Global Veterinaria 6 (4): 424-425, 2011
ISSN 1992-6197

Vegetable Unsaturated Oil Could Alter Saturated Fatty Acids Ratio in Abdominal Fat of Native Turkey (*Meleagris gallopavo*)?

Ramin Salamatdoustnobar, Abolfazl Ghorbani and Kambiz Nazeradl

Department of Animal Science, Shabestar Branch, Islamic Azad University, Shabestar, Iran

Abstract: This experiment was performed using 90 male native Azerbaijan turkey for evaluation the effect of canola oil feeding on the alteration of abdominal fat saturated fatty acids composition. Turkey chicks randomly divided into three experimental treatments with three replicates were arranged in a completely randomized design. The experimental period lasted 20 weeks. Experimental diets consisted of: basal diet with 0, 2.5 and 5 percent of canola oil. Results showed that canola oil significantly alter saturated fatty acid and total saturated fatty acid percentage in abdominal fat of turkey.

Key words: Native turkey · Canola oil · Abdominal fat · Saturated fatty acids

INTRODUCTION

Oilseeds such as canola have been used in diets of animal to increase unsaturated, long-chain fatty acids at the expense of medium-chain fatty acids such as C14:0 and C16:0 in milk [1]. Canola and other temperate vegetable oils are composed predominantly of unsaturated 18-carbon fatty acids: the monounsaturated oleic (18:1) and polyunsaturated linoleic (18:2) and linolenic (18:3) acids. In addition to these fatty acids, most oils also contain small but significant amounts of the saturated palmitic (16:0) and stearic (18:0) acids. It is widely known that the melting point of chicken fat is dependent upon its fatty acid profile [2] and that it is possible to customize this fatty acid composition by dietary intervention [3]. The aim of this experiment was to assess the effects of canola oil on the saturated fatty acid of abdominal fat.

MATERIALS AND METHODS

Birds and Diets: The research was performed with 90 male native Iranian turkeys during the period from 4th to 20th week of age. Chicks with completely randomized design of 3 treatments, with 3 repetitions and 10 chicks in each box were fed experimental diets containing 0% CO(T1), 2.5% CO(T2) and 5%CO (T3) in the fattening period. Experimental diets prepared as the isonitrogenouse and isoenergetic, accordance with the 1994 recommendations of the National Research Council [4] (Table 1). The birds were allowed access to water and diets *ad-libitum*. At the end of the breeding period, two number of each pen randomly selected and after slaughtering, abdominal fat collected and stored at -20°C until analysis. Fatty acid composition was determined by gas chromatography (GC). Data were analyzed in a complete randomized design using the GLM procedure of SAS [5] and mean compared with Duncan multiple range test.

RESULTS AND DISCUSSION

Results of saturated fatty acids of abdominal fat are shown in Table 1. Results showed that Myristic Acid (C14:0) and Behenic Acid (C22:0) fatty acids among treatment were not significant, but only numerically with ascending rate compared control group have increased, while Pentadecylic Acid (C15:0) decreased and from 1.2771 percent in control group reach to 0.5059 and 0.3885 percent, respectively in experimental treatments. Palmitic Acid (C16:0) significantly affected experimental diets and from 28.4081 reached to 18.7950 and 17.4684 percent in experimental treatment also Arachidic Acid (C20:0) have decrease rate and from 2.1870 percent reached to 1.5371 and 1.0091 percent in treatment and for Stearic Acid (C18:0) usage canola oil could increased from 8.9256 to 9.3932 and 10.7676 percent respectably in experimental treatments. This condition could affect total

Corresponding Auhtor: Ramin Salamatdoustnobar, Department of Animal Science, Shabestar Branch, Islamic Azad University, Shabestar, Iran, E-mail: r.salamatdoust@gmail.com.

Table 1: Least square means for saturated fatty acids percentage of abdominal fat

	Control	2.5	5	P value	SEM
Myristic Acid (C14:0)	1.2165a	1.4522a	1.3742a	0.7390	0.2131
Pentadecylic Acid (C15:0)	1.2771a	0.5059a	0.3885a	0.1375	0.2882
Palmitic Acid (C16:0)	28.4081a	18.7950b	17.4684b	0.0001	0.4044
Stearic Acid (C18:0)	8.9256b	9.3932b	10.7676a	0.0083	0.2789
Arachidic Acid (C20:0)	2.1870a	1.5371ab	1.0091b	0.0986	0.3160
Behenic Acid (C22:0)	1.7060a	2.0410a	2.0112a	0.8309	0.4247
Saturated fatty acid (Satu)	43.720a	33.724b	33.0190b	0.0002	0.8368
Unsaturated fatty acid (Unsatu)	54.518b	64.647a	65.6880a	0.0112	1.9146
Satu/unsatu	0.8031a	0.5218b	0.5031b	0.0001	0.0156
Unsatu/satu	1.2766b	1.9717a	2.0711a	0.0005	0.0741

of saturated fatty acid of abdominal fat and significantly decreased and from 43.720 percent in control group reached to 33.724 and 33.0190 percent for experimental treatments. This condition have reverse effects on the unsaturated fatty acid and increased levels of that with usage canola oil in experimental treatments and from 54.518 percent in control group significantly increased in treatment containing 2.5 and 5 percent canola oil, 64.647 and 65.6880, respectively. Obviously this condition affect ratio of saturated fatty acids to unsaturated fatty acids (satu/unsatu) and from 0.8031 reached to 0.5218 and 0.5031 and unsaturated ratio to saturated fatty acids significantly from 1.2766 reached to 1.9717 and 2.0711 in experimental treatment, respectively. Effect of feeding different fat sources on saturated fatty and polyunsaturated fatty acids were affected more severely [6]. Fat firmness and melting point are dependent upon the fatty acid profile, which, in turn, can be modified by dietary means [7-9].

In conclusion, results of the present experiment showed that canola oil could alter saturated fatty acid and total saturated fatty acid percentage in abdominal fat of turkey.

ACKNOWLEDGMENT

Financial support for this study (Islamic Azad University, Shabestar Branch) was provided.

REFERENCES

1. Khorasani, G.R., P.H. Robinson, G. De Boer and J.J. Kennelly, 1991. Influence of canola fat on yield, fat percentage, fatty acid profile and nitrogen fraction in Holstein milk. J. Dairy Sci., 74: 1904-1911.
2. Hrdinka, C., W. Zollitsch, W. Knaus and F. Lettner, 1996. Effects of dietary fatty acid pattern on melting point and composition of adipose tissues and intramuscular fat of broiler carcasses. Poultry Sci., 75: 208-215.
3. Yau, J.C., J.H. Denton, C.A. Bailey and A.R. Sams, 1991. Customizing the fatty acid content of broiler tissues. Poultry Sci., 70: 167-172.
4. National Research Council, 1994. Nutrient Requirements of Poultry. 9th rev. ed. National Academy Press, Washington DC.
5. SAS Institute, 1988. SASâ User's Guide: Statistics. SAS Institute Inc., Cary, NC.
6. Valencia, M.E., E.S. Watkins, P.W. Waldroup, A.L. Waldroup and D.L. Fletcher, 1993. Utilization of crude and refined palm kernel oils in broiler diets. Poultry Sci., 72: 2200-2215.
7. Hulan, H.W., F.G. Proudfoot and D.M. Nash, 1984. The effects of different dietary fat sources on general performance and carcass fatty acid composition of broiler chickens. Poultry Sci., 63: 324-332.
8. Sklan, D. and A. Ayal, 1989. Effect of saturated fat on grwoth, body fat composition and carcass quality in chicks. Br. Poult. Sci., 30: 407-411.
9. Sanz, M., A. Flores and C.J. Lopez-Bote, 1999. Effect of fatty acid saturation in broiler diets on abdominal fat and breast muscle fatty acid composition and susceptibility to lipid peroxidation. Poultry Sci., 78: 378-382.