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Short Communication

EFFECT OF SATURATED AND UNSATURATED FATTY ACIDS IN BROILER DIETS

Jabar Jamaly and Ebrahim Babaahmady

Animal science Faculty and veterinary Faculty, Ilam University, Ilam, Iran

jamali_jabar@yahoo.com ebrahim_12@yahoo.com

ABSTRACT : The experiment was conducted to determine the effects of different fat sources on broiler performance. 192 broiler chicks were used in this experiment with four different dietary treatments and four replications for each treatment and 12 chicks per cage. Chicks were fed for 5 weeks (end of first week of the end of sixth week), with the same energy and protein diets, for the starter period (7 to 21 days) and growth (22 to 42 days). The diets were included: Control diet; a diet containing 5% tallow; Diet containing 5% soybean oil; Tallow and soybean oil diets containing an equal mixture. All diets were in powder form and chickens were fed freely during the period. Food intake and weight were measured at the end of each period. Data were analyzed using statistical software SAS. The results showed higher weight gain of chickens, in the initial period, the period of growth and fat in diets for the whole period, compared to the control diet, ($P < 0.01$). And chicks that were fed with a mixture containing tallow and soybean oil, during the period of the total growth, received the highest weight gain ($p < 0.01$). Diets had no effect on feed consumption in starter period ($P > 0.05$), but during the whole period of growth, chicks were consumed fed diets, containing a mixture of tallow and soybean oil and soybean oil diet had higher feed intake ($p < 0.01$) compared to the control diet. In the initial period of mixed diets containing tallow and soybean oil and soybean oil diet, improved feed conversion compared to the control diet ($p < 0.01$) and during the growth and all of the period, all diets containing fat had better feed conversion ($p < 0.01$) than the control diet, And mixed diets containing tallow and soybean oil alone to both of them, was improved the feed conversion ($p < 0.01$).

Key Words: Saturated, unsaturated, fatty acids, performance, broiler chickens

INTRODUCTION

Lipids are added to poultry rations primarily to high-energy compounds [11, 6]. Vegetable oils such as soybean oil contain high levels of unsaturated fatty acids and are digested by birds, more than animal fats (including tallow). Fatty acids derived from tallow fatty acids, especially, are very saturated and young birds may not be able to digest them well [9]. When animal fats and vegetable oils are added to poultry diets there is a synergism between animal fats and vegetable oils [7]. Adding soybean oil to tallow, mixture of metabolizable energy is superior to the sum of their individual [13]. Sanz and colleagues (2000) reported that broilers are fed, with diets rich in unsaturated fatty acids with double bonds, containing less abdominal fat or total fat than the broilers are fed with diets saturated fatty acids [12]. Some unsaturated fatty acids such as linoleic acid are essential for humans and animals [10] and should be added to their diets. In general, solvent-soluble vitamins fat as an energy source, reducing dust in diet, use of the cube and its role in dietary palatability are important for broilers. Efficiency in energy use due to high fat diet can also be due to lower heat produced by these diets. Storage tissues are affected by dietary fat [1]. The use of fatty acids in the diet increased the accumulation of abdominal fat and increase carcass [8]. This experiment was to investigate the effects of dietary fat sources on growth performance of broiler chickens. It is better to remember table 1.

MATERIALS AND METHODS

192 broiler chicks were used in this experiment with four different dietary treatments and four replications for each treatment and 12 chicks per cage. Food and water consumption as much appetite for chickens and it was optional. Plan was applied an hour and 23 hours dark photoperiod and room temperature was kept between 22-35 ° C to 42 days. Chick starter diets from age 8 to 21 days and growth from age 22 to 42 days were fed with the same energy and protein. The diets included a control diet - a diet containing 5% animal fat - diet containing 5% soybean oil - mixed diets were equal containing animal fat and vegetable oil. Chickens test day were weighed, 21 days and 42 days of experiment. Record daily food intake and feed conversion ratio for each period (g food/g body weight) was calculated. Data collected for analysis of variance were analyzed with SAS statistical software and Duncan means comparison test was performed on a slope.

RESULTS AND DISCUSSION

According to Table 2, the results show that during the starter diets containing fat, the higher weight gained than the control diet; the results of the test are concord to (Beigi Abadi et al., 1381), but is contrary with the results of the experiment of Yousefi (1384), due to the differences in use of the fat. Growth during the entire experimental period, the fats in the diet improved live weight gain (Table 2). These results are concord with the results of Yousefi (1384). Mixture of tallow and vegetable oil in the diet during the growing period obtained the higher weight gain than the two diets containing tallow and soybean oil diet.

Table 1 - Percentage of materials, components and nutrients in broiler diets

Materials, components and nutrients	Starter period				growth period			
	Control	Tallow	Soybean	Tallow+ Soybean	Control	Tallow	Soybean	Tallow+ Soybean
Corn	44/61	79/46	15/44	16/46	42/66	68/47	89/45	89/48
Soybean meal	62/29	02/30	30/30	30	66/24	54/22	17/22	90/22
Fish meal	5	5	5	5	5	5	5	5
Bran	46/0	30/7	8	7/7	46/0	43/16	57/18	88/14
Dicalcium phosphate	72/0	60/0	60/0	60/0	68/0	31/0	27/0	34/0
Lysine	11/0	09/0	08/0	09/0	18/0	19/0	19/0	18/0
Methionine	29/0	31/0	31/0	31/0	30/0	33/0	34/0	33/0
Salt	19/0	19/0	22/0	22/0	19/0	21/0	19/0	14/0
Oyster	1	06/1	06/1	06/1	93/0	13/1	15/1	11/1
Fat	-	5	5	5	-	5	5	5
Baking soda	12/0	12/0	15/0	12/0	13/0	13/0	18/0	18/0
Sand	-	47/2	08/4	69/2	-	-	-	-
A vitamin supplement	5/0	5/0	5/0	5/0	5/0	5/0	5/0	5/0
Mineral supplement	5/0	5/0	5/0	5/0	5/0	5/0	5/0	5/0
coccidiostat	05/0	05/0	05/0	05/0	05/0	05/0	05/0	05/0
Sum	100	100	100	100	100	100	100	100
Nutrients provided								
Metabolisable energy Kcal / Kg	2926	2926	2926	2926	2968	2968	2968	2968
Crude protein (%)	39/2 1	39/21	39/21	39/21	63/19	63/19	63/19	63/19
Ca (%)	95/0	95/0	95/0	95/0	90/0	90/0	90/0	90/0
P (%)	50/0	50/0	50/0	50/0	48/0	48/0	48/0	48/0

1. Vitamin supplement containing: 500000 IU/gr Vitamin A., 15/98% vitamin B₁., 80 % Of vitamin B₂., 98% of vitamin B₃., 99% vitamin B₅., 5/98% vitamin B₆., 80% vitamin B₉., 1% vitamin B₁₂., 50% of vitamin K₃., 50% choline chloride and the carrier material containing antioxidant include wheat bran, corn flour and CaCO₃.
2. Mineral supplement containing: Manganese oxide with a purity of 62%., Iron sulfate II 20%., 77% zinc oxide., copper sulfate, 25%., Iodated Calcium 62%., Permiks selenium 1%, choline chloride 50% with materials containing wheat bran, corn flour and CaCO₃.

The weight gain due to the Synergism effects of animal fats and vegetable oils that there are between them (7). Higher weight gain, is product the fat diets than the control diet during the whole period of growth and due to lower heat which produced by the diets (1). According to Table 2, none of the experimental diets did not affect food intake during the starter period, Yousefi 1384 also reported these results. But during the whole period of growth, a diet containing soybean oil and soybean oil and animal fat mixed diet was consumed much more food compared to the control diet. FCR during the starter in mixed diets containing soybean oil and animal fat and vegetable oil was better than the control diet. Feed conversion coefficient during the starter period in mixed diets containing soybean oil and animal fat and vegetable oil was better than the control diet. In this period, tallow diet showed no significant difference with the control diet. And feed conversion in diets containing tallow not better than the control diet, the better efficiency of metabolizable energy in fat (because of low heat production) due to the young birds are not able to use better of saturated fats (9). Better feed conversion coefficient is achieved due to the high weight gain (Table 2). Aminoroaya (1377) reported similar results. During the whole period of growth, feed conversion coefficient in diets containing fat was better than control diet. These results had concord with the results of Yousefi (1384). A significant difference was obtained between diets containing soybean oil and animal fat. This result is concord with Arman that reported in 2004.

During the period of growth and total mixed diets containing animal fat and vegetable oil feed better than the other two diets containing fat was obtained. During the whole period of growth, the mixed diets containing animal fat and vegetable oil was obtained feed conversion coefficient better than the other two diets containing fat. Better feed conversion coefficient from mixed vegetable oil and animal fats are due to the fats Synergism effects [4].

Table 2. Effect of different dietary treatments on live weight gain, feed intake and feed conversion coefficient.

	period	control	Tallow	Soybean	Tallow + Soybean	p
Live weight gain (gr)	Starter	a 50/411	b 50/464	b 75/482	b 75/491	**
	growth	a 00/1189	b 00/1307	b 00/1447	c 50/1475	**
	Total period	a 50/1600	b 25/1772	b 75/1829	c 25/1967	**
Food consumption (gr)	Starter	a 00/714	a 50/741	a 00/750	a 75/763	NS
	growth	a 50/2637	ab 50/2727	bc 00/2840	c 00/2900	**
	Total period	a 50/3371	ab 00/3469	bc 75/3590	c 75/3663	*
Feed conversion coefficient (gr gain / gr food)	Starter	a 74/1	ab 60/1	b 55/1	b 56/1	*
	growth	a 22/2	b 09/2	b 11/2	c 97/1	**
	Total period	a 11/2	b 96/1	b 96/1	c 86/1	**

Mean that in each row are shown with similar letters, No significant difference (p<0.05).

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