

TUNA OFFAL MEAL FOR GROWING PIGS

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ABSTRACT

Tuna offal meal was produced in experimental quantities by a tuna processing factory at Kavieng. In the first trial it was compared with two imported fishmeals and found to be inferior. In a second experiment three levels of tuna meal were compared with or without a vitamin-trace element supplement. The supplement produced highly significant beneficial effects on performance. The level of fishmeal also had some effect, but this was much smaller than that due to the supplement.

INTRODUCTION

The properties of fishmeal as a stockfood have been described by Woodman (1933) who commented on the high content of protein, its high digestibility, the high quality of the protein in terms of amino acids and the high vitamin and mineral content. Woodman also drew attention to the problem of meat taint caused by oil content higher than 5 per cent.

At present there is no locally produced protein source for feeding pigs and poultry in Papua New Guinea. Meatmeal, fishmeal and proprietary supplements are all imported. The present report describes two preliminary experiments designed to evaluate a locally produced batch of tuna (*Katsuwonus pelamis*) offal meal.

MATERIALS AND METHODS

The meal was prepared in the following way: tuna offals, including heads, fins, tails, scales and spines, but excluding viscera, were boiled in a shallow vat for 2 hours. After cooling, the offal was placed in a forced hot air drier for 2 hours. It was then dried for 8 hours before finally being placed in the hot air drier for 5 hours. The dried offal was then hammermilled. The resultant meal contained 10 per cent moisture and 16.5 per cent fat.

Experiment One

This was designed to compare the performance of pigs fed a ration using tuna offal meal with rations containing two imported fishmeals. The imported fishmeals were designated new

and old. The chemical composition of the three fishmeals was determined and is shown in Table 1. The composition of the three rations used is shown in Table 2. The rations were composed only of fishmeal and sorghum; no additional vitamin or mineral supplements were used.

Twenty four weaner pigs comprising four litters of six were allocated at random to the three treatments, in a randomised block design, so that there were two pigs from each litter on each treatment;

The pigs were housed in concrete floored individual feeding pens which measured 150 x 90 cm. Water and feed were available *ad*

Table 1.—The chemical composition of three fishmeals* used in Experiment One

		Tuna Meal	New Fishmeal	Old Fishmeal
Dry Matter	%	90.3	87.8	84.3
Crude Protein	%	47.4	60.5	72.0
Ash	%	23.1	14.7	19.3

* The above analysis was conducted by W. J. Turner, Department of Agriculture, Stock and Fisheries, Lae, Papua New Guinea.

Table 2.—Composition of rations used in Experiment One

		Tuna Meal	New Fishmeal	Old Fishmeal
Fishmeal	%	23.7	17.6	14.3
Ground Sorghum	%	76.3	82.4	85.7
Moisture	%	11.5	11.1	12.0
Crude Protein	%	17.7	18.9	16.9

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libitum. Food consumption was measured daily and pigs weighed weekly during the experiment which lasted 87 days. Food conversion ratio, weight gain and food consumption were subjected to analysis of variance.

Experiment Two

This was designed to study the effect of protein level and supplementation with vitamins and minerals in rations formulated from tuna offal meal and sorghum. Three combinations of tuna meal were fed each with or without the addition of a vitamin mineral supplement. The rations used are shown in Table 3. Four litters of six weaner pigs were allocated on the basis of litter origin to one of the six treatments in a randomised block design. The pigs were housed and fed in groups in half-covered pens having an area of 18 m². Food and water were available *ad libitum*.

Food consumption of each group was measured as was individual liveweight gain. Weight gain data were analysed by covariance with initial weight as the co-variate.

Table 3.—Composition of rations used in Experiment Two

Rations	1	1A	2	2A	3	3A
Tuna Meal %	16.5	16.5	20	20	25	25
Ground Sorghum %	83.5	83.5	80	80	75	75
Vitamin/Mineral Supplement (g/Kg) ¹	—	2.2	—	2.2	—	2.2

¹ Chemical Resources Pty/Limited, Artarmon, N.S.W.
Contains per kilo of premix, Vit. A, 3,300,000 IU, Vit. D, 660,000 IU Vit. B₂, 1.37 g, Vit. E., 3,300 IU, Cu. 22 g.
I 0.22 g., Fe 88 g., Mn., 44 g., Zn 110 g.

RESULTS AND DISCUSSION

Experiment One

The results of the experiment are shown in Table 4. The performance of pigs receiving tuna offal meal was inferior to that of pigs receiving the imported meals. Weight gain and food consumption were significantly inferior.

Table 2 shows that the samples of the rations which were analysed were not exactly iso-nitrogenous. It is unlikely that the relatively small observed differences in crude protein content could have caused the inferior performance of pigs on the tuna meal treatment.

Table 4.—The growth performance of pigs fed three fishmeals

	Tuna Meal	New Fishmeal	Old Fishmeal
Initial Weight (kg)	14.25	15.00	14.65
Daily Weight gain (g) ¹	458	590	577
Voluntary feed consumption (kg) ²	1.56	1.92	1.92
Feed conversion ratio ³	3.39	3.25	3.33

¹Tuna meal significantly lower than old and new ($p < 0.01$).

²Tuna meal significantly lower than old and new ($p < 0.05$).

³No significant difference.

Table 5.—The effect of level of tuna offal meal and vitamin mineral supplementation on growing pigs

	Level of fishmeal (%)				
	16.5	20	25	Non Supplemented	Supplemented
Average daily weight gain (g) ¹	655	603	673	550	737
Average daily food consumption (g)	1820	1555	1675	1573	1793
Food conversion ratio	2.78	2.58	2.49	2.86	2.43

¹There were significant differences in means due to level of fishmeal ($p > 0.05$) and supplementation ($p > 0.001$).

Experiment Two

The results of this experiment are shown in Table 5. There were significant differences in mean daily weight gain due to level of tuna offal meal. Food consumption and weight gain were least at the 20 per cent level of fishmeal. Food conversion ratio improved as the level of fishmeal increased.

The increase in daily gain resulting from the addition of the vitamin-mineral supplement was large and highly significant. Supplemented pigs grew 34 per cent more quickly. The effect of supplementation declined as levels of fishmeal rose, due possibly to the natural levels of micro-nutrients in the meal. It appears, therefore, that tuna offal meal, while a reasonable source of protein and probably calcium and phosphorus, is deficient

in vitamins or trace elements. Any rations made using this ingredient would require adequate supplementation.

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