Research Paper Animal Science

Effect of Feeding Dried Tuna Waste Silage on Blood Lipid Profile in Large White Yorkshire Pigs

Anuraj K. S. PhD scholar, Animal Nutrition Division, Indian Veterinary Research Institute, Izatnagar, U.P.-243122.

Shyama K. Asst. Professor, Animal Nutrition, College of Veterinary & Animal Sciences, Mannuthy, Kerala-680651.

Hari Abdul Samad Ph.D Scholar, Division of Physiology and Climatology, Indian Veterinary Research Institute, Izatnagar, U.P.-243122.

ABSTRACT

An investigation was carried out for a period of 104 days on thirty six weaned Large White Yorkshire piglets to find out the effect of dietary incorporation of dried tuna waste silage on blood lipid profile. Dried tuna waste silage was used to replace dried fish on protein basis at 0, 50 and 100 per cent, in isocaloric and isonitrogenous grower and finisher rations as dietary treatments T1, T2 and T3, respectively. All the animals were maintained on their respective dietary regimen from weaning to an average slaughter weight of 70 kg. Blood samples were collected at the beginning and end of the experiment and analysed for different blood lipid profile. The initial lipid profile of experimental piglets was 30.00 mg/dl of triglycerides, 55.54 mg/dl of total cholesterol and 42.88 mg/dl of HDL cholesterol The blood plasma contained 47.02, 27.44 and 26.90 mg /dl of triglycerides, 83.28, 87.25 and 101.62 mg /dl of total cholesterol and 58.48, 68.70 and 65.87 mg /dl of HDL cholesterol of experimental animals of groups T1, T2 and T3, respectively at the end of the experiment.

KEYWORDS Piglets, Dried tuna waste silage, blood lipid profle.

INTRODUCTION

Conversion of fish processing waste into fish silage is one of the cheaper alternatives for its utilization as animal feed and to mitigate the protein deficit and environmental pollution in the country. The liquid fish silage blended with filler materials such as cereals, cereal by-products and crop residues can be dried using conventional dryers. Co-dried fish silage has been used as protein supplement in livestock and poultry rations. The present experiment was aimed to study the effect of dried tuna waste silage on blood lipid profile in Large White Yorkshire pigs.

MATERIALS AND METHODS

An experiment was carried out for a period of 104 days to study the effect of dietary incorporation of dried tuna waste silage on blood lipid profile in pigs.

Experimental Animals

Thirty six Large White Yorkshire weaned piglets (18 male and 18 female), belonging to the Centre for Pig Production and Research, Mannuthy were used as experimental animals. Male piglets were castrated and all the animals were vaccinated against Classic Swine Fever (CSF) and were dewormed before the commencement of the experiment.

The piglets were divided into three groups as uniformly as possible with regard to age, sex and weight. Piglets of each group were allotted randomly into six pens with two piglets in each pen and were allotted to three dietary treatments (T1, T2 and T3).

Housing and Management

Piglets in each replicate were housed in separate pens in the same shed with facilities for feeding and watering. All animals were maintained under identical management conditions. The animals were washed every day in the morning before 10 A.M. and stalls were cleaned twice daily before morning and afternoon feeding. They were allowed to consume as much feed as they could, within a period of one hour and the balance of feed was collected and weighed after each feeding. Fresh and clean drinking water was provided ad libitum in all the pens throughout the experimental period.

Experimental Ration

The animals were fed standard grower ration containing 18 per cent crude protein and 3265 kcal of metabolisable energy (ME) /kg of feed up to 50 kg body weight and finisher ration with 16 per cent crude protein and 3265 kcal of ME/kg of feed from 50 kg onwards (NRC, 1998). The three experimental rations were: T1 – Ration containing 10 per cent dried fish (control). T2 – Ration with 50 per cent of protein of dried fish replaced by dried tuna waste silage and T3 – Ration with 100 per cent of protein of dried fish replaced by dried tuna waste silage.

The ingredient composition of the grower and finisher rations is given in Table 1.

Feeding Trial

The experimental animals of the three dietary treatments were maintained on their respective feeding regimes during the experimental period. The pigs were weighed at the beginning of the experiment and later on at fortnightly intervals. Daily feed intake also was recorded.

Plasma Lipid Profile Studies

Blood samples were collected at the beginning and at 14th week of the experiment using heparin as anticoagulant in clean dry test tubes. Blood samples were centrifuged at 3000 rpm for 10 minutes to separate the plasma for analyzing total cholesterol (Cholesterol Oxidase Peroxidase method), HDL cholesterol (Immunoinhibition method) and triglycerides (GPO-PAP-ESPAS method) using the kits supplied by Agappe diagnostics, Agappe Hills, Ernakulam.

STATISTICAL ANALYSIS

Data collected on various parameters were statistically analyzed by ANOVA as described by Snedecor and Cochran (1994). Means were compared by Duncan's Multiple Range Test (DMRT).

RESULTS

The initial lipid profile of experimental piglets was 30.00 mg/dl of triglycerides, 55.54 mg/dl of total cholesterol and 42.88 mg/dl of HDL cholesterol. The corresponding values of lipid profile of experimental animals of T1, T2 and T3 at 14th week of experiment were 47.02, 27.44 and 26.90 mg /dl of triglycerides, 83.28, 87.25 and 101.62 mg/dl of total cholesterol and 58.48, 68.70 and 65.87 mg/dl of HDL cholesterol, respectively.

DISCUSSION

The blood plasma contained 47.02, 27.44 and 26.90 mg /dl of triglycerides, 83.28, 87.25 and 101.62 mg /dl of total cholesterol and 58.48, 68.70 and 65.87 mg /dl of HDL cholesterol of experimental animals of groups T1, T2 and T3, respectively at the end of the experiment Statistical analysis of the data revealed that the triglyceride concentration was significantly lower ($P<0.01$) for T2 and T3 when compared to T1 while the total cholesterol concentration was significantly higher ($P<0.05$) in T2 and T3 when compared to T1. No difference was observed in HDL cholesterol level for the three treatments. Further, the values recorded in the present study fall within the normal range reported for the species.

Thomas (2007) reported 57.62 mg /dl of plasma triglycerides, 120 mg /dl of total cholesterol and 43.80 mg /dl of HDL cholesterol in pigs fed standard pig ration.

Table 1. Ingredient composition of rations, %

Ingredients	Grower rations			Finisher rations		
	T1	T2	T3	T1	T2	T3
Yellow maize, kg	66	60	50	72	67	63
Soyabean meal, kg	18	18.5	18	16.5	17.5	18
Wheat bran, kg	5.5	6	11.5	6	7.5	8.5
Unsalted dried fish, kg	10	5	-	5	2.5	-
Dried Tuna waste silage, kg	-	10	20	-	5	10
Salt, kg	0.5	0.5	0.5	0.5	0.5	0.5
Total	100	100	100	100	100	100
To 100 kg of the mixture added Calcite, kg	-	0.09	0.21	0.2	0.9	1.5
Zinc sulphate, g	20	20	20	20	20	20
Nicomix AB_2D_3K[1], g	10	10	10	10	10	10
Nicomix BE[2], g	10	10	10	10	10	10

[1]Nicomix AB_2D_3K (Nicholas Piramal India Ltd., Mumbai) containing Vitamin A-82500 IU, Vitamin D_3-12000 IU, Vitamin B_2-50 mg and Vitamin K-50 mg, per gram.

[2] Nicomix BE (Nicholas Piramal India Ltd., Mumbai) containing Vitamin B_1-4 mg, Vitamin B_6-8 mg, Vitamin B_{12}- 40 mcg, Niacin-60 mg, Calcium pantothenate- 40 mg and Vitamin E- 40 mg, per gram.

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