano oil	L2 0.5 % oregano oil	L3 1% oregano oil
g/bird/day				
0-14 days	564	40.2	586	42
15-28 days	1516	108	1525	109
29-42 days	2512	179	2473	176
0-42days	4586	109	4584	109
			588	42
			1544	110
			2523	180
			4655	111
			573	41
			1555	111
			2470	176
			4598	109

By administering of 1% essential oregano oil (L3), the food conversion improved by

4% compared with the control group, and followed by L2 (2%), L1 (1.5%) (table 4).

Table 4 The effect of different dietary concentrations of oregano oil on the feed conversion ratio (g feed/g gain)

Results	LM -	L1 0.3 % oregano oil	L2 0.5 % oregano oil	L3 1% oregano oil
0-14 days	1.35	1.35	1.33	1.29
15-28 days	1.75	1.74	1.75	1.74
29-42 days	2.31	2.25	2.20	2.15
0-42days	1.93 ^a	1.90	1.89	1.85 ^b

• ^{a,b} means withing same column having different letters are significantly different (p<0.05)

The different results obtained from the groups that were administered oregano oil were determined by the quantity of bioactive substances contained, carvacrol, linalool, borneol, α și γ -terpinen, α și β -pinen. Essential oregano oil had positive effects on the pathogen organisms, the digestive enzyme secretions and on the liver. Our experiments have proved that a level of 1% of essential oregano oil has positively influenced the weight gain and the feed conversion. Our obtained results are in accordance with those of other research carried out by Ertas and al. 2005, in which case following the administration of 200 ppm of an essential oils mixture (oregano, clove and anise) one notices improvement in the growth performance of live broilers. Similar results have been reported by Ciftici et al., 2005 after the use of essential anise oil; Jamroz and Kamel 2002 by using a product from plant extracts; Al-Sultan 2003 using a 0.5 % tumeric plant; Zhang et al., 2005 using essential oils and Gahazalan and Ali 2008 using rosmarin.

CONCLUSIONS

Studies carried out in the past 5 years on the use of aromatic and spicy medicinal herbs in broilers' feed have extended. All groups that received oregano oil had better results than the control group. The main conclusion was that the use of these plants as powder and of the extracted essential oils determine a high growing performance and a very good feed conversion. The addition of 1% oregano oil to the diet was improved daily live weight by 5% and feed conversion ratio by approximatley 4 % compared to the control group. The research shows that the essential

oregano oil may be considered a as a potential natural growth promoter for poultry.

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