

Growth Performance of Pekin Ducks Fed with Golden Snail and Fresh Banana Peelings

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Keywords: Performance — Pekin ducks — CV 2000 — Golden snail — Banana peel — Replacement

Summary

The growth performance and economics of feeding confined Pekin ducks with three different levels of golden snail fresh meat and banana peelings in equal percentage for replacing 50%, 70% or 90% of the commercial feed of the diet was studied.

Body weight gains and feed consumption of ducks, cost of feed and profit above feed and stock cost different significantly among treatments. Feed conversion varied during the first month of feeding but became comparable after the second month.

Ducks fed the diet with 45% banana peel and 45% golden snail meat gave the best performance, were the most economical and yielded the highest profit.

Snail meat and banana peeling utilization as replacement to commercial diet for ducks is advantageous in terms of growth performance and cost benefit.

Résumé

La performance de croissance et la rentabilité de l'alimentation de canards de Pékin en "enceinte close" ont été étudiées pour trois niveaux différents de viande fraîche d'escargot doré et de pelures de bananes à pourcentage égal en remplacement de 50%, 70% ou 90% d'aliment commercial de la ration.

Les gains de poids vif, et la consommation alimentaire des canards, le prix de la nourriture, le gain sur la nourriture et les frais de stockage diffèrent significativement selon les traitements.

La conversion alimentaire varie pendant le premier mois de nutrition mais devient comparable après le second mois.

Les canards nourris par une alimentation composée de 45% de pelures de bananes et 45% de viande d'escargot doré donnent le meilleur rendement, sont le plus économique et offrent le profit le plus élevé.

L'utilisation de la viande d'escargot et de pelures de bananes en remplacement de la nourriture commerciale pour canards est avantageuse en termes de rendement et de bénéfice.

Introduction

The duck industry is a thriving business in the Philippines. Ducks are raised for their meat and eggs. Their most important product, the "balut" (hard-boiled incubated duck egg), is a popular delicacy because of its delicious, unique flavor and nutritive value. However, a shortage of duck eggs for the production of "balut" and red salted eggs is becoming a problem. This shortage is mainly due to highly competitive cost of feeds particularly corn and soya bean meal which comprise the bulk of feed ingredients used as source of energy and protein, respectively, in commercially-mixed feeds for swine and poultry. Cost of feed constitutes almost 80 % of production cost, thus causing financial problems for duck raisers.

Several alternative sources which could reduce feed expenses without impairing growth, development and reproduction have already been identified (2, 3, 4 and 7). They are earthworm (*Perionyx excavatus*) meal, maggot (*Musa domestica*) meal, toad (*Bufo marinus*) meal, cassava (*Manihot esculenta*) and ipil-ipil leaves (*Leucaena*

leucocephala LAM DE WIT), to name only a few. Recently, two of the readily available and cheap alternative sources of protein and energy were identified as follows: (a) golden snail (*Pomacea canaliculata*) (1 and 8) and (b) the peel of the banana (*Musa sapientum*) (7 and 9), respectively.

Considered by farmers as a major pest, the golden snail has 86.10 % DM, a GE value of approximately 3336.27 kcal/kg, 62.48 % crude protein, 3.48 % ether extract, 16.03 % ash and 13.36 % nitrogen free extract. It has 3.40 % calcium and 1.22 % phosphorus (1).

Meanwhile, banana, a Philippine export product, is grown practically all over the archipelago throughout the year. About 100,000 metric tons of bananas are classified as rejects yearly (6). This does not include the peelings of bananas thrown away by small retailers who sell bananas in cooked form directly to the consumer. The banana peel, fresh, dehydrated has 91 % DM, 5.4 % crude

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Received on 10.10.94 and accepted for publication on 27.06.95.

protein, 3051 kcal/kg ME, 13.40 % ether extract, 11.50% crude fiber, 9.90 % ash and 51.01 % nitrogen free extract. It has 0.37 % calcium and 0.24 % phosphorus (5).

Since majority of the population of ducks are raised by small farmers in rural areas, development of this industry will eventually redound to rural development.

The study aimed to: — evaluate the performance of CV 2000 Pekin ducks fed with varying levels of golden snail meat and banana peeling as replacement to the commercial diet and — determine the economical level of golden snail meat and banana peeling substitution to commercial diet in the production of ducks.

Material and Method

Seventy-two Cherry Valley strain (CV 2000) Pekin ducks were randomly distributed in four treatments assigned in a completely randomized design (CRD). Six ducks were used per replicate with 18 ducks per treatment.

The data gathered were subjected to analysis of variance and significant differences between treatment means were determined using Duncan's Multiple Range Test (DMRT).

Rice hull was used as litter in the experimental pens as well as to minimize direct contact of ducks with wet ground. Each pen measured 12 sq ft, enough to accommodate six growing ducklings.

Two-week-old Pekin ducklings were purchased at Pesos (P)* 5.00 each. Brooding of the ducks was continued in the next 30 days using a leading commercial ration, as feed. When the experiment started, the ducks were 44 days old and were valued at P25 each.

Ad lib feeding of the dietary treatments based on the recommended daily feed allowance for growing ducks, on dry matter, was followed with the amount of feed given computed on "as-fed" (wet or fresh) basis. Estimated metabolizable energy of the Treatments A, B, C and D were 3593, 2931, 2969 and 2800 kcal/kg and estimated crude protein content of 27.97 %, 30.36 %, 32.75 % and 22 %, respectively. Availability of feed was checked three times a day and ample water was maintained in the drinking troughs at all times.

Fresh banana peelings (BP) were washed thoroughly to rinse off the ripening agents used such as calcium carbide, from the peel and the "eye" and "handle" of each peel were removed before chopping it finely. Golden snail (GS, *Pomacea canaliculata*) meat collected a day or two before using to allow the snail to purge, were crushed to remove the shell from the meat. Then, it was ground. The commercial mash (CM), chopped BP and GS meat were hand mixed and given to the ducks. Feeding duration was two months, adjusting the feed allowance with the age and consumption of the ducks.

Results and Discussion

Cost of Banana Peel and Golden Snail Meat

A kg of fresh snail meat costs P1.60 while fresh chopped banana peel was P0.45/kg. The commercial mash was P9.00/kg.

Weight and Weight Gain of Ducks

Initial mean weight of 44 day-old ducks was 0.36 kg. Growth of birds varied after the first and second months of feeding. Table 1 shows the monthly weight and weight gains of ducks.

TABLE 1.
Mean weight and gain in weight of ducks

Treatment	Mean weight (kg)		Mean weight gain (kg)	
	1st month	2nd month	1st month	2nd month
A - 50:25:25	1.03 b	1.99 ab	0.67 b	1.63 ab
B - 30:35:35	1.05 ab	2.18 a	0.69 b	1.82 a
C - 10:45:45	1.06 a	2.28 a	0.70 ab	1.92 a
D - Commercial mash	1.09 a	1.62 b	0.73 a	1.26 b

Mean weights followed by a common letter are not significantly different at 1 % level of significance, using DMRT.

Mean weight gains followed by the same letter are not significantly different at 5 % level, using DMRT

Body weight and weight gain of ducks fed with Treatment D (Control) was significantly lower than ducks fed with Treatment B (30 % CM, 35 % BP and 35 % GS) and Treatment C (10 % CM, 45 % BP and 45 % GS) but was not different to the weight and weight gain of ducks fed with Treatment A (50 % CM, 25 % BP and 25 % GS) after 60 days of feeding. After two months, ducks fed with Treatments B and C were significantly heavier and gained more weight than ducks fed the commercial mash (Treatment D) but comparable to those fed the Treatment A diet.

The result implies that replacing commercial ration by as much as 90 % with equal percentage of banana peel and golden snail meat produces better growth rate of ducks.

Feed Consumption and Feed Conversion of Ducks

Feed consumption of ducks placed under "as-fed" basis recorded a significant increasing trend as the levels of replacement of the commercial ration with banana peel and snail meat increased. Table 2 shows the monthly feed consumption and feed conversion of ducks.

TABLE 2.
Mean feed consumption and feed conversion of ducks

Treatment	Mean feed consumption (kg)		Mean feed conversion	
	1st month	2nd month	1st month	2nd month
A - 50:25:25	6.60 b	21.37 c	9.85 b	13.11 a
B - 30:35:35	8.10 a	24.32 b	11.74 a	13.36 a
C - 10:45:45	8.39 a	25.25 a	11.98 a	13.15 a
D - Commercial mash	4.47 c	16.99 d	6.12 c	13.48 a

Mean is the same column followed by the same letter are not significantly different at 1 % level of significance, using DMRT.

*Exchange rate:1 US\$ = P26.25

Findings show that the diets with golden snail meat and banana peelings are highly palatable, and thus have higher consumption rate. Although Treatment A had metabolizable energy higher than the CM diet, feed intake of the ducks was better than in the control diet. Ducks as natural foragers are influenced by the physical characteristics of the mixture, hence their preference for the diets with banana peel and snail meat over the 100 % commercial diet.

Feed conversion of ducks varied only after one month of feeding. After the second month, feed conversion were not significantly different. The ducks ate and converted an average of 13.32 kg feed for every kg gain in weight. This shows that more commercial ration was required to produce a kg gain in weight than when ducks were fed banana peel and golden snail meat as replacement for commercial ration.

Cost of Feed

Mean monthly cost of feed consumed by the ducks is shown in Table 3. Ducks fed the control diet were the least economical. Increasing the levels of banana peel and snail meat as replacement to commercial ration caused a proportionate highly significant decrease in the cost of feed used. Increasing replacement of the commercial ration with banana peel and snail meat, which are considerably cheaper than the ration sold in the market, to diets of ducks significantly reduced the cost of feed.

TABLE 3.
Cost of feed consumed and feed to produce a kg duck meat.

Treatment	Cost/kg of ration	Cost of feed consumed (P)		Cost of feed to produce a kg duck (P)	
		1st month	2nd month	1st month	2nd month
A - 50:25:25	5.01	33.07 c	107.06 b	49.35 b	65.58 b
B - 30:35:35	3.42	27.70 b	83.17 c	40.15 c	45.69 c
C - 10:45:45	1.83	15.35 d	46.76 d	21.92 c	24.06 d
D - Commercial mash	9.00	40.23 a	152.91 a	55.08 a	121.32 a

Mean cost of feed consumed followed by the same letter are not significantly different at 1 % level of significance, using DMRT.

Mean cost of feed to produce a kg duck meat followed by the same letter are not significantly different at 5 % level of significance, using DMRT.

The higher the level of commercial ration in the diet of the ducks, the higher was the cost of feed to produce a kg duck meat.

Profit Above Feed and Stock Cost

Table 4 shows the feed and stock cost and profit realized from the sale of 104 day-old ducks.

Birds fed with Treatment C yielded the highest profit while the ducks fed the commercial mash and Treatment A (50 % CM, 25 % BP and 25 % GS) incurred deficits. The differences between the profits earned from the ducks were highly significant.

TABLE 4.
Mean feed and stock cost and profit from sale of ducks

Treatment	Cost of feed and stock (P)	Sale of ducks (P)	Profit (P)
A - 50:25:25	132.06 b	129.35 ab	-2.71 c
B - 30:35:35	108.17 c	141.70 a	33.53 b
C - 10:45:45	71.76 d	148.20 a	76.44 a
D - Commercial mash	177.91 a	105.30 b	-72.61 d

Means under the same column followed by the same letter are not significantly different at 1 % level of significance, using DMRT.

Raising CV 2000 Pekin ducks on commercial feed alone would compromise economic returns. Aware of this, backyard duck raisers provide their ducks with forages. When ducks are raised in confinement, partial replacement of the commercial ration used with cheap locally available feeds or farm by-products to reduce the cost of production and, therefore, ensure profit is mandatory.

Conclusion and Recommendations

Based on the results of this study, the following conclusions were derived:— the ducks fed with fresh banana peel and fresh snail meat in equal percentage and 10 % commercial diet gave the best performance in terms of body weight gain, feed intake, feed conversion and profit above feed and stock cost at the later stage of the study, and — the utilization of banana peelings and golden snail meat as substitute to the commercial diet for ducks is significantly profitable.

The researchers recommend the use of 45 % banana peel, 45 % golden snail meat and 10 % commercial ration mixture as feed to 45-day-old growing CV 2000 Pekin ducks for profitable duck meat production. In addition, a follow-up research need to be conducted using the same diet for laying ducks. Processing of the banana peel and snail meat is also suggested to facilitate feeding and ensure continuous supply.

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