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DACUSOL, RUTH K. APRIL 2013. Growth Performance of Colored Broilers Given Commercial Ration Supplemented with Sweet Potato Tubers, Mungo Beans and Golden Kuok Meat. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

This study was conducted at the BSU Experimental Farm at Balili, La Trinidad Benguet from July to September 2012. Generally, the study was conducted to determine the effect of sweet potato tuber, mungo bean and golden kuhol meal on the growth performance of colored broiler.Specifically, the study aimed to determine the gain in weight, feed intake, feed conversion ratio, and return of investment of colored broilers given commercial feeds only and those given commercial feeds supplemented with sweet potato tubers and mungo bean, or sweet potato tubers and golden kuhol meat.

Result of the study showed no significant differences in the initial weight among treatments. The average initial weight of birds at 21 days of age was 0.447 kg.Birds fed with commercial feed had the highest final weight of 2.16 kg, compared to birds fed with commercial feed supplemented with 200g sweet potato tubers and 100g golden kuhol and birds fed with commercial feeds supplemented with 200g sweet potato and 100g mungo with an average final weight of 2.04 kg and1.90 kg respectively.

As for the total feed intake and total gain in weight, birds fed with commercial feed had the least feed intake with an average of 3.50 kg and an average total gain in weight of 1.72 kg. Birds fed with commercial feeds supplemented with 200g sweet potato and 100g mungo with an average of 3.68 kg and commercial feeds supplemented with 200g sweet potato tubers and 100g golden kuhol had the highest average feed intake of 3.85 with an average total gain in weight of 1.61 and 1.46 kg respectively.

Birds fed with commercial feed had the best FCR (2.13). Followed by birds fed with commercial feeds supplemented with 200g sweet potato tubers and 100g golden kuhol (2.39) which was significantly better than birds fed with commercial feeds supplemented with 200g sweet potato and 100g mungo (2.43).

Although return on investment was not subjected to statistical analysis, better ROI (1. 93%) was obtained from the birds fed with commercial feed compared to birds given commercial feeds supplemented with sweet potato tubers and mungo beans (-23.94%) and commercial feed supplemented with sweet potato tubers and golden kuhol (-24.30%).

It is therefore concluded that sweet potato tubers, mungo beans and golden kuhol meal can be supplemented to commercial feeds if the feedstuff will be available at lower price.

INTRODUCTION

The colored broiler was believed to have descended from French chickens are relatively easy to raise. In the Philippines, they are being raised free-range style. They are let loose in the field, or allowed to run in the backyard eating available grass, grubs and other edible plants and insects. Because they are being naturally grown free-range style, clean chicken meat with less cholesterol and fat is expected. Colored broiler can be raised both for their meat and for their eggs (Regional Agriculture and Fisheries In formation Division – DA, 2000).

Since colored broilers are raised in backyard, it is a common practice to feed them with locally available feedstuffs in addition to what they forage. Some of the indigenous feed sources in the Cordillera are sweet potato tubers, mungo beans and golden kuhol.

Generally, mungo bean is said to be one of the cheapest source of protein in humans in the Philippines (PCARRD, 1991); hence excess produce can also be a feed for colored broilers. This crop is excellent for green manure because it matures early, grows fast and produces abundant vegetable tops. In like manner sweet potato is also a common food and feed resource in the Cordillera. It is a creeping plant with perennial vines and grown the whole year round. This crop is rich in carbohydrates, vitamin A, and minerals. Another abundant feed is the golden kuhol. It is considered pest for rice producers as it feeds on newly transplanted rice seedlings. One possible way of eliminating them is to feed them to animals as a protein source.

This research attempts to generate information on how to best use mungo bean, sweet potato tubers and golden kuhol as feed for poultry and to impart such knowledge to the farmers, students and fellow researchers. As these feed resources are commonly found

in the Cordillera and there will be no reason for a poultry raiser not to make use of them as feedstuffs.

Generally, the study was conducted to determine the effect of sweet potato tubers, mungo bean and golden kuhol meal on the growth performance of colored broilers.

Specifically, the study aimed to determine the gain in weight, feed intake, feed conversion ratio, and return of investment of colored broilers given commercial feeds only and those given commercial feeds supplemented with sweet potato tubers and mungo bean, or sweet potato tubers and golden kuhol meat.

This study was conducted at the BSU Experimental Farm at Balili, La Trinidad Benguet from July to September 2012.

REVIEW OF LITERATURE

Sweet potato tubers are rich in easily digestible carbohydrates but are deficient in protein, calcium and phosphorus. They are good substitute for maize or sorghum silage in feeding dairy cows. The tubers and the spent pulp after extraction of starch from tubers may also be used as a feed for livestock. It is utilized as a high carbohydrates feed for cattle, poultry and pigs and is usually supplemented with protein rich feeds. It is also a good source of K, the predominant mineral present in sweet potato (Ghosh et al., 1988).

Sweet potato is one of the world's most important crops. It content nutritional dietary factors, such as vitamin A, ascorbic acid, thiamin, riboflavin and niacin. It was also found out that the tubers content low level of protein, fat and fiber, but the nitrogen- free extract fraction in the tubers is an indication of their main potential value as an energy source (Elliot and Gody, 1981)

Villareal (1982) stated that sweet potato is widely used as animal feed. He said that it is rich in vitamins and minerals. The yellow or orange variety contains a considerable amount of vitamin A. In primitive situation animal raisers boiled the tubers before being fed to animals. Nowadays with the advance of technology, roots are processed into chips are more nutritious than soybean in beef ration.

As to mungo bean, PCARRD (1991) reported that it is rich in vitamin, calcium and sodium. It is also a good source of the essential amino acid lysine and tryptophan. However, it is deficient in the sulfur-containing amino acids and cystine. The protein content of mungo bean ranges from 20-25%. In addition, mungo bean has a higher energy value than many other legume seeds. It is high value resource for poultry feeds (Wiryawan et al., 1995).

Golden kuhol, on other hand, is an aquatic animal which live on pounds and feed mainly on plants (Department of Agriculture, 1994). Each golden kuhol contains 15 grams of nutrients and a mouthful contains the following: digestible energy, 80 calories; proteins, 12.2 grams; fat, 0.4 grams; carbohydrates, 6.6 grams; ash, 3.2 grams; riboflavin, 12.0 mg; phosphorous, 61.0mg; sodium, 0.04 mg; potassium, 17.0 mg, and niacin, 18.0 mg.

In a feeding trial, Erasquin (1987) found that snails' meat could be incorporated in broiler diets to as high as 15% without affecting growth performance.

According to Baro (2009) of the Bureau of Agricultural Research (BAR), golden kuhol may be considered a threat in rice production, using it as feed for poultry and livestock offers a different perspective of looking at the golden kuhol. Golden kuhol is remarkably nutritious and easy to digest and found to stimulate fast growth and reproduction in both poultry and livestock. The snail meat provides protein and energy-giving fat while the shell contains calcium, phosphorous, vitamins, and minerals.

The snail species that can be used to feed livestock is the golden apple snail (*Pomacea canaliculata*). This freshwater snail was later farmed as a high protein food for both human and farm animals. Snail meal is a suitable replacement for other protein sources in poultry diets. It could replace 30% of the fishmeal in starter phase of broilers and up to 100% of the fishmeal in the grower stage with an increase of growth rate and no negative effect on the taste of the broiler meat Diamonde, 2012.

MATERIALS AND METHODS

The materials used were one hundred twenty (120) colored broiler chicks, mungo bean, sweet potato tubers (orange variety) and golden kuhol meat, commercial feed, electric bulbs, disinfectant, cartoon sheets, plastic waterers, feeding trough, weighing scale, record book and ball pen.

Experimental Design and Treatment

The one hundred twenty (120) 21-days old birds were randomly distributed to three treatments following the Completely Randomized Design. Each treatment was replicated four times with ten birds per replicate. Before the birds were placed in their respective groups or treatment, the birds were weighed individually at day 21 to get their initial weights. Final weights were taken when the birds reached 60 days old.

The treatments were:

T_0-commercial feed

T_1- commercial feeds + 200 grams sweet potato and100 grams mungo beans

T_2-commercial feeds + 200 grams sweet potato and 100 grams golden kuhol meat

Commercial feed was given to birds in T_0 from 7:00 am – 5:00 pm while in T_1 and T_2, birds were given commercial feeds at 7:00-8:00 in the morning and then at 4:00-5:00 in the afternoon. The feed supplement was offered separately at 8:00 in the morning until 4:00 in the afternoon. In T_1, the feed supplement was made up of two parts sweet potato + one part mungo beans by weight while in T_2 was composed of two parts sweet potato tubers + one part golden kuhol meat by weight.

Pre-experimental Period

Before the start of the study, the pens were cleaned and disinfected. Feeding troughs and waterers were thoroughly washed with laundry soap. Electric bulbs were installed in each cage to provide heat and light to the experimental Colored broilers. The floor was covered with cartoon sheets and old newspaper to help conserve heat and serve as a receptacle for feeds for the first weeks.

Upon the arrival of the chicks, they were placed inside the brooding pen. They were offered refilled water with antibiotic (vetracin) for three weeks. Chicks were fed with chick booster from day 1 to day 18. On day 19 - 21 mixed chick booster and grower was offered.

Brooding cages were lighted day and night for the first two weeks. Sometimes during the day when the temperature increases light were turned off. On the time that the power is off, to provide heat to the chicks burning charcoal were placed under the brooding pen and candle light inside the brooding pen to provide light to the birds for them to be able to eat.

To maintain good health, avoid morbidity and mortality, cleanliness and sanitation were observed. In every after two days the cartoon sheets and old newspaper that were used to cover the floor were change.

Preparation of the Feed Supplement

Ground mungo beans were bought from the market. Some golden kuhol were gathered from the BSU rice fields but most were bought from the market. The golden kuhol were washed and then boiled to separate the shell from the meat, sliced and mixed with grated sweet potato tubers before given to birds. On the other hand, the ground mungo bean was mixed grated sweet potato tubers before given to birds.

Feeding Management

Birds were given commercial feeds *ad libitum* from day old to 21 days old. The feed supplement was offered starting at day 22 up to when the birds are 60 days old. Clean water was made available at all times. Cleaning of the feeding trough and waterer was done daily.

The data gathered were as follows:

1. Initial weight (kg). This was taken by weighing the chicks individually at 21 days of age.

2. Final weight (kg). This was taken by weighing the birds individually at 60 days of age.

3. Feed offered (kg). This was obtained by weighing the amount of feed given to the birds during the experimental period.

4. Feed left-over (kg). This was obtained by weighing the feed left over of the birds during the experimental period.

5. Cost of feeds (Php). This refers to the market price of the feeds at the time of the study.

Data Computed

1. Total gain in weight (kg). This was taken by subtracting the initial weight of birds from their final weight per replicate.

2. Average daily gain (kg). This was obtained using the following formula:

$$\text{Average daily gain} = \frac{\text{Total gain in weight}}{\text{Experimental period}}$$

2. Total feed consumption (kg). This was obtained by subtracting the feed left-over from the total feed given to the birds daily.

3. Feed cost required to produce a kilogram gain in weight. This was obtained by multiplying the cost of feed per kilo by the feed conversion ratio.

4. Feed conversion ratio (kg). This was obtained by dividing the total feed consumption by the total gain in weight of the birds

5. Morbidity (%). This was obtained by dividing the total number of sick birds by the total number of the birds in each replicate and multiplied by 100%

6. Mortality (%). This was obtained by dividing the total number of dead birds by the total number of birds in each replicate and multiplied by 100%

7. Net gain (Php). This was computed by adding the total expenses and subtracting it to the total gross sale to come up with the net gain.

8. Return on investment (ROI). This was computed using the formula:

$$ROI = \frac{\text{Total sale - Total cost}}{\text{Total Cost}} \times 100$$

Data Analysis

The data were subjected to Analysis of Variance (ANOVA) for Completely Randomized Design (CRD) and treatment means were compared using the Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Weight of Birds

Table 1 presents the initial and final weight of the birds in the different treatments. Initial weight was taken at 21 days old. Statistical analysis showed no significant differences in all treatment means. This tends to indicate homogeneity of experimental units at the start of the study. This is mainly due to the fact that birds were of the same age and received the same management and ration during the brooding stage.

Statistical analysis showed highly significant differences among the treatments in final weight of birds at 60 days of age. Birds fed with commercial feed has the heaviest live weight of 2.16 kg, followed by birds fed with commercial feeds supplemented with sweet potato tubers and golden kuhol meat with a live weight of 2.06 kg and then by the birds fed with commercial feed supplemented with sweet potato tubers and mungo beans with a live weight of 1.90 kg.

Table 1. Average initial and final weight of birds in different treatments

TREATMENT	BODY WEIGHT (kg)	
	INITIAL (at 21 days old)	FINAL (at 60 days of age)
Commercial feeds	0.44[a]	2.16[a]
Commercial feeds + 200g sweet potato tubers and100g mungo beans	0.44[a]	1.90[c]
Commecial feeds + 200g sweet potato tubers and 100g golden kuhol meat	0.44[a]	2.06[b]

Means with the same superscript are not significantly different ($P \geq 0.05$) DMRT

Result of this study tend to agree with findings of Mocati (2006) where broilers fed with pure commercial ration had higher final weight that birds fed commercial feed with mungo beans. In another study, Binalay (2012) reported no significant differences in the final weights of broilers given pure commercial feed and those given 100g of mungo bean per kg of commercial feeds. Differences of the result may be due to the different duration of the study and the way in which mungo beans was added the commercial feed. Mocati (2006) substitute 10%, 20%, 30% of commercial feeds in diets of broilers from 22-45 days of age while Binalay (2012) supplemented broiler ration with 100g mungo bean per kilogram commercial ration during the starting to finishing period and during finishing period only.

In the group fed with commercial feeds + sweet potato tubers and golden kuhol meat. Result of this study is similar with the finding of Kimo (2000) who reported that bird fed with commercial feed had the highest final weight than birds given commercial feeds mixed with 5%, 10%, 15% level of golden kuhol meat.

Average Gain in Weight of Birds
reared from 21- 60 Days of Age

The total and daily gain in weight of the birds given different ration from 21 to 60 days of age is shown in Table 2. Statistical analysis showed highly significant differences in the average total and daily gain in weight of the birds among the treatment means. Birds given commercial feed had the highest total and daily gain in weight of 1.71 and 0.04 kg, respectively followed by birds fed with commercial feed supplemented with sweet potato tubers and golden kuhol meat with the total average total and daily gain in weight of 1.61 and 0.04 respectively and lastly by those birds fed with commercial feeds supplemented

with sweet potato tubers and mungo beans has an average total and daily gain in weight of 1.48 and 0.03 kg, respectively.

Following the trend in the final weight, birds fed with commercial feed attained the heaviest weight at 60 days of age and gained weight faster, followed by birds fed with commercial feed supplemented with sweet potato and golden kuhol meat and by those fed with commercial feeds supplemented with sweet potato and mungo beans.

Comparing the growth performance of those given feed supplements, the total gain in weight of birds given sweet potato and golden kuhol was 15 g higher that those given sweet potato and mungo. The difference in the total gain and daily gain (4 g/day) tends to indicate that golden kuhol is a better source of protein than mungo for colored broilers. This may also be directly related to the significant differences in the feed intake, where birds given sweet potato and mungo bean supplement has the lowest feed intake.

Table 2. Total gain in weight and average daily gain of the birds

TREATMENT	GAIN IN WEIGHT (kg)	
	TOTAL	DAILY
Commercial feeds	1.72[a]	0.044
Commercial feeds +200g sweet potato tubers and 100g mungo beans	1.46[c]	0.037
Commercial feeds +200g sweet potato tubers and 100g golden kuhol meat	1.61[b]	0.041

Means with the same superscript are not significantly different ($P \geq 0.05$) DMRT

Feed Consumption of Birds
reared from 21- 60 Days of age

The feed consumption of birds in different treatments for 39 days feeding period is presented in Table 3. Statistical analysis showed significant differences in feed consumption among the three treatments (as fed basis). Lowest feed consumption was obtained in the birds given commercial feeds + sweet potato tubers and mungo bean with a mean of 3.50 kg followed by pure commercial feeds with a mean of 3.68 kg and the highest feed consumption was obtained in the group fed with commercial feeds supplemented with sweet potato and golden kuhol meat with a mean of 3.85 kg.

This implies that the supplement sweet potato tubers, mungo bean and golden kuhol meat increase the feed consumption of birds but did not decrease nor increase the final weight of birds. Base on result of the crude protein analysis the sweet potato tubers and mungo beans mixture has higher crude protein content than sweet potato tubers and golden kuhol meat mixture but has low effect on the growth rate of the birds. This maybe attributed that although mungo beans is a good source of protein it was observe that mostly were left in the feeding troughs.

Table 3. Average feed consumption of the birds reared from 21-60 days of age

TREATMENT	FEED CONSUMPTION (kg)	
	AS FED BASIS	DM BASIS
Commercial feeds	3.68[b]	3.33
Commercial feeds +200g sweet potato tubers and 100g mungo beans	3.55[a]	2.76
Commercial feeds + 200g sweet potato tubers and 100g golden kuhol meat	3.85[c]	2.48

Means with the same superscript are not significantly different ($P \geq 0.05$) DMRT

Commercial feed has 90.634% DM, sweet potato tubers and mungo beans mixture has 55.628% DM, 4.26% ash while sweet potato tubers and golden kuhol meat mixture has 35.560% DM, 8.98% ash.

The supplement mixture approximately 25g sample per treatment was subjected to crude protein analyze at the DOST- CAR (Regional Service and Testing Laboratory). Result showed that the sweet potato tubers and mungo beans mixture has 16.57% crude protein content while the sweet potato tubers and golden kuhol meat mixture has 15.97% crude protein content.

Feed Conversion Ratio

The feed conversion ratio of the birds on the different treatments is presented in table 4. Statistical analysis showed highly significant differences between treatments (as fed basis). Birds fed with pure commercial feeds were the most efficient in converting feed into a kilogram body weight (FCR of 2.13), followed by birds given commercial feeds supplemented with sweet potato and golden kuhol meat (FCR 2.39) and birds given commercial feeds supplemented with sweet potato and mungo beans attained the least efficient in converting feed to kilogram weight with an FRC of 2.43.

Result from the study revealed that birds fed with commercial feeds supplemented with sweet potato and mungo beans that attained the highest FCR needs more kilos of feeds to produce a kilogram weight.

Table 4. Feed conversion ratio of the birds reared from 21- 60 days of age

TREATMENT	FEED CONVERSION RATIO	
	AS FED BASIS	DM BASIS
Commercial feeds	2.14[a]	1.94
Commercial feeds +200g sweet potato tubers and 100g mungo bean	2.43[c]	1.83
Commercial feeds + 200g sweet potato and 100g golden kuhol meat	2.39[b]	1.54

Means with the same superscript are not significantly different ($P \geq 0.05$) DMRT

Feed Cost to Produce a Kilogram
Live Weight Colored Broiler

Table 5 presents the feed cost to produce a kilogram of colored broiler. Statistical analysis showed that there were highly significant differences observed among treatments. The lowest feed cost to produce a kilogram was obtained from birds fed with pure commercial feeds with a mean of PhP86.67, while birds given sweet potato tubers and golden kuhol meat had the highest feed cost of PhP130.25. Birds fed with sweet potato tubers and mungo beans had feed cost of PhP98.77 which is lower than birds given sweet potato tubers and golden kuhol meat and higher than birds fed with pure commercial feeds.

Comparing the growth performance of birds given supplement, those fed with sweet potato tubers and golden kuhol meat has higher feed cost of (PhP31.77) than those birds fed with sweet potato tubers and mungo. The difference explains that though birds has significant differences in the feed intake, where birds given sweet potato and golden kuhol has the highest feed intake, still, they were more efficient in utilizing the feed they ate to gain more body weight.

However, it still appears that the use of sweet potato tubers, mungo beans and golden kuhol as a feed supplement greatly increase feed cost to produce a kilogram body weight. Commercial feed is therefore seen to be the most economical in terms of feed cost to produce a kilogram live weight colored broiler.

Morbidity Rate

Seven birds got sick two weeks before the end of the study. It was observed that birds fed with pure commercial feeds had two birds, birds given sweet potato tubers and golden kuhol meat had two birds and birds fed with sweet potato tubers and mungo beans had three birds became lame that they are unable to walk and stand to eat. These birds weighed more or less 1.00 - 1.5 kilogram. During feeding period lame birds were fed separate from the other birds and they survive until the end of the study.

Mortality Rate

One bird died during the duration of the study. The group fed with commercial feed + sweet potato and golden kuhol has 2.5 % mortality. The bird died at 45 days of age of unknown reason, since it was not subjected to necropsy.

Table 5. Feed cost to produce a kilogram live weight

TREATMENT	FEED COST (PhP)
Commercial feeds	86.67[a]
Commercial feeds + 200g sweet potato tubers and 100g mungo beans	98.77[b]
Commercial feeds + 200g sweet potato tubers and 100g golden kuhol meat	130.25[c]

Means with the same superscript are not significantly different (P ≥ 0.05) DMRT

Table 6. Morbidity and mortality rate (%)

TREATMENT	MORBIDITY	MORTALITY
Commercial feeds	5.00	-
Commercial feeds + 200g sweet potato tubers and100g mungo bean	5.00	-
Commercial feeds +200g sweet potato and 100g golden kuhol meat	7.50	2.50

Return on Investment

The returns on investment in the different treatments are shown in Table 6 and the details of expenditures are presented in Appendix 7. It is shown that there is profit obtained from the birds fed with commercial feeds with ROI of 10.77% while those from birds fed with commercial feeds supplemented with sweet potato tubers and mungo beans and commercial feeds supplemented with sweet potato tubers and golden kuhol meat on Colored broiler diet resulted to negative ROI.

Supplementing sweet potato tubers, mungo beans and golden kuhol meat did not improve the growth rate of birds as observe in the study. Possible reason for having a negative ROIs result was high labor cost in the preparation of the feedstuff like grating the sweet potato tubers, as well as washing, boiling, separating the kuhol meat from the shell and sliced then mixed with sweet potato tubers before given to the birds.

Table 7. Return on Investment (ROI) of birds under different treatment

TREATMENT	TOTAL SALES (PhP)	TOTAL COST OF PRODUCTION (PhP)	NET PROFIT (PhP)	ROI %
Commercial feeds	11,854	11,489	364	1.94
Commercial feeds + 200g sweet potato tubers and 100g mungo beans	10,110	13,355	-3,244	-24
Commercial feeds +200g sweet potato tubers and 100g golden kuhol meat	10,923	14,238	-3,314	-23

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary

This study was conducted to determine the effect of commercial ration supplemented with sweet potato tubers, mungo beans and golden kuhol on the growth performance of colored broilers. This was conducted at the BSU Experimental Farm at Balili, La Trinidad Benguet from July to September 2012.

One hundred twenty (120) 21-day old colored broilers were distributed into three treatments following the Completely Randomized Designed (CRD). Each treatment was replicated four times with ten birds per replication. The treatments were pure commercial feed, commercial feeds supplemented with 200g sweet potato and 100g mungo and commercial feed supplemented with 200g sweet potato tubers and 100g golden kuhol.

Result of the study showed no significant differences in the initial weight. This indicated homogeneity of experimental units at the start of the study. The average initial weight of birds at 21 days of age was 0.447 kg.

Statistical analysis revealed highly significant differences in final weight, total feed intake, feed conversion ratio, total and daily gain in weight and feed cost to produce a kilogram weight.

Birds fed with commercial feed has the highest final weight of 2.16 kg, followed by birds fed with commercial feed supplemented with 200g sweet potato tubers and 100g golden kuhol with an average final weight of 2.04 kg and those fed with commercial feeds supplemented with 200g sweet potato and 100g mungo with an average final weight of 1.90 kg.

As for the total feed intake, birds fed with commercial feeds supplemented with 200g sweet potato tubers and 100g golden kuhol has the highest average feed intake of 3.85, followed by birds fed with commercial feeds supplemented with 200g sweet potato and 100g mungo with an average of 3.68 kg and those fed with commercial feed has the least feed intake with an average of 3.50 kg

The average total gain in weight of birds after 60 days old showed that birds fed with commercial feed grew faster with an average total gain of 1.72 kg from 21 days to 60 days of age compared to birds fed with commercial feeds supplemented with 200g sweet potato and 100g golden kuhol and birds fed with commercial feed supplemented with 200g sweet potato tubers and 100g mungo bean with an average total gain in weight of 1.61kg and 1.46 kg respectively.

Feed conversion ratio (FCR) of birds fed with commercial feeds supplemented with 200g sweet potato tubers and 100g golden kuhol was 2.39 which was significantly better than the FCR of birds fed with commercial feeds supplemented with 200g sweet potato and 100g mungo of 2.43. Birds fed with commercial feed had the best FCR of 2.13.

Feed cost to produce a kilogram live weight in colored broilers were PhP86.67, PhP98.77, and PhP130.25 from birds given commercial feeds, birds given commercial feeds supplemented with 200g sweet potato and 100g mungo and birds given commercial feed supplemented with 200g sweet potato tubers and 100g golden kuhol respectively.

Although return on investment was not subjected to statistical analysis, better ROI of 1. 93% was obtained from the birds fed with commercial feed compared to ROI's of -24.30% and -23.94% obtained from birds given commercial feeds supplemented with sweet potato tubers and mungo beans and commercial feed supplemented with sweet potato

tubers and golden kuhol meat respectively. This may be due to the high cost of the supplement, (mungo bean and golden kuhol) including labor in commercial feeds supplemented with sweet potato and mungo (T_1) and commercial feed supplemented with sweet potato tubers and golden kuhol (T_2) compared to birds given commercial feeds (T_0).

Morbidity of 5%, 5% and 7.5% was obtained from commercial feeds (T_0), commercial feeds supplemented with sweet potato and mungo (T_1) and commercial feed supplemented with sweet potato tubers and golden kuhol (T_2), respectively. Mortality of 2.5% was observed from commercial feed supplemented with sweet potato tubers and golden kuhol (T_2).

Conclusion

Based on the result of the study, it is therefore concluded that sweet potato, mungo beans and golden kuhol meal can be supplemented to commercial feeds allowable to the birds without detrimental effect on their growth performance.

Recommendations

Based on the result on instances where commercial feeds is limiting the sweet potato, mungo beans and golden kuhol can be given to colored broilers for they can still support growth though it is not as fast as the growth rate of birds given commercial ration.

Furthermore, it is also recommended that further study should be conducted that would include using these feedstuff for formulating ration base on their analytical nutrient content.

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