INVESTIGATIONS ON THE EFFECTS OF ARTICHOKE (CYNARA CARDUNCULUS VAR. SCOLYMUS) EXTRACT ON 35 – 42 DAYS BLOOD LIPID PARAMETERS OF BROILER CHICKENS

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ABSTRACT

Pharmacological plants are developed as additive in animal feeds. These plants are very important for the improvement of the global poultry industry. This experiment studied the effects of artichoke extract on concentrations of triglyceride, cholesterol, very low lipoprotein (VLDL), high density lipoprotein (HDL) in broiler chickens at 35 and 42 days. The experimental designed was a randomized complete block design (RCBD) with 5 treatments (0, 100, 200, 300 and 500 mg of artichoke extract per liter of water) and 4 replications. Each replication had 10 chickens, out of which 2 chicken were selected for the evaluation of the lipid profile at days 35 and 42. Fasting blood samples were collected for the analyses of triglyceride, cholesterol, very low lipoprotein, High density lipoprotein levels in the serum of the broiler chickens. The result showed that administration of artichoke extract had no effect on blood lipid components at 34 and 42 days. Comparison between concentrations of triglyceride, cholesterol, very low lipoprotein and high density lipoprotein were significantly different (p<0.05). High level of artichoke extract (500 mg/l) had no effect on blood parameters.

Keywords: Artichoke extract, Triglyceride, Cholesterol, High density lipoprotein, Very low lipoprotein, Broiler chicken

INTRODUCTION

In literature there is a linear relationship between serum lipid and coronary disease in animals. Concentration and type of lipid in broiler chicken has effect on the health status of the bird (Qureshi and Dinzz, 1983). Some components in plants decrease blood fat (Westendarp, 2005). Artichoke (Cynara cardunculus var. scolymus) is a pharmacological plant with hypolipidemic potentials (Ziae et al., 2004). Artichoke has been used since 14 century in medical sciences for the treatment of cholestrolemia, triglyceridemia and has hepatoprotective properties (Brand et al., 1992; Zargari, 2003). Artichoke extract has protective activity in liver. Clinical study had shown that artichoke leaves extract decreases blood fats and thus useful for the treatment of arteriosclerosis (Safaikhorram et al., 2010).

Phytochemical present in artichoke includes saponin, insulin, sinaroeptin, synarine, carbohydrate, enzymes, chlorogenic acid and flavonoids. Therapeutically, artichoke extract has been used since 14 century in medical sciences for the treatment of cholestrolemia, triglyceridemia and has hepatoprotective properties (Brand et al., 1992; Zargari, 2003). Artichoke extract has protective activity in liver. Clinical study had shown that artichoke leaves extract decreases blood fats and thus useful for the treatment of arteriosclerosis (Safaikhorram et al., 2010).

Active compounds in the leaf extract of artichoke inhibit cholesterol biosynthesis,
decrease blood glucose and have antioxidant properties (Qureshi and Dinzz, 1983). Applying artichoke leaves in feed stuff, increase total bile secretion and improves digestibility in human, and decreases cholesterol in hypercholesterolemia (Kraff, 1997). Using artichoke extract in rat feed, stimulated bile secretion. Stimulation of bile, improves digestion phases and energy utilization. This function is because of improvement of emulsifiers in intestine. Artichoke extract has positive effect on fat digestion (Seanz et al., 2002). Artichoke extract inhibits synthesis enzyme that involves in cholesterol production, low density lipoprotein oxidation and arteriosclerosis (Radwan et al., 2007). These beneficial activities of artichoke extract guided the current investigation on some parameters of blood cholesterol, triglyceride, HDL, VLDL and LDL in broilers. Whereby the parameters involved liver fat, arteriosclerosis and abdominal fats, measurement of them could be helpful in disease prevention, improved carcass quality in poultry industry and thus supply healthy lean poultry meat to members of the communities.

MATERIAL AND METHODS

Artichoke Extract
Samples of *Cynara cardunculus* var. *scolymus* were collected and authenticated at the herbarium of the Baridj Esans Company, Khorramabad, Iran. It was dried under shade at ambient temperature before extraction. Dried *C. cardunculus* plants (2.0 kg) were crushed to powder and boiled to tender in 2 liters of water. The cold solution was filtered and evaporated to dryness using a rotary evaporator. The extract was re-suspended in water before administration.

Experimental Animal

In this experiment 200 broilers chicken one day old (male and female) commercial strain Kap were used. Broilers were reared up to 21 days by usual rearing, then labeled wing number and located in pens. Four diet pre-starter, starter, grower and finisher were used, and rations were analyzed with the help of UFFDA software (Piotrowska et al., 2011) and the details of feeds and their nutrients are listed (Table 1). The experimental design adopted was randomized complete block design (RCBD) comprising of five treatments with four replications each. Each replication had 10 broilers (male and female).

Blood Lipid Analyses

The treatments were 0 (control), 100, 200, 300 and 500 mg/liter of artichoke aqueous extracts. Artichoke extract was added at 21 – 35 days. After 24 hour, daily residual water was calculated at all of period experiment. At the end of 35 and 42 days two chickens were selected randomly from each of pen. After 4 hour fasting blood sample from wing veins were collected for analyses of blood lipid parameters. Blood samples were stored at room temperature for clotting and centrifuged at 3500 rpm for five minute for blood serum separation and collection. Blood parameters analyzed using autoanalyzer equipment (SELECTRA). For the estimation of triglyceride and cholesterol spectrophotometric method and Pars azmoon kits were used respectively. Boirex kit with spectrophotometric method was used for estimation of HDL. Freidewald formula was used in calculation of the VLDL concentrations from triglyceride value thus: VLDL = c = TG/5 (Friedewald et al., 1972).

Data Analysis

Experimental data were analyzed using SAS software and general linear model (GLM). Means comparison were calculated using multiple domains Danken (SAS, 2009). Statistical model used was: Xijk = µ + Ti + Bj + eijk, where Xijk = observation, µ = mean of the population, Ti = treatment effect, Bj = replication effect and eijk = error of experiment.

RESULTS AND DISCUSSION

Effects of artichoke extract on some blood lipid parameters are presented in Table 2. There was no marked response on the effect of artichoke extract on the blood lipid metabolites consisting