

THE EFFECT OF SAGE (*SALVIA OFFICINALIS*) ESSENTIAL OIL ON BROILER PERFORMANCE

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Abstract

Different levels of sage oil added to standard diet, to determine its effect on weight gain, daily weight gain, and feed conversion ratio compared to control antibiotic group. One hundred day-old broilers (Ross-308) were divided into groups of 25 chicken each, and randomly assigned to based diet. Experimental groups were as follow: E control group, E1 a 0.5% sage oil group, E2 a 1% sage oil group, E3 a 2 % sage oil group. The highest ($p < 0.01$) weight gain was observed on the E3 (2919 g), and followed by E2 (2751 g), E1 (2729 g) and E (2698 g). The addition of sage oil on the diets improved daily live weight by approximately 1% (E1), 2% (E2) and 8% (E3) compared to the control group. In conclusion the results show that sage essential oil of could be considered a potential natural growth promoter for poultry.

Key word: essential oil, , antibiotics, 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 remanescence 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). *Salvia officinalis* (garden sage, common sage) is a small, perennial, evergreen subshrub, with woody stems, grayish leaves, and blue to purplish flowers. It is a member of the family Lamiaceae and is native to the Mediterranean region, though it has naturalized in many places throughout the world. It has a long history of medicinal and culinary use, and in modern times as an ornamental garden plant. The common name "sage" is also used for a number of related and unrelated species. The pharmacodynamic action of the sage is bioactive components, acting synergistically, has as main actions the salt secretive, stomachic, antispasmodic, antidiarrheic, anti-infections (antibacterial, antiviral, antiparasitic and antifungal), immuno-stimulating and analgesic (Istudor, 2001). In this study, we aimed to use sage oil in broiler nutrition as a natural additive as an alternative to antibiotics. For this purpose different levels of sage oil were added in standard diet, and studied so as to determine the effect on performance compared to control antibiotic group.

MATERIALS AND METHODS

One hundred day-old broilers (Ross-308) were divided into four groups of 25 chickens each, and randomly assigned to based diet. The presence and levels of sage oil in standard diet were the main factors tested. Three different levels of sage oil or antibiotic were added to standard diets to generate the other four treatment groups. Experimental groups were as follows: E control group E1 a 0.5% sage oil group, E2 a 1% sage oil group, E3 a 2% sage oil group. Sage 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 days (23% CP and 2995 kcal ME), a grower diet 28 days (20% CP and 3100 kcal ME), thereafter a finisher diet to 42 days (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

<i>Structure and nutritional composition of standard diets</i>				
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 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. Sage essential oil was purchased from Hofigal. 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.

REZULTS AND DISCUSSION

The results of this experiment towards the goal up for to determine the effect of sage oil and the antibiotic The research on the effects of the sage essential 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 E3, which at the age of 42 days had an average weight of 2919 g, with the best daily live weight of 69, 50 g. Compared to the key group, the other groups

treated with various levels of sage oil had daily average intakes higher with 1% (E1), 2% (E2) and 8 % (E3) ($p < 0.05$).

Table 2

The effect of different dietary concentrations of sage oil on the live body weight and body weight gain

	E	E1	E2	E3
Sage essential oil				
	-	0.5 % sage oil	1 % sage oil	2 % sage oil
Live body weight (g)				
0-14 days	441	458	460	466
15-28 days	998	995	1014	1065
29-42 days	1269	1276	1276	1388
0-42days	2698*	2729	2751	2919*
Body weight gain g/bird/day				
0-14 days	31.5	32.71	32.85	33.28
15-28 days	70.57	71.07	72.42	76.08
29-42 days	90.64	91.14	91.18	99.14
0-42days	64.23*	64.97	65.50	69.50*

- means withing same column having different letters are significantly different ($p < 0.05$)

The effect of the sage oil was different from that of the antibiotic and had an impact over the feed intake and its conversion, registering significant differences ($p < 0.05$) (table 3). By administering 2% of essential sage oil, the food conversion improved by 5% compared with the control group, by 3% if we compare it with the E2 group and by 3.5% in comparison with group E1(table 4).

Table 3

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

(g/bird/day)								
	E		E1		E2		E3	
Sage essential oil								
	-		0.5 % sage oil		1 % sage oil		2 % sage oil	
g/bird/day								
0-14 days	564	40.2	586	42	588	42	596	42.5
15-28 days	1516	108	1525	108	1544	110	1604	114
29-42 days	2512	179	2473	176	2462	175	2528	180
0-42days	4586	109	4584	109	4594	109	4728	112

The different results obtained from the groups that were administered sage oil were determined by the quantity of bioactive substances contained, thymol and carvacrol.

Table 4

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

	E	E1	E2	E3
Sage essential oil				
		0.5 % sage oil	1 % sage oil	2 % sage oil
0-14 days	1.28	1.29	1.28	1.28
15-28 days	1.52	1.53	1.52	1.50
29-42 days	1.97	1.93	1.93	1.88
0-42days	1.70*	1.68	1.67	1.62*

- means withing same column having different letters are significantly different (p<0.05)

Essential sage oil had positive effects on the pathogen organisms, the digestive enzyme secretions and on the liver. Our experiments have proved that a level of 2% of essential sage 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 ., 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.

CONCLUSION

Studies carried out in the lest years on the use of aromatic and spicy medicinal herbs in broilers' feed have extended. 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 2% sage oil to the diet was improved daily live weight by 8% and feed conversion ratio by approximatley 5% compared to the contol group. The research shows that the essential oil of *Salvia officinalis*. may be considered a as a potential natural growth promoter for poultry, especially if administered at a level of 2 %.

REFERENCE

1. AL-SULTAN, S.I. 2003 The effect of *Curcuma longa* (tumeric) on overall poerformance of broiler chichens. J.Poultry Science 2 (5):351-353
2. GAHAZALAN, A.A. AND ALI A.M. 2008. Rosemary leaves as a dietary supplement for growth in broiler chickens J. Poultry Science 7 (3):234-239
3. ERATS, O.N., GÜLER, T., CIFTICI, M., DALKILIC, B., 2005 – The effect of on essential oil mixed derived from oregano, clove and anise on broiler performance. I. J. Poultry Science 4 (11) 879-884.
4. CIFTICI, M., GÜLER, T., DALKILIÇ, B., ERTAS, N.O., 2005. The effect of anise oil (*Pimpinella anisium* L.) on broiler performance. I. J. of Poultry Science 4 (11) pg. 851-855
5. HERNANDEZ, F., MADRID, J., GARCIA, V., ORENGO, J., MEGIAS, M.D., 2004 – Influence of Two Plant Extracts on Broilers Performance, Digestibility, and Digestive Organ Size . Poultry Science, vol. 83, pg. 169-174.
6. ISTUDOR, VIORICA, 2001 –Farmacognozie phytochimcale phytotherapy vol. II.. Ed. Medical Bucharest.
7. JAMROZ , D., KAMEL, C., 2003– Plant extract enhance broiler performance. J Animal Science 80 (Suppl.1):4, pg. 41.
8. LEE, K.W., EVERTS, H., KAPPERT, H.J., FRECHNER, M., LOSA R., BEYNEN, A.C., 2004 – Effects of dietary essential oil components on growth performance, digestive enzymes and lipid metabolism in female broiler chickens. Pub. Med. Br. Polit.Sci., Jul, 45 (4):452-14
9. ZHANG, K.Y., YAN, F., KEEN, C.A. WALDROUP, P.W. 2005 – Evaluation of Microencapsulated Essential Oils and Organic Acids in Diets for Broiler Chickens. I. Journal of Poultry Science 4 (9): 612-619, 2005