

BIBLIOGRAPHY

CAYTAP, JANINE K. APRIL 2012. Carcass Yield and Quality of Sunshine Chicken Fed with Ground Hot Pepper as Feed Additive. Benguet State University, La Trinidad Benguet.

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ABSTRACT

This study was conducted to determine the effect of ground hot pepper on the carcass yield and quality of Sunshine chicken. Specifically, the study aimed to determine the effect of ground hot pepper on the dressing percentage and to determine the quality of carcass product from Sunshine chickens fed with different level of ground hot pepper through organoleptic test.

A total of 12 Sunshine chickens were picked as samples from a previously concluded growth feeding trials with the following treatments: Pure commercial feeds, 5g ground hot pepper /kg of commercial feed, 10 g ground hot pepper /kg of commercial feed, 15 g ground hot pepper /kg of commercial feed.

Result revealed that there were no significant differences between treatment in terms of dressing percentage, meat cuts as percentage of slaughter weight and the organoleptic test of the different birds in each treatment. A significant difference were observed in the percentage of the head although this was most likely due to the difference in cutting the head from the carcass and not the inclusion of ground hot pepper into the feeds of the birds. A significant difference was also observed in the aroma. The average



dressing percentage of the birds obtained in this study was 58.12 %. The mean weight of the major meat cuts expressed as percentage of the slaughtered weight were as follows: 13.03 % for the breast, 8.09 % for the back, 8.87 % for the wings, and 19.37 % for the legs.

Based on the results of the study it is therefore concluded that the carcass yield and quality of the meat of Sunshine chickens were not affected when birds are fed with ground hot pepper at the level of 5-15g /kg of commercial feeds.



INTRODUCTION

Meat is not only one of the very oldest food for humans, but is also the most biologically valuable. This is mainly due to its high nutrient content. A part of the human requirements for nutrient is covered by eating meat. Humans have been consuming meat as part of their diet for most of their existence and will likely continue this behavior for a long period of time. It is not surprising that meat has an special high importance in the menu planning of those people who like to deliver extreme performance on their daily life.

One of the sources of meat of man is chicken and the consumption of chicken meat is steadily rising. Many people are now health conscious and are best on eating more health food products. Because of this, chicken meat with its good nutrient content and low fat content is often preferred rather than other meats.

However, it is not only the fat content of the meat that is being looked into by the meat consumers but also the presence of chemical residues in the meat brought about by feed additives like antibiotics and other growth promotants. With this, many meat consumers prefer to eat meat of organically grown animals which include chicken or those animals that have been fed with organic diets and have been raised without the use of hormones, antibiotics and other.

To satisfy the increasing demand of meat consumers today on the preference of organic meat, this study was then realized to determine the carcass yield and quality of Sunshine chicken fed with ground hot pepper as feed additive and it hopes to promote the use of natural products as feed additives.



Specifically, this study aimed to determine the dressing percentage, carcass yield and the carcass quality of the Sunshine chicken fed with different levels of ground hot pepper through organoleptic test.

This study was conducted at the Meat Laboratory of the Department of Animal Science on July 2011.



REVIEW OF LITERATURE

Pepper fruits are very popular due to their health-promoting properties associated with their high content of vitamins C and E that are present in high concentration in various pepper types (Howard *et al*, 2000).

Capsicum frutescent or siling labuyo is a small, erect, branched, half-woody, with oblong-ovate leaves and flowers that are either solitary or several in each axel. The fruit is commonly red when ripe, oblong-lanceolate in shape, and the seeds are numerous discoid. The fruit contains the active principal capsaicin 0.14% and capsicum. It contains fatty oils, 15-20% volatile oil, starch 0.8-1.2%, pentosans 8.57%, and pectins 2.33% (Quisumbing, 1978).

According to Sumathy Kutty and Mathew (1987), *Capsicum frutescent* is grown for its spice and vegetable green fruits of commerce. It has different uses at mature green, red ripe and dried stages. It is valued for its pungency which is due to crystalline acrid volatile alkaloid capsaicin, present in the placenta of fruits. Capsaicin has diverse prophylactic and therapeutic uses in allopathic and ayurvedic medicine.

The hot taste of peppers arises from capsaicinoids, alkaloids specific for the *Capsicum* genus. Based on their capsaicinoid contents, peppers may be classified as hot, semi-hot and sweet. Capsaicin, the main compound of capsaicinoids, has been studied extensively to exploit its potentially therapeutic value (Long and Madeiros, 2001; Kogure *et al*, 2002; Szolcsanyi, 2004). It is considered as an analgesic and anti-inflammatory drug (Szocsanyi, 2004).

Coma (2000) mention that nutrition may have a significant effect on certain attributes of meat quality. Meat quality is complex without a single definition. Fresh meat



attributes such color, 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 other elements of production process like genetic handling and slaughtering.

When it comes to meat, qualitative studies have found that freshness, sensory factors and perceived 'healthfulness' are the most important drivers of product choice. Poultry tends to be perceived more favorably than beef or pork in terms of these attributes (Verbeke and Beliefe, 1999).

Also when compared with other meat, chicken has slightly higher protein content but the total fat content is no more than 20% of that of other meat. The saturated fatty acid content is 50% that of other meat and the level of polyunsaturated fats slightly higher, thus placing chicken very favorably with respect to human nutrition (Paul and Southgate, 1978).

Poultry accounts for the major part of all meat produced in many countries. It is not just pertaining to its meat but also to its nutritional value. According to Paris (1998) a poultry carcass should produce high yield of meat of good nutritional value and eating and as a commodity, it has to meet the requirement of the costumer. Quality should include nutrient value flavor and especially free from chemical residue.

To produce a good quality of meat, it is best to use organic feeds which are formulated ration without using synthetic chemicals. Formulated ration such as organic feeds are economical than commercial feeds. Organic chicken refers to animals reared in semi out-door conditions and feed diets without using chemicals (Gill, 2000).



METHODOLOGY

Materials

The different materials used in the study were as follows: 12 heads of 45 days old Sunshine chicken, weighing scale, slaughtering materials such as sticking knife, butchering knife and bolo, pot for boiling water; stove, water, basin, camera and a record notebook.

Methods

Experimental birds and treatment. The birds used in the study were taken from a previous growth study which utilized the following treatments;

To- control (pure commercial feed)

T₁- 5 grams ground hot pepper per kg of commercial feed

T₂- 10 grams ground hot pepper per kg of commercial feed

T₃- 15 grams ground hot pepper per kg of commercial feed

After a feeding period of 45 days, three birds representing three replications were taken from each treatment and served as samples for carcass evaluation. The above treatments used in the growth trial were also followed in this study.

Slaughtering of birds. The live weights of the birds were taken individually before dressing. Prior to dressing, the birds were confined in cages and fasted for 8 hours but water was provided *ad libitum*. At the time of slaughtering or dressing, birds were restrained by holding both of their 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. To have better bleeding, each bird was raised with the caudal part higher than the head. After bleeding, each bird was immersed into hot water for about a minute, after



which, its feathers were plucked. Re-immersing was done when some feathers were hard to pluck. After plucking, the birds were washed thoroughly and made ready for evisceration.

Evisceration was done by laying the birds with its back on the table. The esophagus and windpipe were pulled out from the base of mandible. For easy insertion of the hand, a slit was made around the vent and then down to the keel. The hand was then inserted into the slit in the abdomen and the visceral organs were pulled out. After entrails were pulled out, the liver, heart and gizzard with proventriculus were separated. The head was detached at the atlanto occipital joint which was accomplished by severing the skin, muscle and ligaments at the said joint with sharp knife.

Carcass yield evaluation. The dressed chickens were then chopped into the standard cuts, namely the legs, breast, back, wings, feet, neck and head and these were weighed individually and were recorded in grams (Figures 1-7). The internal organs such as the heart, gizzard and GIT (full and empty) were likewise weighed.

Carcass quality evaluation. The meat samples for taste test were taken from the breast portion of the carcass. These were cooked in four cups of water at the same time in the same type of utensil (casserole) for 45 minutes. Cooking was done per treatment. After cooking, meat samples were sliced into bite sizes after which these were presented to a panel of tasters. The panel of tasters was composed of 10 professionals and 10 students. Each member of the panel was provided with a score card for him to put his rating after tasting each sample. Also, each member was requested to rinse his mouth after each taste to remove any remains of the meat samples previously eaten that may have affect his rating for the succeeding meat sample.





Figure 2. Weighing of feet from the slughtered birds



Figure 3. Weighing of wings from the slaughtered birds

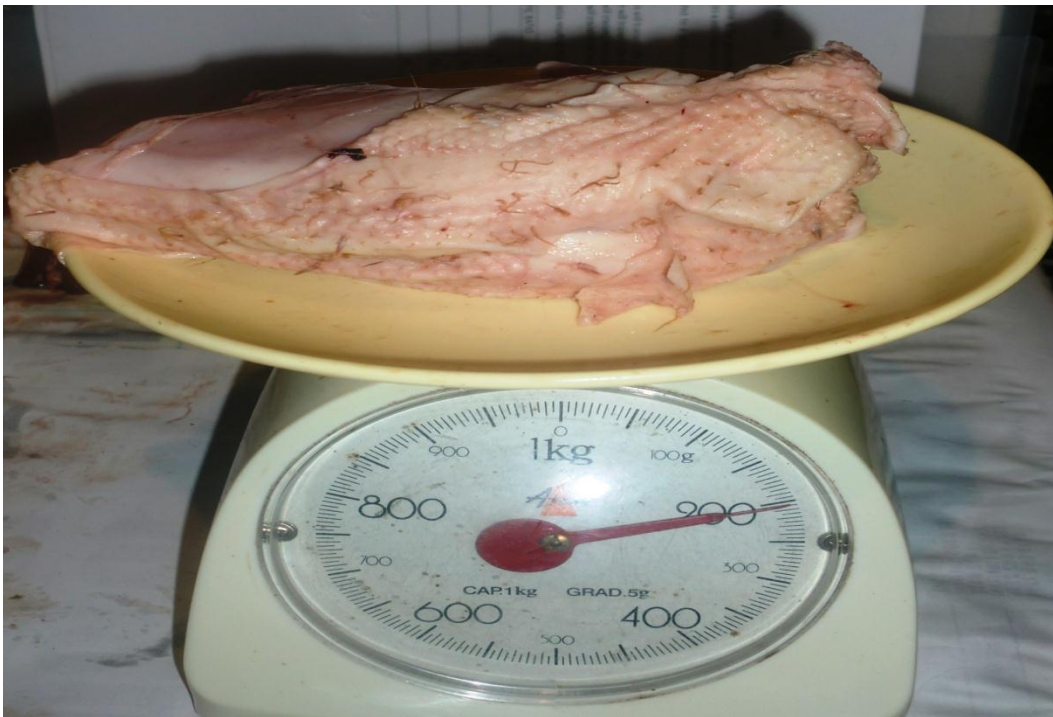


Figure 4. Weighing of breast from the slaughtered birds



Figure 5. Weighing of neck of from the slaughtered birds



Figure 6. Weighing of head from the slaughtered birds

Data Gathered

The following parameters were gathered from the study:

1. Slaughter weight (kg). This was the weight of the bird before slaughtering.
2. Dressed weight (kg). This was the weight of bird's carcass after plucking the feathers, and removing the head, feet and entrails.
3. Weight of legs (g). This was obtained by weighing the legs separately from the other cuts.
4. Weight of breast (g). This was obtained by taking the weight of the breast from each carcass.
5. Weight of the back (g). This was obtained by taking the weight of the back from each carcass.
6. Weight of the wings (g). This was obtained by taking the weight of the wings from each carcass.
7. Weight of the feet (g). This was obtained by taking the weight of the feet from each carcass.
8. Weight of the neck (g). This was obtained by taking the weight of the neck from each carcass.
9. Weight of the head (g). This was obtained by weighing the head from each carcass.
10. Weight of the heart (g). This was obtained by taking the weight of the heart from each carcass.
11. Weight of the liver (g). This was obtained by taking the weight of the liver from each carcass



12. Weight of the gizzard (g). This was obtained by taking the weight of the gizzard of each carcass.

13. Weight of the GIT (full) (g). This was obtained by the weighing of the GIT with it's contents.

14. Weight of the empty GIT (empty) (g). This was obtained by taking the weight of the GIT after it has been emptied.

15. Meat appearance, aroma, juiciness, tenderness, flavor and acceptability. These were obtained through organoleptic involving a panel of taster's.

Data Computed

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

2. Percentage weight of the different cuts (%). This was obtained by dividing the actual weight of the meat cut by the slaughter weight multiplied by 100%.

Data Analysis

The data gathered were consolidated, tabulated and analyzed using the analysis of Variance for Completely Randomized Design. Treatment means were compared using Duncans Multiple Range Test (DMRT).



RESULTS AND DISCUSSION

Slaughter Weight, Dressed Weight, and Dressing Percentage

Table 1 presents the slaughter weights, dressed weights and dressing percentage of the birds in the different treatments. In terms of slaughter weights, statistical analysis revealed that there were no significant differences between treatment means of birds given pure commercial feed and those birds given 5-15 grams ground hot pepper /kg of commercial feed offered to them. This means that the sample birds used in the study were more or less of the same weight of slaughter. The birds had an overall mean slaughter weight of 1.25 kg.

Similarly, true to both the dressed weight and the dressing percentage, no significant differences were also observed between treatment means. Noticeable differences are observed as percentage in the Table but such differences were still considered small to cause significant effects as revealed by the statistical differences. The non-significance between treatment means means that the dressed weight and the dressing percentage of the sample birds in all the treatments were more or less the same.

Table 1. Slaughter weight, dressed weight, and dressing percentage of sample birds.

TREATMENT	MEAN*		
	SLAUGHTER WEIGHT(kg)	DRESSED WEIGHT(kg)	DRESSING PERCENTAGE(%)
Pure commercial feed	1.35 ^a	0.79 ^a	58.27 ^a
5 grams ground hot pepper/kg CF	1.27 ^a	0.73 ^a	58.06 ^a
10 grams of ground hot pepper/kg CF	1.17 ^a	0.68 ^a	58.61 ^a
15 grams of ground hot pepper/kg CF	1.23 ^a	0.71 ^a	57.53 ^a

*Mean with the same letters are not significant different at 5% level, DMRT



The dressed weight of the birds ranged from 0.68 to 0.79 kg and the dressing percentage ranged from 57.53 to 58.61 %. The dressed weight did not include both the weights of the head and feet so that in terms of dressing percentage, it appears that the values obtained were very much lower compared to the average dressing percentage of broiler chickens.

Major Meat Cuts Yields

Table 2 presents the weight of the major meat cuts namely the back, breast, wings and legs expressed as percentage of the slaughter weight. True to all the above parameters, no significant differences were obtained between treatment means. This implied that the weight of the major meat cuts expressed as percentage of the slaughter weight were more or less similar. It is also implied that though there are noticeable differences between treatment means as presented in the Table, such difference were still considered small to cause significant effects. Moreover it is also implied that the addition of the ground hot pepper into the feeds of the birds at the level of 5-15 grams/kg commercial feed did not affect the weights of the major cuts.

Table 2. Weight of the back, breast, wings and legs expressed as percentage of the slaughter weight of sample birds (%)

TREATMENT	MEAN*			
	BACK	BREAST	WINGS	LEGS
Pure commercial feed	14.51 ^a	17.76 ^a	8.52 ^a	18.36 ^a
5 grams ground hot pepper/kg CF	12.84 ^a	17.84 ^a	8.74 ^a	19.74 ^a
10 grams of ground hot pepper/kg CF	12.74 ^a	17.52 ^a	9.31 ^a	20.02 ^a
15 grams of ground hot pepper/kg CF	12.04 ^a	19.22 ^a	8.92 ^a	19.21 ^a

*Mean with the same letters are not significant different at 5% level, DMRT



Minor Meat Cuts Yields

The weight of the minor meat cuts namely the feet, neck and head in the different treatments are shown in Table 3. It is shown in the Table that there were no significant differences between treatment means in the percent weight of the feet and neck. Which means that the addition of ground hot pepper into the feeds of the birds at the level of 5-15 g/kg feed did not affect the weight of the feet and neck. There are noticeable differences, as presented in the Table, however, such differences were still considered small to cause significant differences. A significant effect was observed in the percent weight of the head. One probable cause of this significant is due to the inaccuracy how the head was cut but most likely this was caused by the differences in cutting the head and not due to the inclusion of ground hot pepper into the feeds of the birds.

Table 3. Weights of the feet, neck and head expressed as percentage of the slaughter weight of sample birds (%)

TREATMENT	MEAN*		
	FEET	NECK	HEAD
Pure commercial feed	4.68 ^a	4.33 ^a	3.33 ^b
5 grams ground hot pepper/kg CF	4.93 ^a	4.08 ^a	3.83 ^{ab}
10 grams of ground hot pepper/kg CF	7.22 ^a	4.14 ^a	4.44 ^a
15 grams of ground hot pepper/kg CF	5.02 ^a	4.02 ^a	3.40 ^b

*Mean with the same letters is not significant different at 5% level, DMRT



Yield of the Internal Organs

The weight of internal organs as percentage of the slaughter weight of the birds in all treatments are presented in Table 4 and 5. Similar to the major meat cuts, statistical analysis revealed no significant differences between treatment means in the percent weight of GIT (full and empty), gizzard, liver and the heart. This implied that the percent weight of the above internal organs of the birds in different treatments were more or less similar. It is also implied that adding ground hot pepper into the ration of the birds at the level of 5-15 g/kg feed probably did not cause any adverse effect on the growth or development of such organs for these to be more or less of the same percent weight. The mean percentage of the internal organs was 10.41 % and 6.99 % for the GIT, (full and empty), respectively; 2.90% for the gizzard, 1.01 % for the heart and 2.66 % for the liver.

Figure 7 shows the percentage of meat cuts and entrails.

Table 4. Weight of the GIT (full and empty) and gizzard as percentage of the slaughter weight of sample birds (%)

TREATMENT	MEAN*		
	FULL GIT	EMPTY GIT	GIZZARD
Pure commercial feed	7.17 ^a	5.64 ^a	2.98 ^a
5 grams ground hot pepper/kg CF	11.27 ^a	7.53 ^a	3.34 ^a
10 grams of ground hot pepper/kg CF	12.17 ^a	8.56 ^a	2.86 ^a
15 grams of ground hot pepper/kg CF	11.04 ^a	6.23 ^a	2.43 ^a

*Mean with the same letters are not significant different at 5% level, DMRT



Table 5. Weights of the heart and liver expressed as percentage of slaughter weight of the sample birds (%)

TREATMENT	MEAN*	
	HEART	LIVER
Pure commercial feed	1.12 ^a	2.34 ^a
5 grams ground hot pepper/kg CF	0.95 ^a	3.03 ^a
10 grams of ground hot pepper/kg CF	1.14 ^a	2.86 ^a
15 grams of ground hot pepper/kg CF	0.83 ^a	2.43 ^a

*Mean with the same letters are not significant different at 5% level, DMRT

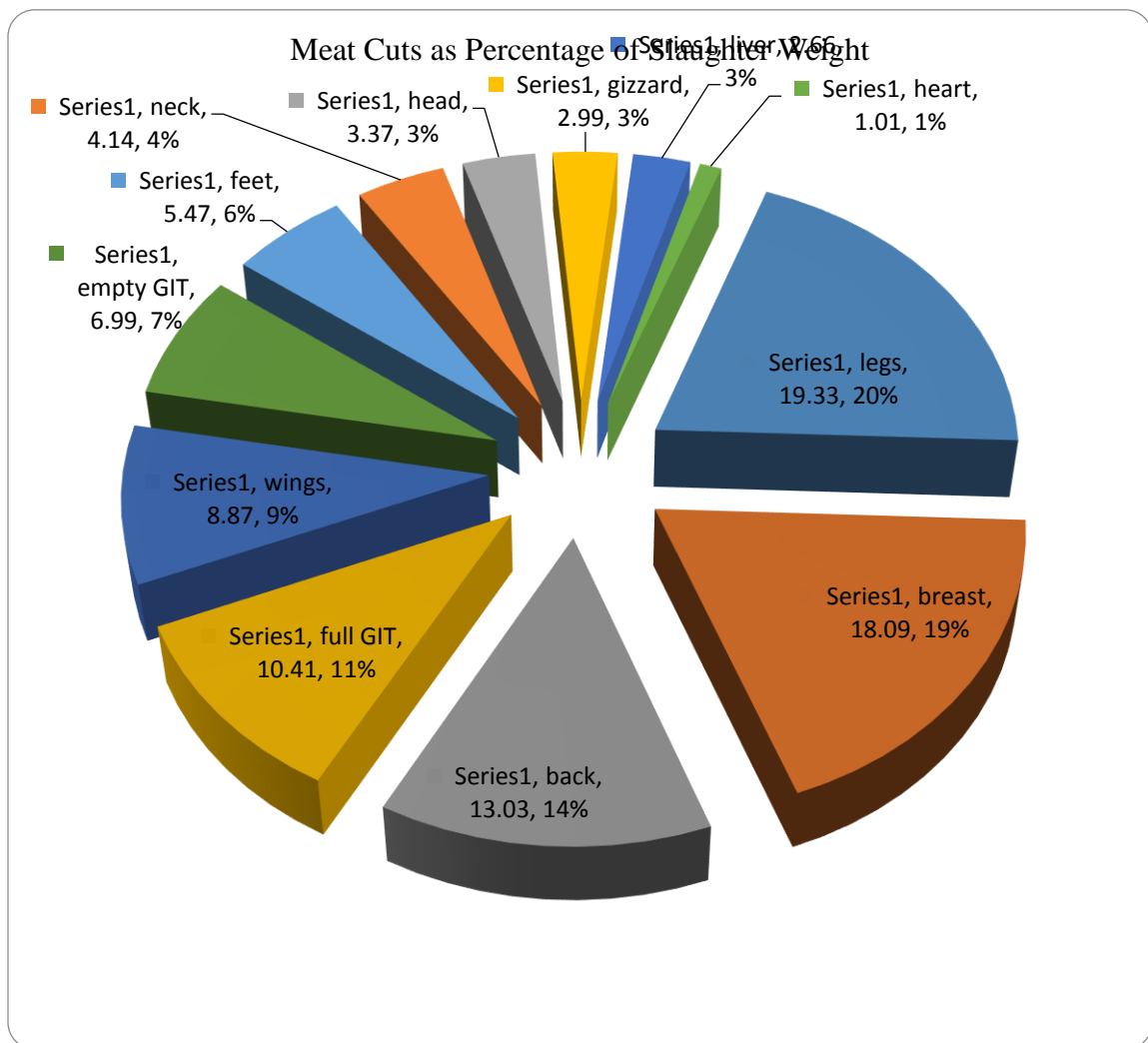


Figure 7. Pie Graph of Meat Cuts and Entrails



Sensory Quality Attributes

Appearance. Table 6 shows the ratings for appearance of the meat in the different treatment. Statistical analysis revealed no significant differences between treatment means which indicates that the appearance of the meat in the different treatments were more or less similar. It also implied that the ground hot pepper added to the ration of the birds at the level of 5-15 g/kg feed did not alter the appearance of the meat. In verbal description, the meat samples in the different treatment were all rated as desirable in appearance by the member of the panel of tasters.

Aroma. Table 7 shows the aroma of the meat samples in the different treatments as evaluated by the panel of tasters. It appears that there are significant differences between treatment means. McWilliams (2003) cited that, the volatility and detection of aroma are related to the temperature of food. It is the high temperature tends to volatize aromatic compounds making them apparent for judging. However, in verbal description the meat aromas of the samples in the different treatments were all rated liked very much.

Table 6. Appearance of the cooked meat samples in the different treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
Pure commercial feed	2.54 ^a	Desirable
5 grams ground hot pepper/kg CF	2.60 ^a	Desirable
10 grams of ground hot pepper/kg CF	2.56 ^a	Desirable
15 grams of ground hot pepper/kg CF	2.54 ^a	Desirable

*Mean with the same letters are not significant different at 5% level, DMRT



Table 7. Aroma of the cooked meat samples in the different treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
Pure commercial feed	2.64 ^{bc}	Like very much
5 grams ground hot pepper/kg CF	2.54 ^a	Like very much
10 grams of ground hot pepper/kg CF	2.68 ^c	Like very much
15 grams of ground hot pepper/kg CF	2.56 ^{ab}	Like very much

*Mean with the same letters are not significant different at 5% level, DMRT

Tenderness. Table 8 presents the ratings for tenderness of the meat samples in the different treatments. Similar to appearance statistical analysis revealed no significant differences between treatment means. This means also that the tenderness of the meat samples from the different treatment was more or less the same and adding 5-15g of ground hot pepper for every kilogram of feed offered to the birds did not reduce nor improve the tenderness of the meat. The meat samples in the different treatments were all rated verbally as slightly tender.

Table 8. Tenderness of the cooked meat samples in the different treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
Pure commercial feed	2.40 ^a	Slightly tender
5 grams ground hot pepper/kg CF	2.38 ^a	Slightly tender
10 grams of ground hot pepper/kg CF	2.43 ^a	Slightly tender
15 grams of ground hot pepper/kg CF	2.33 ^a	Slightly tender

*Mean with the same letters are not significant different at 5% level, DMRT



Juiciness. The juiciness of the meat samples in the different treatment are presented in Table 9. No significant differences among treatment means were revealed by the statistical analysis. This means that meat samples from the different treatment had more or less the same juiciness. Also, it means that the ground hot pepper, when added into the diet of the birds at the level of 5-15 g/kg feed, does not affect the juiciness of the meat of such birds when slaughtered. In verbal description, the meat samples in the different treatments were all rated slightly juicy.

Flavor. Table 10 shows the ratings for flavor of the meat samples from the different treatments. Statistically, no significant differences were observed between treatment means indicating that the meat from the different treatments had more or less the same flavor. It also indicates that the ground hot pepper, when added into the diets of the birds at the level of 5-15 g/kg feed, did not affect the flavor of the meat. However, in verbal description the meat samples derived from birds given pure commercial feed was rated very good while the meat samples derived from birds given ground hot pepper were rated as good only.

Table 9. Juiciness of the cooked meat samples in the different treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
Pure commercial feed	2.44 ^a	Like moderately
5 grams ground hot pepper/kg CF	2.45 ^a	Like moderately
10 grams of ground hot pepper/kg CF	2.33 ^a	Like moderately
15 grams of ground hot pepper/kg CF	2.34 ^a	Like moderately

*Mean with the same letters are not significant different at 5% level, DMRT



Acceptability. Table 11 presents the overall acceptability of the meat samples in the different treatments as evaluated by the panel of tasters. Statistical analysis showed that there were no significant differences among treatment means. However, in verbal description, the meat samples derived from birds given ground hot pepper were liked very much by the panel of tasters while the meat samples derived from birds given pure commercial feeds or given no ground hot pepper were liked moderately.

Table 10. Flavor of the cooked meat samples in the different treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
Pure commercial feed	2.50 ^a	Very good
5 grams ground hot pepper/kg CF	2.43 ^a	Good
10 grams of ground hot pepper/kg CF	2.38 ^a	Good
15 grams of ground hot pepper/kg CF	2.36 ^a	Good

*Mean with the same letters are not significant different at 5% level, DMRT

Table 11. Acceptability of the cooked meat samples in the different treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
Pure commercial feed	2.49 ^a	Like moderately
5 grams ground hot pepper/kg CF	2.56 ^a	Like very much
10 grams of ground hot pepper/kg CF	2.50 ^a	Like very much
15 grams of ground hot pepper/kg CF	2.50 ^a	Like very much

*Mean with the same letters are not significant different at 5% level, DMRT



SUMMARY, CONCLUSION, RECOMMENDATION

Summary

The study was conducted to determine the effect of ground hot pepper on the carcass yield and quality of Sunshine chicken.

Specifically, the study aimed to determine the effect of ground hot pepper on the dressing percentage and carcass quality Sunshine chickens fed with different levels of ground hot pepper through organoleptic test. The treatments were as follows. Pure commercial feeds, 5g ground hot pepper per kg of commercial feeds, 10g ground hot pepper per kg of commercial feeds and 15g ground hot pepper per kg of commercial feeds. The dressed weight range from 0.68 to 0.79 kg and the dressing percentage ranged from 57.53 to 58.61 % (feet and head off). No significant differences were also observed in the weight of the major meat cuts yields namely the back, breast, wings and legs expressed as percentage of the slaughter weight. The percent back range from 12.04 to 14.57 %; 17.52 to 19.22 % for percent breast, 8.52 to 9.31 % for percent wings, and 18.36 to 20.02 % for percent legs. However, no significant differences were also observed in the percent feet and neck. Significant differences were observed on the percent head but this was caused by the differences in cutting to separate the head from the carcass and not because of the inclusion of ground hot pepper into the feeds of the birds.

In terms of organoleptic test, results of the study also showed that there were no significant differences in the appearance, tenderness, juiciness, flavor and the overall acceptability of the meat samples. Significant differences were observed in the aroma as revealed by the statistical analysis. However the aroma of the meat samples in all the meat sample in all the treatments were liked very much.



Conclusion

Based on the results of the study it is therefore concluded that the carcass yield and quality of the meat of Sunshine chickens were not affected when birds are fed with ground hot pepper at the level of 5-15g /kg of commercial feeds.

Recommendation

Based on the result of the study, ground hot pepper may be fed to broilers at the levels of 5-15g /kg of commercial feed because of its effect on the growth of the birds but not on carcass quality.



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