Research Paper

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Effect of Dried Tuna Waste Silage on Mineral Availability in Large White Yorkshire Pigs

Biology

KEYWORDS : Dried tuna waste silage, Large White Yorkshire pig, Mineral availability

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ABSTRACT

An investigation was carried out in Large White Yorkshire pigs to find out the effect of dietary incorporation of dried tuna waste silage on mineral availability. Piglets (n=36) were randomly allotted to the three dietary treatments, T1 (standard ration with 10 % dried fish), 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) up to 70 kg body weight. A digestion trial was conducted towards the end of the experiment to find out the nutrient utilization. There was no significant difference in availability of phosphorus, magnesium, and copper where as availability of calcium, manganese and zinc was lower in treatment groups. But it didn't affect the growth of the animals.

INTRODUCTION

Seafood processing plants generate different kinds of wastes during different stages of processing. 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. Conversion of fish processing wastes into meal by drying and grinding is not economical, because of the high investment required for machinery and transportation of the waste materials to the area of processing. However, these wastes can be converted into silage as a cheaper alternative.

Tuna waste is one of such bio-waste available in our country which can be utilized as silage to provide good quality protein to animals and to mitigate the environmental pollution in the processing area. The main constraint in the utilisation of fish silage is its high water content which can be rectified by blending with filler materials such as cereals, cereal by-products and crop residues and then drying using conventional dryers. Co-dried fish silage made from different types of fish has been used as protein supplement in livestock and poultry ration.

However, the information regarding the use of dried tuna waste silage as animal feed is scanty in literature. Hence, the present study was planned to determine the effect of dried tuna waste silage on mineral availability in large white Yorkshire pigs.

MATERIALS AND METHODS

Large White Yorkshire piglets (n=36) of uniform age and weight, were randomly allotted to three dietary treatments, T1 (standard ration with 10 % dried fish), 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 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 pigs were weighed before feeding and watering at fortnightly intervals. A digestion trial was conducted towards the end of the experiment The experiment lasted for 104 days. A digestibility trial was conducted at the end of the experiment to determine the digestibility of nutrients and percentage availability of minerals of the experimental rations by total collection method. Before the commencement of the actual collection period, animals were subjected to a preliminary period of three days when they were fed the same quantity of the feed. Faecal matter was collected for three days as and when they were voided, uncontaminated with feed, dirt or urine. Faecal matter collected daily from each animal was weighed and representative samples were taken after thorough mixing. These samples were placed in double lined polythene bags, labeled and kept in deep freezer until further analysis. The representative samples of feed offered and balance feed, if any, were also taken daily during the collection period and were pooled and sub samples were taken for analysis.

The faecal samples and feed samples were analyzed for proximate principles (AOAC, 1990) and minerals such as Ca, Mg, Cu, Mn and Zn were analyzed using Atomic Absorption Spectrophotometer (Perkin Elmer 3110) after wet digestion, using nitric acid and perchloric acid (2:1). Phosphorus contents of both feed and faecal samples were analyzed by colorimetry (Vanado-molybdate method, AOAC, 1990) using Spectrophotometer (Spectronic 1001 plus, Milton Roy, USA). Data collected on various parameters were statistically analyzed by Completely Randomized Design (CRD) method as described by Snedecor and Cochran (1994). Means were compared by Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Data on percentage availability of minerals are presented in table given below.

Table 1. Availability of minerals of three experimental rations, %

Parameter	Mineral availability of experimental rations		
	T1	T2	T3
Calcium	56.70 ± 5.01[a]	54.72 ± 3.81[a]	45.96 ± 2.21[b]
Phosphorus	51.51 ± 5.17	49.63 ± 6.71	48.31 ± 3.70
Magnesium	65.53 ± 3.13	67.25 ± 1.51	63.29 ± 6.80
Manganese	59.52 ± 3.90[a]	51.93 ± 3.79[b]	48.73 ± 1.96[b]
Copper	55.55 ± 3.83	53.01 ± 5.89	48.14 ± 6.26
Zinc	60.75 ± 3.27[a]	58.87 ± 3.27[a]	51.07 ± 4.82[b]

[1]Mean of six values

a, b - Means of different superscripts within the same row differ significantly (P<0.01)

The percentage availability of the three experimental rations T1, T2 and T3 were 56.70, 54.72 and 45.96 for Ca, 51.51, 49.63 and 48.31, for P, 65.53, 67.25 and 63.29 for Mg, 59.52, 51.93 and 48.73 for Mn, 55.55, 53.01 and 48.14 for Cu and 60.75, 58.87 and 51.07 for Zn, respectively. Calcium availability was significantly lower (P<0.01) for ration T3 (45.96 per cent) as compared to T1 (56.70) and T2 (54.72). Manganese availability was significantly lower (P<0.01) for T2 (51.93) and T3 (48.73) as compared to T1 (59.52). Zinc availability was also significantly lower (P<0.01) for T3 (51.07) as compared to T1 (60.75) and T2 (58.87). Shyama (2009) evaluated the effect of phytase supplementation on availability of minerals in pigs observed availability of Ca, P, Mg, Mn, Cu and Zn as 52.03, 50.07, 68.15, 77.13, 67.60 and 65.77 per

cent, respectively for the standard pig ration. The availability of Ca, P and Mg values were similar to values obtained in the present study while availability of Mn, Cu and Zn was higher than that of the present study.

CONCLUSIONS

There was no significant difference in availability of phosphorus, magnesium, and copper where as availability of calcium, manganese and zinc was lower in treatment groups. But it didn't affect the growth of the animals. Cost of feed per kg body weight gain of pigs was Rs. 50.84, 46.98 and 45.05 for T1, T2 and T3, respectively. The rations T2 and T3 containing dried tuna waste silage at 50 and 100 per cent replacement of protein from dried fish were economically efficient over ration T1 containing dried fish. It can be concluded that dried tuna waste silage can be used economically as a substitute for dried fish in the ration of growing-finishing pigs on protein basis, without any adverse effect on growth rate, feed conversion efficiency and carcass characteristics.

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