BIBLIOGRAPHY

PADUYAO, EDIMER L. APRIL 2012. Yield and Sensory Properties of Carcass from Mallard Ducks *(Anas platyrhynchos)* Fed with Banana Peelings. Benguet State University, La Trinidad, Benguet.

Adviser: Madeline S. Kingan, MSC.

ABSTRACT

This study was conducted to determine the effect of banana peelings on the yield and sensory properties of carcass from Mallard ducks. Specifically, it aim to find out the effect of banana peelings on the dressing percentage of Mallard ducks, as well as to compare the weights of meat cuts such as legs, breast, back, wings, head, neck, and feet in Mallard ducks fed with banana peelings. An Organoleptic Evaluation is also done to assess the quality of carcasses produced, under La Trinidad, Benguet.

The results of statistical analysis showed no significant differences in terms of meat cuts while significant differences were revealed through Organoleptic Test of the different birds in each treatment. The weight of the birds used in the study varies so that it produced highly significant result in terms of slaughter weight. However, no significant differences were observed in the dressed weight of Mallard ducks meat.

It is therefore concluded that the sensory properties of carcass from Mallard ducks were affected by the incorporation of banana peelings in the feed. Meanwhile on the yield properties, some of the minor cuts and internal organs were affected while all of the major cuts were not.

INTRODUCTION

Mallard duck (*Anas platyrhynchos*) is a popular source of meat in some areas of the world. In the Philippines, it plays an important role in the poultry industry as a source of egg and meat products. Typically, they are mainly raised for the production of embryonated eggs, salted eggs, and century eggs.

According to Paris (1998), a poultry carcass such as ducks should produce high yield of meat of good nutritional value and eating quality. As a commodity, it has to meet the requirement of the customer in terms of attractive color and appearance of the product offered. Also, include the nutrient value, flavor, and the smell and especially free from chemical residues.

Nowadays, people are health conscious and that they are very particular on what they eat. As much as possible, the food they eat should be free from any toxic substances which are hazardous to man. Moreover, the taste preferences must be satisfactorily met. Consumers are even willing to pay a higher price for it. It is in this connection that this study was conducted to determine the yield and sensory properties of carcass from Mallard ducks fed with banana peelings.

This study is about the yield and sensory properties of carcass from Mallard ducks fed with banana peelings. Studying ducks generally is a very important aspect not only for veterinarians or animal science but also for people who are already engaged in duck raising.

This study will give pertinent information to the farmers for more improved and efficient Mallard duck raising. The results to be obtained from the study could be the pool knowledge of Mallard duck raisers.

Generally, this study was conducted to determine the yield and sensory properties of carcass from Mallard ducks fed with banana peelings.

Specifically, it aims to determine the carcass weight of Mallard ducks fed with banana peelings and determine the dressing percentage of Mallard ducks fed with banana peelings.

The experiment used a total of 12 Mallard ducks, which were subjected to 90 days feeding trial. The carcass evaluation and Organoleptic Test was done at the Department of Animal Science Room on March 4, 2012 from 1-6pm.

REVIEW OF LITERATURE

Duck Production

According to Perez (1991), domesticated ducks *(Anas platyrhynchos)* are distributed throughout the world, although nearly 75 % are found in the South and East Asia. It is generally believed that domestic ducks originated from Mallard. Most of the domestic ducks in the Philippines today are descendants of stocks introduce into the country from China many years ago. Through the process of natural selection, they have evolved themselves into adaptable strains which are able to produce and reproduce under local environment conditions.

Groiler (2002) specified that one of the ducks being raised here in the Philippines is Mallard. It is a unique duck like species of tropical American countries which belongs to a small group of waterfowls. Mallard ducks are also able to forage for much of their keep. They are inherently hardy, vigorous, and robust. They have also fleshed breast and are highly prized for their meat which are more flavorful and less fatty than that of common ducks.

Hoffman (1992) added that Mallard duck is a dual purpose breed of ducks. It grows fast and also lays a good number of eggs. It achieves an average live weight of 1.05 kg. When fed a well-balanced diet, it can produce valuable quantities of dietary protein.

Ensminger (1980) noted that ducks are among the most versatile animals. They will live happily under a wide range of climatic conditions, and they are free from such common poultry ailments as leucosis, marek's disease, infectious bronchitis, and the other respiratory troubles. Ducklings are popular gourmet cooks and connoisseurs of good food.

Virtually, everything from the feather to the feet, including the liver and tongue, can be turned to profit; the only unsalable thing about them is their quack.

Zainal (2002) mentioned that duck raising, once a small sideline occupation is growing in importance to the meat industry. With the growing demand for the poultry meat, the duck industry has commenced to follow the same pattern of the broiler industry. This could be seen in the establishment of more specialized business venture with modern poultry abattoirs, processing for better packaging and presentation to consumers.

Basilio (1986) stated that ducks provided with good management and proper nutrition will respond by increasing production that would offset the investment in nutrition. Feeds can be formulated in several kinds depending upon the purpose and age for which the birds are raised.

Palomar (1980) mentioned that duck can be compared favorably with pork from which fresh sausage are traditionally made. Duck meat is better than pork in manufacturing of fresh sausage provided that meat is soaked after processing. Huda *et. al.,* (2010) added that duck meat is considered as white meat, even though its meat is considerably darker than the other poultry meat such as chicken or turkey. The reason for that is ducks are more active in comparison to chicken therefore they need and use more oxygen. The extra oxygen in the body of the ducks or other types of game bird, gives their meat dark red color.

Salda (1980) revealed that duck farming is not well studied but it offers several advantages, one of which is that ducks maintain higher and longer productivity than chicken. Ducks are produced, hardy, and resistant in most poultry diseases. The high

demand for duck eggs as fresh boiled *(pinoy)*, embryonated *(balot)*, and salted *(itlog na pula)* are also increasing due to the country's rapid population growth.

Bantasan (1999) reported that duck raising is commonly associated with bodies of water, pond, lake or bays. Many raisers think that ducks will not thrive without being raised beside bodies of water where they can freely swim, play, and get food from within. However, ponds or lakes are not necessary for raising ducks as long as sufficient drinking water is provided. Likewise, chickens or ducks can be raised without ponds. Ducks and chickens are alike in preferred feedstuffs that contain nutrients needed for their maintenance, growth, and egg production.

Pond (2000) concluded that ducks can be successfully raised in confinement on litter floors and do not require swimming water for growth, health or reproduction. Young ducklings are sometimes started on slatted or raised wire floors because of the wetness of the droppings. Commercial houses often provide an indoor litter area and an outside run.

PCARRD (2006) stated that ducks can be raised in areas near bodies of water or in areas where there are rice fields to feed on after harvest. The ideal site for a duck farm is in areas relatively far from human settlements considering the noise ducks create and wastes which produce unpleasant odor. These consequences are not acceptable to non-duck raisers.

Lawas *et. al.*, (1998) said that at present, feeds specific for grower ducks particularly for the Philippine Mallard ducks are not yet commercially available. Some raisers who attempt to grow ducks in confinement use feed intended for chickens and the cost of feeding until ducks reach the ready-to-lay stage is generally high. The cost of commercial feeds therefore is a limiting factor to the duck raisers.

Gillespie (1983) cited that the best breeds of ducks for duck meat production are the White Pekin, Aylesbury, and Muscovy. The Muscovy produces excellent meat quality. Adult drakes weight about 10 lbs. (4.05 kg) while adult hens weigh about 7 lbs. (3.2 kg) at 17 weeks age.

Babe and Blakely (1994) showed that the normal system for breeding ducks is flock mating. Incubation of duck eggs is 28 days, the same time as turkeys. The only exception is the Muscovy duck which requires 33 to 35 days. Duck eggs hatched in an incubator and are handled in the same way as chicken except that more moisture is required at hatching time. If eggs are being hatched by broody ducks, it is important that the ducks be allowed free access to water during this period. Nature endowed the broody duck with the desire to ruffle their feather and immerse their total body at this time giving them the extra moisture necessary for proper hatching.

Moore and Singh (1972) indicated that ducks prefer quietness and must be handled gently. Young ducklings need not have water until they are six to eight weeks old. They are quiet safe at five weeks to go into grass run and range house. The duck should be provided suitable house with run, preferably on the banks of tanks or any water place. Any suitable shed or a part of the poultry house may be utilized for the purpose. The roof of the house may be made of any kind, but the floor should be pucca, preferably cemented. Chickens and ducks should not be kept together. A house with a length of 36 meters, breadth 2.3 meters and height 1.8 meter will be enough to accommodate 24 ducks.

Singh and Moore (1978) confirmed that after the ducks are feathered, they are ready to range for themselves on tanks and lakes, where grass snails, and other insects make up a considerable portion of their food. Ducks are voracious feeders and will eat anything they

can find. For 1 kilogram of live weight gained by the birds, about 4 kilograms of feed is consumed. The growing and laying birds should be fed with a good ration. Care should be taken that the breeding birds do not get fat.

Kampen *et. al.,* (1998) stated that hatchability was affected by the length of the reproduction cycle (laying period and incubation period), behavior aspect related with dump nesting, and the presence of nonterm eggs. However, the rearing system, which allows free access to swimming water, was found to have no significant effect on hatchability. It is concluded that the nesting behavior of the domesticated Muscovy duck is similar to that of its wild ancestor which is the Mallard duck. Domestication did not alter the natural breeding behavior of the Muscovy duck.

PCARRD (1991) mentioned that ducks through their eggs and meat produce, offer an opportunity for rural families to improve their nutrition that is generally deficient in protein. Duck raising also offers an opportunity to rural farmers to augment their farm income producing highly priced protein products out of locally available feed resource.

Philippine Mallard Duck (Pateros)

According to Bondoc (1998), the Philippine Mallard, known locally as *itik* or Pateros duck, is mainly raised for the production of *balot* and *pinoy* (embryonated eggs), *itlog na pula* (salted eggs), and century eggs.

Palad (1994) characterized that the Philippine Mallard's feet are orange and the bill of the male is bright green, while that of female is less brightly colored. The head feathers of the drake are indecent green color, and glitters in the sun. The drake has a raspy low voice similar to that of the wild duck and is very attentive to the females.

PCARRD (1991) revealed that the male Pateros has a coarser head than the female. The average weight of an adult drake is 1.75 kg, while the adult female is 1.50 kg. One male Pateros can serve 15 to 20 females, normally registering a high fertility of 80 to 85 %. Under traditional management practices, a duck can lay 200 eggs in 365 days of laying, with eggs relatively large in size. However, these ducks are non-sitters. As experienced by local raisers, their adaptability to local environmental conditions and management practices is far better than other stocks. Moreover, their products have unique attributes that consumers generally prefer.

Afable (1997) added that the plumage color and patterns of the Philippine Mallard ducks are dominantly of the wild mallard pattern (54 %); followed by the ducky pattern (20 %), runner pattern (12 %), magpie pattern (9 %) and the restricted pattern (5 %). The average breast depth, breast width, keel length, and shank length in the Philippine mallard is 6.80 centimeters, 7.30 centimeters, 10.30 centimeters, and 4.90 centimeters respectively. Drakes generally are also found to be heavier and have longer anatomical body than the female ducks.

Banana

According to Adriano (1983), banana fruit contains ash, fat, protein, crude fiber, carbohydrates, and vitamins (A, B, C, D) which are essential elements needed by the body. Kafker (1994) stated that it also contains minerals such as potassium (K), and phosphorus (P). Potassium (K) is a mineral that is good for the heart. Banana fruit also have useful levels of riboflavin. Pavlova (2000) added that a medium size banana fruit supplies about a third of an adult's recommended daily intake of pyridoxine.

Salming (1985) stated that banana fruit can be use as poultry feedstuffs when chopped, dried and ground. It is composed of carbohydrates, which are about 22 % and 1.5 % proteins. He added that banana meal increased the feed intake, gain in weight and improves feed efficiency of the birds.

Bahatan (1984) found that 0.5 % milled banana peelings mixed with commercial feeds improved the performance of broilers. Likewise, Concepcion (1984) mentioned that broilers given 15 % banana fruit peeling meal in the ration of birds had the highest feed consumed, final weight, and total gain weight.

Salting (1979) mentioned that steers fed with banana peelings rejects and concentrate gave the highest average daily gain. In terms of feed efficiency, the animal fed with banana meal plus concentrate required the least amount of feed per kilogram gain.

Sison (1982) revealed that the dried banana peelings are good feed supplement for finisher hogs. Result showed that dried banana peelings could be incorporated in the hog finisher diet without adverse effect on weight gain and feed conversion ratio.

Silverio (1981) reported that banana fruits are rich of energy and protein source for animal production. On the other hand, Castillo and Gerpacio (1976) showed that banana as raw material contains dry matter, crude protein, ether extract, crude fiber, ash, and nitrogen free extract.

MATERIALS AND METHOD

Materials

The materials used in the study are as follows: 12 heads of 90 days old Mallard ducks fed with pure commercial feeds and banana peelings as feed supplement, slaughtering materials such as stove, butchering knife, water, basins, containers, weighing scale. Also, digital camera, pens, labeled bond papers, and record notebook were used for entering and documenting the data.

Methodology

Experimental animals. The carcasses evaluated in the study were taken from a previous growth study which utilized the following treatments:

T_0 - 100 % Commercial feeds (Control)

T_1 - 90 % Commercial Feeds + 10 % Banana Peelings

T_2 - 80 % Commercial Feeds + 20 % Banana Peelings

After a period of 90 days on the different diets, 4 birds, one bird per replicate were taken from each of the three treatments for carcass evaluation.

Slaughtering of the birds. Prior to dressing, the birds were confined in a pen and fasted for 8 hours but water was provided *ad libitum.* The slaughter weights of the birds were taken individually before dressing. At the time of slaughtering, the birds were secured by holding both shanks with one hand and both wings to prevent struggling. Each bird was immersed in hot water about a minute for easy plucking of the feathers. After plucking, the birds were washed thoroughly and made ready for evisceration. Evisceration was done by laying the bird in dorsal recumbence. The esophagus and wind pipe were then pulled out from the

base of mandible. For easy insertion of the hand, a slit was made around the vent then down to the keel. Then the hand was inserted into the slit in the abdominal cavity and the abdominal attachment of the entrails. After the entrails were pulled out, the liver, heart, and gizzard with the proventriculus were separated. The head was detached from the atlanto-occipital joint, which was accomplished by severing the skin, muscle and ligaments at the joint with a sharp knife.

Carcass yield evisceration. After evisceration, the birds were placed on the weighing scale and the dressed weights were recorded in grams. The carcasses were then chopped into major and minor cuts then weighed accordingly. The gizzard and GIT were likewise weighed after they were allowed to drip to remove the remaining fluid or blood.

The dressed bird were then chopped into standard cuts then weighed. The legs, breast, back, wings, feet, neck, and heads were weighed individually for each bird. The intestinal organs such as heart, gizzard, and GIT were likewise weighed after they were allowed to drip to remove the remaining blood.

Carcass quality evaluation. The meat samples for taste test were taken from the breast and leg portion of the carcass. These were cooked in five cups of water for 45 minutes. A panel of tasters composed of 10 students and 10 professionals were invited randomly to taste the cooked meat samples. Score sheets were provided for the panels to mark their evaluation.

Data Gathered

The following parameters were gathered from the study:

1. Slaughter weight (g). This was the weight of the Mallard ducks before slaughter time.

2. Dressed weight (g). This was the actual weight of the slaughtered bird after plucking the feathers, head, feet, and entrails off.

3. Weight of the head (%). This was obtained by weighing the head after its detachment from the neck at the atlanto-occipital joint divided by the slaughter weight multiplied by 100 %.

4. Percent neck. This was obtained by taking the weight of the neck from each carcass divided by the slaughter weight multiplied by 100 %.

5. Percent breast. This was obtained by taking the weight of the breast from each carcass divided by the slaughter weight multiplied by 100 %.

6. Percent wings. This was obtained by taking the weight of the wings from each carcass divided by the slaughter weight multiplied by 100 %.

7. Percent back. This was obtained by taking the weight of the back from each carcass divided by the slaughter weight multiplied by 100 %.

8. Percent heart. This was obtained by taking the weight of the heart from each carcass divided by the slaughter weight multiplied by 100 %.

9. Percent liver. This was obtained by taking the weight of the liver from each carcass divided by the slaughter weight multiplied by 100 %.

10. Percent gizzard. This was obtained by taking the weight of the gizzard from each carcass divided by the slaughter weight multiplied by 100 %.

11. Percent full GIT. This was obtained by taking the weight of the GIT with content divided by the slaughter weight multiplied by 100 %.

12. Percent empty GIT. This was obtained by taking the weight of GIT after removing its content divided by the slaughter weight multiplied by 100 %.

13. Percent legs. This was obtained by taking the weight of the legs from each carcass divided by the slaughter weight multiplied by 100 %.

14. Percent feet. This was obtained by taking the weight of the feet from each carcass divided by the slaughter weight multiplied by 100 %.

15. Dressing percentage (%). This was obtained by dividing the carcass weight by the slaughter weight multiplied by 100 %.

16. Meat appearance, flavor, juiciness, tenderness, and acceptability. This was obtained through Organoleptic testing from the panels.

Data Analysis

Data was analyzed using Analysis of Variance (ANOVA) appropriate for Completely Randomized Design (CRD) and treatment means were compared using Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Slaughter Weight, Dressed Weight, and Dressing Percentage

Table 1 presents the slaughter weights, dressed weights, and dressing percentages of the birds used in the study. Statistical analysis found that the highest level of the banana peelings produced the heaviest birds as compared to the birds given the lowest level. This could be correlated to the essential nutrient content of banana peelings such as phosphorus carbon and carbohydrates which further enhanced growth when added to commercial feeds. Meanwhile, the slaughter weights of the birds fed with pure commercial feeds produced the lightest weights.

In the same table, dressed weights and dressing percentages of the birds from the different treatments are presented. The heaviest dressed weight was taken from the birds fed with 20 % of banana peelings. This may be attributed to slaughter weight whereby the heavier the bird during slaughter, the heavier would be when it is dressed. To compare, the dressed weights of the birds fed with pure commercial feeds and those fed with 10 % banana peelings were not significantly different from each other.

Statistical analysis shows that there are no significant differences among the dressing percentages from the birds. This could be because the number of birds and replication were not enough to produce significant results. This implies that using banana peelings as feed supplement did not affect the dressing percentages of the birds.

Table1. Slaughter weights, dressed weights, and dressing percentages of the sample birds

TREATMENT	SLAUGHTER WEIGHT (g)	DRESSED WEIGHT (g)	DRESSING PERCENTAGE
Pure commercial feeds	775.00 [c]	675.00 [b]	87.09 [a]
10 % banana peelings + 90 % commercial feeds	831.25 [b]	718.75 [b]	86.47 [a]
20 % banana peelings + 80 % commercial feeds	893.75 [a]	781.25 [a]	87.37 [a]

*Means with the same letter superscript are not significantly different

Table 2. Weights of back, breast, wings, and legs of the sample birds

TREATMENT	BACK (%)	BREAST (%)	WINGS (%)	LEGS (%)
Pure commercial feeds	13.71 [a]	13.06 [a]	7.10 [a]	13.06 [a]
10 % banana peelings + 90 % commercial feeds	12.03 [b]	12.48 [a]	6.77 [a]	12.18 [b]
20 % banana peelings + 80 % commercial feeds	11.61 [b]	11.89 [a]	6.01 [a]	11.33 [c]

*Means with the same letter superscript are not significantly different

Weight of Major Cuts

Weight of Wings

There were no significant differences seen in terms of wing weight which implies that banana peelings supplemented to the Mallard ducks diet did not make any changes on the weight of wings.

Weight of Back

The results shows that the banana peelings added into the birds' rations affect the weight of back of the dressed Mallard ducks under the different treatments. This reveals that the addition of the banana peelings induced effect on the weight of back presented in Table 1.

Weight of Breast

Weight of the breast is recorded in Table 2. Statistical analysis shows no significant differences on the weight of breast from the different treatments. This reveals that the inclusion of banana peelings on the birds' ration had minimal effect on the breast yield.

Weight of Legs

Table 2 presents the weight of legs. The three treatments summed up with an average weight of 12.19 %. Statistical analysis shows significant differences among the different treatment means which signifies that the birds yielded different amount of meat particularly in the legs with regards to the diet.

Weight of Minor Cuts

Weight of Head

The weight of heads exhibited in Table 3 reveals no significant differences across the different levels of banana peelings in the diet of the Mallard ducks. Head sizes of the replicates from the different treatments were seen to be independent from the diets of the Mallard ducks.

Weight of Neck

In the same table, statistical analysis shows that there were significant differences found among the weights of neck which means that the neck yields of the Mallard ducks fed with or without banana peelings were more or less not alike.

Weight of Feet

Significant differences were noted on the weight of feet based on statistical analysis. It indicates that the birds had more or less different feet yield recorded in Table 3.

Table 3. Weights of head, neck, and feet of the sample birds

TREATMENT	HEAD (%)	NECK (%)	FEET (%)
Pure commercial feeds	6.61 [a]	12.74 [a]	2.26 [a]
10 % banana peelings + 90 % commercial feeds	6.62 [a]	11.13 [b]	1.35 [b]
20 % banana peelings + 80 % commercial feeds	5.87 [a]	9.51 [c]	1.11 [b]

*Means with the same letter superscript are not significantly different

Table 4. Full GIT, empty GIT, gizzard, heart, and liver expressed as percentage of the sample birds

TREATMENT	FULLGIT	EMPTYGIT	GIZZARD	HEART	LIVER
Pure commercial feeds	8.87 [a]	7.10 [a]	6.45 [a]	2.10 [a]	6.29 [a]
10 % banana peelings + 90 % commercial feeds	8.72 [a]	6.77 [a]	6.02 [a]	0.90 [b]	5.41 [a]
20 % banana peelings + 80 % commercial feeds	7.69 [a]	6.15 [a]	5.59 [a]	0.56 [b]	4.76 [a]

*Means with the same letter superscript are not significantly different

Weight of Internal Organs

Weight of Full and Empty GIT

Table 4 presents the full and empty weights of GIT. They were found comparable across the different dietary levels of banana peelings. It indicates that the banana peelings did not induce any change in the gastrointestinal tract weights of the Mallard ducks. Statistical analysis shows that the birds did not have significant differences on the different treatments.

Weight of Gizzard

The gizzard weights displayed in Table 4 were found comparable across levels of banana peelings in the diet. This signifies that banana peelings in the diet of the birds did not produced any adverse effects on this internal organ.

Weight of Heart

Table 4 shows that the banana peelings in the rations of the slaughter birds produced significant effects on the weight of hearts as revealed by the statistical analysis.

Weight of Liver

Liver weights recorded in Table 4 reveals that the banana peelings in the diets of the slaughter birds did not produce significant effects on the weight of the organs. It could be explained that the liver remained on their normal sizes whether the birds were fed with pure commercial feed or with the banana peelings.

Sensory Quality Attributes

Appearance

The appearance of the meat samples displayed in Table 5 ranges from 1.50 to 2.49 for the numerical and moderately desirable for the verbal rating. Based on the statistical analysis, there were significant differences between the numerical means of the birds fed with pure commercial feed compared to the birds fed with banana peelings in the appearance of the meat but all of them fall to one verbal rating. To add, the appearance of meat samples taken from the birds fed with banana peelings are darker in color than those fed with commercial feeds.

It can be assumed that the appearance of the meat produced by Mallard ducks is affected by the diet or the supplementation of the different levels of banana peelings.

Aroma

Table 6 revealed that the banana peelings have an effect on the aroma of the meat produced by the birds based on the result of the evaluation through Organoleptic Test. They all got a verbal rating of like moderately. Statistical analysis showed that there were significant differences between the treatment means in terms of aroma but all of them lie to one verbal rating.

Flavor

In terms of flavor, the meat samples produced significant differences among the treatments that were revealed by the statistical analysis but all of them fall to one verbal rating.The numerical means obtained from the different treatments ranges from 1.50 to 2.49 with a verbal rating of good is presented in Table 7. These results showed that the addition of banana peelings at the levels of 10 to 20 % affect the flavor of the meat.

Table 5. Appearance of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Pure commercial feeds	Moderately Desirable
10 % banana peelings + 90 % commercial feeds	Moderately Desirable
20 % banana peelings + 80 % commercial feeds	Moderately Desirable

Table 6. Aroma of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Pure commercial feeds	Like Moderately
10 % banana peelings + 90 % commercial feeds	Like Moderately
20 % banana peelings + 80 % commercial feeds	Like Moderately

Table 7. Flavor of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Pure commercial feeds	Good
10 % banana peelings + 90 % commercial feeds	Good
20 % banana peelings + 80 % commercial feeds	Good

Tenderness

Tenderness of the meat samples ranges from 1.50 to 2.49 for the numerical rating and moderately tender for the verbal rating is exhibited in Table 8.

Based on the statistical analysis, there were significant differences between the birds fed with commercial feeds compared to the birds fed with 10 to 20 % banana peelings but all of them lie to one verbal rating.

Juiciness

Table 9 displays the juiciness of the meat samples. Statistical results showed that there were no significant differences among the different treatments. The numerical means obtained from the different treatments ranges from 1.50 to 2.49 with a verbal rating of moderately juicy. This signifies that the juiciness of the meat samples derived from the birds in the different treatments was more or less the same. It also shows that the addition of banana peelings did not affect the juiciness of the meat samples produced by the birds.

Acceptability

Table 10 shows that the meat samples taken from the Mallard ducks fed with the different rations were moderately liked by the taste panels.

Table 8. Tenderness of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Pure commercial feeds	Moderately Tender
10 % banana peelings + 90 % commercial feeds	Moderately Tender
20 % banana peelings + 80 % commercial feeds	Moderately Tender

Table 9. Juiciness of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Pure commercial feeds	Moderately Juicy
10 % banana peelings + 90 % commercial feeds	Moderately Juicy
20 % banana peelings + 80 % commercial feeds	Moderately juicy

Table 10. Acceptability of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Pure commercial feeds	Like Moderately
10 % banana peelings + 90 % commercial feeds	Like Moderately
20 % banana peelings + 80 % commercial feeds	Like Moderately

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted to determine the yield and sensory properties of carcass produced from Mallard ducks fed with banana peelings.

Specifically, the study aimed to determine the effect of banana peelings on the carcass weight, dressing percentage of Mallard ducks, and to determine the quality of carcass produced from Mallard ducks fed with banana peelings through Organoleptic Test.

The birds used in the study were 12 heads of Mallard ducks subjected to the following treatments for 90 days: T_0 - pure commercial feeds; T_1 - 10 % banana peelings + 90 % commercial feeds; and T_2 - 20 % banana peelings + 80 % commercial feeds. After the feeding trial, the sample birds were selected for carcass evaluation.

The result of statistical analysis showed significant differences in terms of Organoleptic Test while no significant differences in terms of the different meat cuts of the different treatment.

Conclusion

It is therefore concluded that the sensory properties of carcass from Mallard ducks were affected by the incorporation of banana peelings in the feed. Meanwhile on the yield properties, some of the minor cuts and internal organs were affected while all of the major cuts were not.

Recommendation

Based on the result of the study, it is therefore recommended that banana peelings feed is a good supplement to Mallard ducks.

LITERATURE CITED

ADRIANO, F. T. 1983. The Banana, its Cultivation, Distribution and Uses. 2nd ed. London, Burkworth and C.O.

AFABLE, F. A. 1997. Morphological Variabilities and Blood Protein and Isozyme Polymorphisms in Philippine Mallard (*Anas platyrhynchos Linn.*) and in Muscovy Ducks *(Cairina moschata Linn.)* of the Philippines and Thailand. Ph. D. Thesis, UPLB, College, Laguna.

BABE, H. D. and J. BLAKELY. 1994, the Science of Animal Husbandry, Prentice Hall Career and Technology, New Jersey.

BAHATAN, E. B. 1984. Utilization of milled banana peelings in broiler production. BS Thesis. Mountain State Agricultural College, La Trinidad, Benguet.

BANTASAN, M. T. 1999. A Comparative Study on the Growth Performance of Ducks Fed with Dry Feeds and Those with Wet Feeds. BS Thesis. Benguet State University, La Trinidad, Benguet.

BASILIO, B. 1986. Backyard Duck Raising Extension Bulletin No. 9. U.S.M. Kabacan, Cotabato.

BONDOC, O. L. 1998. Biodiversity of Livestock and Poultry Genetic Resources in the Philippines, Los Baños, Laguna.

CASTILLO, B. S. and GERPACIO. 1976. Nutrient Composition of Some Philippine Feedstuffs. U.P. Los Baños, Laguna.

CONCEPCION, A. G. 1984. Effect of banana fruit peeling as feed supplement in the growth performance of broilers. BS Thesis. Mountain State Agricultural College, La Trinidad, Benguet.

ENSMINGER, M. E. 1980. Poultry Science. 2nd ed. The Interstate Printers and Publishers Inc. Danville, Illinois, United States of America.

GILLESPIE, J. R. 1983. Modern Livestock and Poultry production. 2nd ed. Delmar Publisher Inc. Albany, New York.

GROILER, J. P. 2002. Duck Production. McMillan Publishing Company. United States of America.

HOFFMAN, E. 1992. A Natural History of the South American Pato, *Cairina moschata* Pisa. South America.

HUDA, N. R. AHMAD and K. RAMADHAN. 2010. Agriculture and Food Science Conference. Indianapolis. United States of America.

KAFKER, F. A. 1994. Lexicon Universal Encyclopedia. McMillan Publishing Company. United States of America.

KAMPEN, V. M., M. S. HARUN M. MABASO and R. J. VEENEKLAS. 1998. Breeding Biology of Muscovy Duck *(Cairina moschata)* in Natural Incubation: The Effect of Nesting Behavior on Hatchability. Poultry Sciences, 77: 1280 1286.

LAWAS, M. V. P., B. D. ROXAS and I. A. LAMBIO. 1998. Laying Performance of Philippine Mallard Ducks Fed with Diets Substituted with Fresh *Azolla*. Animal Production Technology II.

MOORE, E. N. and H. SINGH. 1972. Livestock and Poultry Production. Prentice-Hall of India Private Limited, New Delhi, India.

PALAD, M. dP. 1994. Cytogenetics of Pekin *(Anas platyrhynchos L.)*, Philippine Mallard *(Anas platyrhynchos L.)*, Muscovy *(Cairina moschata L.)* duck and their crosses. MS Thesis. UPLB, College, Los Baños, Laguna.

PALOMAR, L. S. 1980. Correlation analysis between live weight and some related dressed carcass and turkey. BS Thesis. Benguet State University, La Trinidad, Benguet.

PAVLOVA, A. 2000. Fruit Nutrition and Evolution. Prentice-Hall Inc. United States of America.

PHILIPPINE COUNCIL FOR AGRICULTURE, FORESTRY AND NATURAL RESOURCES RESEARCH AND DEVELOPMENT (PCARRD). 1991. State of the Art and Abstract Bibliography: Goat Researches. Livestock Series No. 7. UPLB.

PHILIPPINE COUNCIL FOR AGRICULTURE, FORESTRY AND NATURAL RESOURCES RESEARCH AND DEVELOPMENT (PCARRD). 2006. The Philippine Recommends for Duck Egg Production. UPLB. Los Baños, Laguna.

PEREZ, C. B. 1991. The Philippine Recommends for Duck Raising. Philippine Council for Agriculture, Forestry and Natural Resources Research and Development, Los Baños, Laguna.

POND, J. L. 2000. Duck Production. McMillan Publishing Company. New York City, United States of America.

SALDA, M. R. 1980. Performance of Pekin Ducks under Mountain State Agricultural College, BS Thesis. MSAC, La Trinidad, Benguet.

SALMING, R. E. 1985. The Effect of Ground Dried Banana Fruits as a Supplement to Broilers. BS Thesis. Mountain State Agricultural College, La Trinidad, Benguet.

SALTING, P. S. 1979. Feeding of Banana Rejects for Beef Cattle. Animal Husbandry and Agriculture. Journal 12.

SILVERO, V. G. 1981. The Utilizing of Banana Meat in Hog Ration. Bureau of Animal Industry and National Science Development Board.

SINGH, H. AND E. N. MOORE. 1978. Livestock and Poultry Production. 2nd ed. Prentice - Hall of India Private Limited, New Delhi, India.

SISON, J. A. 1982. Animal Feed Service Bulletin, Animal Feed Control Division, Bureau of Animal Husbandry, Visayas Avenue, Diliman, Quezon City.

TANGPEP, J. 2011. Yield and Sensory Properties of Carcass from Broilers Fed with Silkworm Pupa Meal. BS Thesis. Benguet State University, La Trinidad, Benguet.

ZAINAI, M. A. 2002. Duck Meat Production. McMillan Publishing Company. USA.