## BIBLIOGRAPHY

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## ABSTRACT

This study was conducted to determine the effect of home-mixed ration on the carcass characteristics of colored broilers.

It aimed to find out the effect of home-mixed ration on the dressing percentage of colored broilers under La Trinidad condition. It also aimed to evaluate the organoleptic quality of meat produced. The treatments used were as follows: T0=commercial feeds, T1= A. 35% corn + 18% soy bean + 10% rice bran+ 20% mongo + 15% copra meal, B= 40% corn + 10% soybean + 20% rice bran + 15% mongo + 15% copra meal, T2= A. 40% corn + 25% soybean + 23% mongo + 7% chayote + 5% galiang tuber, B. 40 % corn + 20% soybean + 18% mongo + 12% chayote + 10% galiang tubers. A total of 24 birds were slaughtered for the evaluation.

This result indicated that there were no significant differences between treatments in terms of the mean weight and mean percentage of the slaughter, dressed, abdominal fat, legs, breast, wings, head, neck, feet, heart liver, gizzard, full and empty gastrointestinal tract (GIT).

On the other hand, significance differences among treatments were noted in terms of mean weight and mean percentage of back and mean percentage of the abdominal fat.

In sensory properties there were no significant differences among treatments in terms of appearance, aroma, tenderness, juiciness, taste, and acceptability. Generally, colored broiler given home-mixed ration had a higher percentage of back and abdominal fat and improved sensory properties produced from colored broiler.

# INTRODUCTION

Poultry production has now occupied a leading role among agricultural industries in many parts of the world particularly in the Philippines. A colored broiler is one of the most important animal protein sources for the people as the price is relatively affordable. In our locality, we prefer to buy poultry meat because it is cheaper than those meats coming from different livestock animals and they are being naturally grown in a free-range style.

Poultry carcass produces high quality nutritious value, flavor, texture, and eating quality of meat as commodity. Chicken meat yield is likewise affected by management techniques, nutrition, weather and rearing conditions, genetics, transportation, and the ability of the birds to respond to the environment (Bertol, 2004).

Gill (2002) as cited by Kalinggan (2012) mentioned that to produce good quality meat, it is best to use organic feeds because they are formulated ration without synthetic chemicals such as antibiotics.

Characteristics of the meat depend on the management and feeding practices of the owner. Due to high cost of feedstuff, poultry raisers tend to formulate feed rations using naturally available feedstuffs such as the home-mixed ration without downgrading the meat characteristics.

This study served as a basis for colored broiler raisers in formulating ration on readily available feedstuffs on their locality to improve the performance of colored broilers and have higher income and to discourage the rampant use of synthetic supplements in food animals if it is proven effective. Furthermore, it hopes to promote the use of home-mixed ration in improving the carcass characteristics of animals such as colored broilers. Also, it served as standard information for students and future researchers.

Generally, the study was conducted to evaluate the carcass characteristics of colored broilers given different home-mixed ration. Specifically, it aimed to determine: the effect of home-mixed ration on the dressing percentage of colored broilers under La Trinidad condition; the characteristic of carcass produced from colored broilers fed with home-mixed ration through organoleptic testing; and the home-mixed ration that will give the best characteristic of colored broiler carcass.

The study was conducted at the Benguet State University, Meat laboratory at Balili, La Trinidad, Benguet on September 2012.

# REVIEW OF LITERATURE

The nutritive value of poultry is not confined to its nutritional content and completeness of the protein, it is also due to fat and the ratio of individual fatty acids. White meat chicken and turkey, quail meat differs little fat, so it is more commonly used in dietetic food. It is desirable that in the muscle, fat content does not exceed 3.5-4%. Lipids of chicken meat in contrast to the lipids of meat other farm animals to humans are rich in essential fatty acids — linoleic, linolenic and arachidonic, which accounted for 22% of the mass of all fat (Agro and Food Union, 2010).

Coma (2000) cited that nutrients may have significant effects on certain attributes of meat quality. Meat quality is a complex without a single definition. Fresh meat attributes such as colors, quality of fats, tenderness, juiciness and flavor are essential in order to drive the purchase and assure consumers fidelity. In addition, we must not forget the interrelation with the other elements of production process like genetic handling and slaughter.

A poultry carcass should produce high yield of meat of good nutritional value and eating quality. On the other hand as a commodity, it has to meet the requirement of the customers in terms of attractive color and appearance of the products offered (Paris, 1998). Quality also include the nutrient value, flavor and smell and especially free from chemical residues (Inocencio 2001 as cited by Donguez, 2004).

Castellini *et al.,* (2002) as cited by Velarde (2010) stated that a good quality meat is characterized by many factors, but the true importance is the nutrient present in the meat or lean. Animals fed with commercial feeds or diets with additional chemicals have greater effect on the growth performance but have lesser quality of meat. The odor of the meat is

fishy and when being cooked, it also gives out odor. The lean comprises of residues of chemicals such as antibiotics, chromium and other metallic based chemicals, which gives hazard to consumers. On the other hand, animals grown organically, produced meat which has lesser fats and the nutrients present are compounds digestible by the body and not hazardous to the consumers. The meat has an aroma of freshness as compared to the commercially produced meat.

Martin (1992) mentioned that visual traits of the carcass are of practical importance because they are the qualities that can be evaluated. The freezing technique can have a significant effect on the lightness and uniformity in the appearance of the frozen carcass especially in broilers which are accumulated in the subcutaneous fat mainly in certain areas in the skin, such as along the feather line (Paris, 1998).

Breed and feeds given to the animals are one of the contributing factors affecting yield, quality, and nutritional value of meat. A good breed and a good ration is recommended as a source of good quality and nutritional value poultry meat. Formulated feeds from plant and animal protein are a good substitute for commercial feeds. Feeds are necessary in the production of poultry for it sustains the birds and the one being converted into meat for human consumption (Musa, 2006).

Organoleptic Test

Anonymous, stated that an organoleptic test will be done to determine the acceptability of the colored broilers meat coming from the different treatments. Two samples were taken from each treatment to be used for the test. Organoleptic evaluation consists in describing the attributes of food, in this special case of meat and meat products

that can be perceived by the sense organs. The attributes to be evaluated are texture and consistency, smell, and taste.

Texture and consistency (tenderness and juiciness). Meat prepared for the consumer should be tender and juicy. Meat tenderness depends on the animal species from which the meat originates. Lamb, pork and poultry meat are sufficiently tender after slaughter, but beef requires a certain period of maturation to achieve optimal eating quality. Texture and consistency, including juiciness, are an important criterion, still neglected by many consumers, for the eating quality of meat. Often consumers do not know that the eating quality of meat can be upgraded by ripening, especially in the case of beef and similar meats. There is also a great deal of consumer negligence in how to prepare meat. It should be cooked to become sufficiently tender, but cooking should not be too intense otherwise the meat becomes dry, hard and with no juiciness. The simple way to check the consistency of foods is by chewing. Although this test seems easy, in practice it is rather complicated. Taste panelists need experience, particularly when the different samples have to be ranked, for example which sample is the toughest, the second toughest or the most tender. The texture is of less importance in meat products, such as cured or canned products, sausages, etc., because they are either made of comminuted meat and/or meat which has undergone heat treatment or long maturation periods and will therefore generally be tender. On the other hand, inadequate processing methods (too intensive cooking, curing, comminuting) may cause losses in the desired consistency and juiciness, and the best way to check this is by chewing.

Smell and taste (aroma and flavor). These characteristics are related to each other to a certain extent because they have to be evaluated together for the reliable determination of a product's flavor. The smell of fresh meat should be slightly acidic, increasing in relation to the duration of the ripening period because of the formation of acids such as lactic acid. On the other hand, meat in decomposition generates an increasingly unpleasant odor owing to substances originating from the bacterial degradation of the meat proteins, such as sulphur compounds, mercaptane, etc.

The freshness of meat is generally indicated by its smell together with its appearance and color. Sorting out deteriorated meat is mandatory from the point of view of the product's palatability. It is also important because of the fact that high bacterial contamination of meat in decomposition could be accompanied by food-poisoning bacteria(pathogens), which have a deleterious impact on consumers' health. On the other hand, the best fresh meat can also be heavily contaminated with food-poisoning bacteria because these micro-organisms do not cause organoleptic alterations by destruction of meat proteins. Food poisoning can therefore only be avoided by proper hygienic meat handling. The flavor of fresh meat can also be checked by putting small samples (approx. 10 pieces of 1 $cm^3$ each) in preheated water of 80°C for about five minutes (boiling test). The odor of the cooking broth and the taste of the warm meat samples will indicate whether the meat was fresh or in deterioration or subject to undesired influences, for instance rancidity of the meat fat, any a typical meat flavor due to the feed and the sex (boar taint) of the animal or treatment with veterinary drugs shortly before slaughter. When processing the meat, the smell and taste of the meat products can differ a great deal owing to heat treatment and the use of salt, spices and food additives. Every meat product has its typical smell and taste,

and the test person should know about it. Changes in these qualities indicate the use of improper raw materials or a deterioration of the meat product during storage. Experience is required to become acquainted with the typical flavor (smell and taste) of foods. Only four basic taste components--sweet, sour, bitter and salty--will be perceived by the taste buds. These receptors are small papillae located in certain areas of the tongue. However, the overall flavor consists of smell and taste produced by the meat components and influenced and covered by spices and those compounds produced by ripening or heat treatment. Flavor test panelists should be aware of these special cases. Panelists should not smoke or eat spicy meals before starting the test and should rinse their mouth frequently with warm water during the test. Sensory evaluation plays an important role in the examination of meat and meat products. Not only does scientific sensory evaluation with skilled panelists using special test programs and point systems give reliable results, but useful results can also be obtained in a simple way at the consumer level. For the average consumer sensory evaluation is the only way to decide whether or not he or she should buy or eat a certain product. In developing countries consumers do not receive sufficient information and training on this point, although it is often the only means available for quality control. Sensory evaluation is easy to understand and to perform. What is needed is a basic knowledge of the composition of foods and their typical texture, color and flavor.

# MATERIALS AND METHODS

## Experimental Materials

The materials that were utilized in the study were 24 heads of 60-days old colored broilers taken from a growth study, weighing scale, slaughtering materials such as knives or blades, bolo, basin, chopping board and pot for boiling water, camera, record book and pen.

## Experimental Procedures

Completely Randomized Design (CRD) was used in the study. Eight birds weighing about 2kg were taken out from each treatment making a total of 24 heads of 60-days old colored broilers. The different treatments were:

$T_0$- commercial feeds

$T_1$-Home-mixed Ration A- 35% corn+18% soybean+10% rice bran+20% mungo+15% copra meal

Home-mixed Ration B-40% corn+10% soybean+20% rice bran+15% mungo+15% copra meal

$T_2$-Home-mixed Ration C- 40% corn+25% soybean+23% mungo+7% chayote+5% galiang tubers

Home-mixed Ration D- 40% corn+20% soybean+18% mungo+12% chayote+10% galiang tubers

Slaughtering of Birds

Before dressing, the live weights of the birds taken individually (Figure 1). The birds were confined in cages and fasted for 8 hours but water was provided *ad libitum* (Figure 2). At the time of slaughtering or dressing, each bird was secured by holding both shanks to prevent struggling. With the help of an assistant, sticking was done by severing the large blood vessel of the neck at the lateral side below the mandible. Complete bleeding was accomplished by raising the bird approximately $45^0$C so that the caudal part will be higher than the head. After sticking, the birds were immersed into a hot water about a minute, after which its feathers was plucked. Re- immersing was done when some of the feathers are hard to pluck. 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 the wind pipe were pulled out from the base of the mandible. For easy insertion of the hand, a slit was made around the vent and then down to the keel. The hand was inserted into the slit in the abdominal cavity then to the abdominal attachment of the entrails. After the entrails were pulled out, the liver, heart and gizzard with proventriculus were separated. The head was detached from the atlanto-occipital joint, which was accomplished by severing skin, muscle and ligaments at the said joint with sharp knife.

Sensory Evaluation

The chicken meat sample for taste test was taken from the breast portion of the carcass. The meat was cooked in a steamer for 45 minutes without adding salt or any spice ingredients. The meat was sliced into bite sizes and was placed on a plastic cups then presented to a panel of tasters for them to give their evaluation on the sensory traits of the

cooked meat. To minimize residues of the meat tasted by each panel taster that might affect the rating on the succeeding samples, each taster was requested to drink water before and after tasting each sample. Panel of tasters composed of 20 persons, invited randomly to taste the cooked samples. A score sheet was provided for the panel to mark their evaluation.

Data Gathered

The following parameters gathered from the study:

1. Slaughter weight (kg). This was the weight of the bird before slaughter time.

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

3. Weight of abdominal fat (g). This was the weight of the abdominal fat.

4. Weight of the major cuts (g). This includes the weight of the legs (including thigh), breast, back, and wings.

5. Weight of other cuts (g). This includes the weight of head, neck, and feet.

6. Weight of internal organs (g). This was the weight of heart, liver, gizzard, full GIT, and empty GIT.

7. Meat quality. This was taken through organoleptic test and includes aroma, appearance, tenderness, juiciness, taste, general acceptability.

Data Computed

From the data above, the following data will be computed:

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

2. Percentage of major cuts (%). This was obtained by dividing the weight of

the major cuts by the dressed weight multiplied by 100: which includes the following: legs (including the thigh), breast, back, and wings.

3. Percentage of other cuts (%). This was obtained by dividing the weight of the other cuts by the dressed weight multiplied by 100 which includes the following: head, neck, and feet.

4. Percentage of edible internal organs (%). This was obtained by dividing the weight of the internal organs by the dressed weight multiplied by 100 which includes the following: heart, liver, gizzard, full GIT, and empty GIT.

Data Analysis

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

## RESULT AND DISCUSSION

### Slaughter and Carcass Weights and Dressing Percentage

After eight hours of fasting, the birds were slaughtered. Table 1 presents the mean slaughter and carcass weights and dressing percentage of 60 days old colored broilers. Statistical analysis revealed that there were no significant differences in terms of slaughter and carcass weight. This proves the homogeneity of birds used in the study. The weight of the birds ranged from 1.7 to 2.0 kilograms.

Table 1 also presents no significant differences among treatment means in terms of dressing as revealed by statistical analysis. The dressing recovery from birds regardless of treatment was comparable. This shows giving home mixed ration to the birds does not affect the dressing percentage of the birds. The dressing percentage in the study reached the 70% industry standard.

Table 1. Mean slaughter and carcass weight and dressing percentage

| TREATMENT | SLAUGHTER WEIGHT (KG) | CARCASS WEIGHT (KG) | DRESSING PERCENTAGE |
|---|---|---|---|
| Commercial feeds | 1.91[a] | 1.19[a] | 62.53[a] |
| Home-mixed ration A and B | 1.90[a] | 1.21[a] | 64.12[a] |
| Home-mixed ration C and D | 1.84[a] | 1.14[a] | 61.53[a] |

*Means with the same letter are not significantly different at 0.05 by DMRT

Weight of Major Cuts

Table 2 presents the mean weight and percentage of major cuts particularly the breast, back, legs, and wings expressed as portion of the carcass weight as affected by the different treatments. The table shows that there were no significant differences between treatments. Based on numerical values in terms of leg weight, it was observed that treatment 1 had the mean percentage of 33.52 followed by treatment 2 which had a mean percentage of 32.83 and the birds given commercial feeds had a mean percentage of 32.54. In terms of mean weights of breast and wings, birds which were given the different rations have produced more or less the same weights for the said cuts.

The table further shows that there were significant differences among treatments in terms of the back weight. Birds given treatment 1 ration and treatment 2 ration attained the highest mean percentage of 21.63 % and 22.11% respectively compared to bird that were not given home mixed ration which had a mean percentage of 20.38%. This implies that giving home mixed ration to colored broilers could significantly increase the mean percentage of back.

Weight of Heart, Liver, and Gizzard

Table 3 presents the mean weight of heart, liver, and gizzard as percentage of carcass weight derived from the different treatments. Statistical analysis revealed no significant differences among treatments. This proves that supplementing colored broilers with different levels of home-mixed ration has no effect on the mean percentage of the heart, liver, and gizzard.

Table 2. Weight of major cuts as percentage of dressed weight

| TREATMENT | LEGS | WINGS | BREAST | BACK |
|---|---|---|---|---|
| Commercial feeds | 32.54[a] | 13.73[a] | 33.34[a] | 20.38[b] |
| Home-mixed ration A and B | 32.54[a] | 13.44[a] | 31.74[a] | 21.63[a] |
| Home-mixed ration C and D | 32.83[a] | 13.26[a] | 31.74[a] | 22.11[a] |

*Mean with the same letter are not significantly different at 0.05 by DMRT

Weight of Abdominal Fat

Table 4 shows the mean weight of abdominal fats of colored broilers. Statistical analysis revealed that there were no significant differences among the mean weight of the carcass, but was found significant on the mean percentage. It was observed that the birds given the different levels of home-mixed ration had a mean of 4.30 % and 4.40% which was significantly heavier than birds given commercial feeds with a mean of 2.75%. This implies that supplementing of home-mixed ration to colored broilers could increase the weight abdominal fats.

Weight of Full and Empty GIT

It showed in Table 5 that the mean weight of full and empty GIT were found to be comparable between the different levels of home-mixed ration. This signifies that varying levels of home-mixed ration does not cause any change in the weight of gastrointestinal tract of colored broilers.

Table 3. Weight of heart, liver, and gizzard as percentage of dressed weight

| TREATMENT | HEART | LIVER | GIZZARD |
|---|---|---|---|
| Commercial feeds | 0.84[a] | 3.26[a] | 2.38[a] |
| Home-mixed ration A and B | 0.77[a] | 3.32[a] | 2.45[a] |
| Home-mixed ration C and D | 0.95[a] | 3.76[a] | 2.55[a] |

*Means with the same letter are not significantly different at 0.05 by DMRT

Table 4. Weight of abdominal fats as percentage of dressed weight

| TREATMENT | MEAN |
|---|---|
| Commercial feeds | 2.75[a] |
| Home-mixed ration A and B | 4.30[a] |
| Home-mixed ration C and D | 4.40[a] |

*Means with the same letter are not significantly different at 0.05 by DMRT

Table 5. Weight of full and empty GIT as percentage of dressed weight

| TREATMENT | FULL GIT | EMPTY GIT |
|---|---|---|
| Commercial feeds | 6.85[a] | 5.06[a] |
| Home-mixed ration A and B | 6.89[a] | 5.54[a] |
| Home-mixed ration C and D | 8.84[a] | 6.50[a] |

*Mean with the same letter are not significantly different at 0.05 by DMRT

Weight of Head, Neck, and feet

Table 6 shows the mean weight of head, neck, and feet expressed as portion of the carcass weight as affected by different treatments. The table shows that there were no significant differences between treatments in terms of percent head, neck, and feet.

This signifies that using home-mixed ration as feed supplement could not increase the weight of head, neck, and feet of colored broilers.

Table 6. Weight of head, neck, and feet as percentage of dressed weight

| TREATMENT | HEAD | NECK | FEET |
|---|---|---|---|
| Commercial feeds | 4.54[a] | 7.63[a] | 7.74[a] |
| Home-mixed ration A and B | 4.68[a] | 6.20[a] | 8.55[a] |
| Home-mixed ration C and D | 4.99[a] | 8.97[a] | 8.11[a] |

*Means with the same letter are not significantly different at 0.05 by DMRT

Table 7. Sensory evaluation summary

| SENSORY TRAITS | VERBAL DESCRIPTION |
|---|---|
| Appearance | |
| Commercial Feeds | Desirable |
| Home-mixed ration A and B | Moderately Desirable |
| Home-mixed ration C and D | Moderately Desirable |
| Aroma | |
| Commercial Feeds | Like Much |
| Home-mixed ration A and B | Like Much |
| Home-mixed ration C and D | Like Much |
| Tenderness | |
| Commercial Feeds | Moderately Tender |
| Home-mixed ration A and B | Moderately Tender |
| Home-mixed ration C and D | Moderately Tender |
| Juiciness | |
| Commercial Feeds | Moderately Juicy |
| Home-mixed ration A and B | Moderately Juicy |
| Home-mixed ration C and D | Moderately Juicy |
| Taste | |
| Commercial Feeds | Moderately Good |
| Home-mixed ration A and B | Moderately Good |
| Home-mixed ration C and D | Moderately Good |
| Acceptability | |
| Commercial Feeds | Like Much |
| Home-mixed ration A and B | Like Much |
| Home-mixed ration C and D | Like Much |

## Sensory Quality Attributes

Table 7 shows the sensory evaluation summary of appearance as influenced by the treatments. The birds given commercial feeds had a verbal description of desirable while birds given the home-mixed ration rated moderately desirable, this indicates a difference among treatments based on verbal description. The aroma as affected by the different treatments was rated as like much in all treatments. The tenderness of meat samples based on the verbal description of tasters, the products under the different treatments were all rated moderately tender. Result of juiciness evaluation as affected by the different

treatments were rated to be moderately juicy in all treatments. This implies that colored broilers meat in all treatments were more or less the same in terms of meat juiciness. The result of meat taste evaluated was rated to be moderately good in all treatments. Acceptability of meat samples were rated to be like much verbally in all treatments.

# SUMMARY, CONCLUSION AND RECOMMENDATION

## Summary

The study was conducted to determine the carcass characteristics of colored broilers given home-mixed ration on September 15, 2012 at the Meat Laboratory Room, Benguet State University.

It was conducted generally to evaluate the effect of home-mixed ration on the carcass characteristics of colored broilers and specifically, to determine the effect of home-mixed ration on the dressing percentage under La Trinidad condition and to characterize the effect of the formulated ration on the carcass produced from colored broilers through organoleptic test, and also to determine which ration will give the best characteristics of colored broiler carcass. The treatments used were as follows; $T_0$ (commercial feeds); $T_1$ (A-35% corn+18% soybean+10% rice bran+20% munggo+15% copra meal), (B-40% corn+10% Soybean+20% rice bran+15% munggo+15% copra meal) $T_2$ (A-40% corn+25% soybean+23% munggo+7% chayote+5% galiang tuber), (B-40% corn+20% soybean+18% munggo+12% chayote+10% galiang tubers).

Basing on the statistical analysis there were no significant differences in terms of slaughter weight, dressed weight, weight of legs, wings, breast, weight of minor cuts, weight of heart, liver, gizzard, and weight of full and empty GIT expressed as percent of carcass weight. However, weight of back and percentage of abdominal fat had significant differences.

In terms of weight of back, birds given $T_2$ (A-40% corn+25% soybean+23% munggo+7% chayote+5% galiang tuber), (B-40% corn+20% soybean+18% munggo+12% chayote+10% galiang tubers) garnered the highest back percentage with a mean of 22.11%,

followed by birds given $T_1$ (A-35% corn+18% soybean+10% rice bran+20% munggo+15% copra meal), (B-40% corn+10% Soybean+20% rice bran+15% munggo+15% copra meal) with a mean of 21.63% and birds given commercial feeds had a mean of 20.38%.

Additionally, as for verbal description there were no differences in terms of aroma, tenderness, juiciness, taste, and acceptability. As for appearance it showed that there were differences in terms verbal description.

## Conclusion

Based from the results and observation, it is therefore concluded that using home-mixed ration increased the percent of back and percent of abdominal fat of carcass from colored broilers.

## Recommendation

This study covered the effect of home-mixed ration on the carcass characteristics and sensory properties; it is interesting to know how home mixed ration affect the meat quality and this could be scope of a further study.

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