BIBLIOGRAPHY

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ABSTRACT

The study was conducted to determine the effect of hot pepper as feed additive on colored broiler chickens. Specifically, it aimed to determine the effect of hot pepper on the feed consumption, gain in weight, feed conversion ratio and morbidity and mortality rates of colored broiler chickens fed with diets supplemented with different levels of diced hot pepper. The different levels of hot pepper composed the different treatments which were as follows; T_o- 0g hot pepper (pure commercial feeds), T_1- 5g diced hot pepper/ kg feeds, T_2- 10g diced hot pepper/ kg feeds and T_3- 15g diced hot pepper/ kg feeds. This study was conducted at theBenguet State University Experimental House, Balili, La Trinidad, Benguet from April to May 2010.

One hundred sixty (160), 7-day old Colored Broiler Chickens were randomly distributed into four treatments following the Completely Randomized Design (CRD). Each treatment had four replications with 10 birds per replication.

Results of the study revealed that there were no significant difference between the two treatments in terms of initial weight and feed conversion ratio. Significant difference were observed between the treatments in terms of the final weight, gain in weight and feed

consumptions of the birds. Birds given diced hot pepper at the level of 15g/kg feed, were heavier in weights at the end of the study and had higher gain in weight compared to those birds that were not given diced hot pepper. The birds given diced hot pepper had better resistance to diseases which resulted to a higher profit.

Although the return on investments (ROI) was not subjected to statistical analysis, result of the study showed that better ROI obtained from the birds given diced hot pepper. Those birds given diced hot pepper at the level of 15g had an ROI of 12.55% and birds given 5g and 10g with ROI's of 2.49% and 2.15%, respectively.

INTRODUCTION

Poultry is one of the world's major and fastest growing sources of meat. In recent years, poultry farming has increased throughout the world, especially in developing countries. According to the PCARRD and BAR (2006), the projections for the overall world production of poultry in the year 2010 will increase twofold, while the increase in developing countries alone will be threefold.

In the Philippines, livestock and poultry industries contributed about one third of the Gross Value Added on Agriculture. Although poultry farming supplies the populations in large urban centers with animal proteins, it should be acknowledge that this form of farming is very expensive and depends mainly on imported inputs. This form of rearing essentially requires chicks from selected stocks and whole feeds made from raw materials which are mainly imported (PCARRD and BAR, 2006).

Family poultry are still very important in low-income food-deficit countries. However, the incidence of diseases is one of the major constraints to small holder poultry production systems. Newcastle disease, the most serious epizootic poultry disease in most low-income food-deficit countries, occurs every year and kills on average 70-80% of the unvaccinated rural family poultry flocks. Ethnoveterinary medicine is widely used by resource-poor Family Poultry-keeping farmers. Natural products, especially plant products that are locally available, are generally used. Although Family Poultry-keeping farmers claim that these practices are effective, there is an urgent need for applied research to substantiate their findings (Gueye, 1999).

One of the plants that is claimed to be used to treat various unknown diseases, including Newcastle disease is the hot pepper or silinglabuyo (Capsicum frutescens) (Gueye, 1999).

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

This study was conducted to find out the effect of hot pepper as a feed additive to Sunshine chickens. The result of the study will benefit not only the researcher but also the poultry raisers most especially that the use of apathetic antibiotics in treating diseases is limited or even banned in other countries. It can also serve as basis for other researchersto come up with other related studies.

This study was conducted to determine the effect of hot pepper as feed additive on the growth performance of colored broiler chickens. Specifically, it aimed to determine the effect of hot pepper on the growth rate, feed consumption, gain in weight, feed conversion ratio, morbidity and mortality rates of colored broiler.

This study was conducted at the Poultry Experimental House of Benguet State University, La Trinidad, Benguet from April to May 2011.

REVIEW OF LITERATURE

Capsicum is commonly a spicy flavoring for foods and the peppers are eaten as a vegetable in many parts of the world. Among other countries, capsicum contains potassium and vitamin C. Usually the peppers are dried and ground into powder for medicine. The active ingredients include only compound called oleoresins which temporarily irritate the eyes. Interestingly, birds do not have the ability to taste capsicum. Therefore, it may be added to bird's feeds for commercially-raised birds as a way to keep small mammals from eating the bird's feed (Jensen and Curtis, 2003).

Capsaicin is said to do many miraculous things medicinally. One of the most miraculous is probably its ability to prevent or even stop a heart attack. It increases heart action without raising blood pressure. It also thins your blood and reduces the risks of suffering a stroke. Another good property that cayenne possesses is it acts as an internal disinfectant. It can detoxify the colon and help with eliminative functions (Godwin, 2001).

Birds do not have the same sensitivity to capsaicin, because it targets a specific pain receptor in mammals. Chili peppers are eaten by birds living in the chili peppers' natural range. The seeds of the peppers are distributed by the birds that drop the seeds while eating the pods, and the seeds pass through the digestive tract unharmed. This relationship may have promoted the evolution of the protective capsaicin. Products based on this substance have been sold to treat the seeds in bird feeders to deter squirrels and other mammalian vermin without also deterring birds. Capsaicin is also a defense mechanism against microbial fungi that invade through punctures made in the outer skin by various insects (Tewksbury and Nabhan, 2001).

Some other medicinal uses of cayenne are of pain relievers, by being put on topically to the area. If you have a cut it can stop the bleeding, or it can be taken internally to relieve pain from stomach ulcers by creating more mucous and coating the wall of the stomach. Capsicum also has properties, which can knock out cold and flu miseries, or when used as a gargle can relieve sore throat pain. People with diabetes may take it to lower their blood sugar levels. Cayenne is also very high in vitamin C so it acts as a preventative against respiratory infections and can help strengthen the immune system. It has also been proposed that the capsaicinoids might be useful in fighting cancer. So cayenne is an all around great medicinal plant that can be used for a very large variety of whatever might be ailing you (Manzoni, 2001).

Capsicum sp is reported to be widely used to treat various unknown diseases, including Newcastle disease. Capsaicin the pungent agent in capsicum sp was indeed found to increase bird's resistance against major threats (Gueye, 1999).

Antibiotics are substances added to feeds that are not included for their nutritional values, but are in one way or another improves animal performances or efficiency of animal production (Cheeke, 1990).

Sas (1990) stated that many plants have health giving properties that enable the system to clean itself expelling the toxins and controlling the acidity of the blood. Plants also supply certain elements that are vital for health including vitamins and minerals, so that the organ may be stimulated or brought to normal activity.

Capsaicin, 8-methyl-n-vanilyl-6-nonenamide, is the active substance found in pure extracts of hot peppers. Capsaicin oleoresin, the active substance found in crude extracts,

contains 0.02% capsaicin, 1.55% volatile oils, a fixed oil and up to 0.2% ascorbic acid (*Tyler et al*.,2001).

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

MATERIALS AND METHODS

Materials

The materials used in the study were 160 straight-run Colored Broiler chickens, commercial feeds, brooding-rearing cages, weighing scale, newspaper sheets, feeding and drinking troughs, record book, ball pen, stick brooms, disinfectant, 100 watts incandescent bulbs and diced hot peppers

Methodology

Pre-experimental period. A week before the arrival of the chicks, cages and all equipment were cleaned and disinfected. The floor of the brooders was covered with old newspaper sheets to help conserve heat during the brooding period and served as feed receptacles during the first days of brooding. The 100 watt bulbs were installed as a source of heat to the chicks.

Upon arrival, the chicks were placed inside the brooder and were fed with chick booster feeds. Water was available to them at all times. Restricted feeding was done to the experimental birds.

Experimental design and treatments. Following the Completely Randomized Design (CRD), the 160 broiler chicks were divided into four treatments. Each treatment was replicated four times with 10 birds per replication making a total of 40 birds per treatment.

The different treatments were as follows:

T_o= 0g diced hot pepper or pure commercial feeds (C.F)

$T_{1=}$ 5g diced hot pepper per kg feeds (Figure 1)

T_2= 10g diced hot pepper per kg feeds (Figure 2)

T_3= 15g diced hot pepper per kg feeds (Figure 3)

All the experimental birds were subjected to the same management practices except for the level of diced hot pepper given to them depending on what treatment where these were assigned. The diced hot pepper was mixed into the feeds given to the birds. The addition of diced hot pepper started on the 8th day of brooding until end of the study or when birds were 60 days old.

The hot pepper was cut into approximately 3mm so that the experimental birds can eat it. Hot peppers were collected from Mountain Province and Benguet.

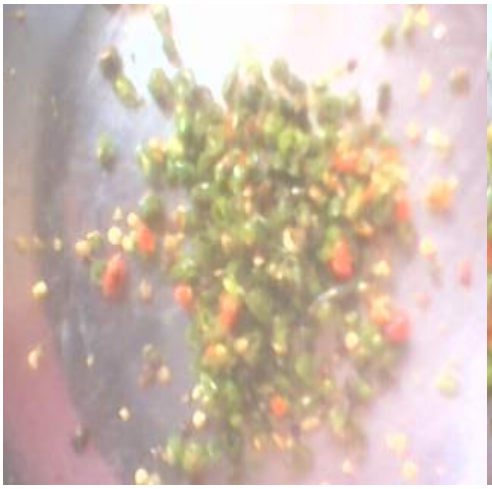

Figure 2. 5g diced hot pepper

Figure 3. 10g diced hot pepper

Figure 4. 15g diced hot pepper

Data Gathered

The data gathered were the following:

1. Initial weight (kg). This was taken by weighing the birds at the start of the study on the 8th day of brooding.

2. Final weight (kg). This was taken by weighing the birds at the end of the study which was at 60 days old.

3. Feed offered (g). This was the amount of feeds given to the birds each day.

4. Feed leftover (g).This was the amount of feeds not consumed by the birds which was obtained every day before feeding in the morning.

5. Cost of production (Php). This includes the cost of stocks, feeds, labor and other materials that were used in the study.

6. Morbidity. This refers to the number of birds that got sick during the duration of the study.

7. Mortality. This was the number of birds that died during the duration of the study.

Data computed:

1. Total gain in weight of the birds (kg). This was obtained by subtracting the initial weights from the final weights of the birds.

2. Total feed consumption (kg). This was obtained by adding the total amount of feed eaten by the birds from the beginning until the end of the study

3. Feed conversion ratio. This was obtained by dividing the total feed consumption by the total gain in weight.

4. Morbidity rate (%). This was computed by dividing the number of sick birds by the number of birds at the start of the study multiplied by 100 percent.

5. Mortality rate (%).This was computed by dividing the number of dead birds by the number of birds at the start of the study multiplied by 100 percent.

6. Gross income. This was obtained by multiplying the final weight of the birds by the price per kilogram live weight.

7. Net income. This was obtained by subtracting the total cost of production from the total sales or gross income.

8. Return on investment. This was obtained by dividing the net income by the total cost of production multiplied by 100 percent.

Data Analysis

The data gathered were consolidated, tabulated and analyzed using the Analysis of Variance for Completely Randomized Design (CRD) and treatment means were compared using the Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Body Weights

The initial weights of the birds in the different treatments are shown in Table 1. Statistical analysis revealed that there were no significant differences among the treatments. While there are slight differences observed in the initial weights of the experimental birds as presented in the Table, such differences were minimal to cause significant differences among the treatments. The result implies that the experimental birds were more or less of the same weight at the start of the study. The meaninitial weight of the birds was 0.12 kg.

Table 1 also presents the final weights of the experimental birds under the different treatments. Statistical analysis revealed that there were significant differences among the treatment means. Generally, the birds given diced hot pepper had heavier weights than the control birds or those that were given no diced hot pepper. Birds given 15 grams of hot pepper per kilogram of feeds had final weight with a mean 1.328 kg, followed by the birds given 5 and 10 grams of hot pepper per kilogram of feeds with means of 1.219 kg and 1.196 kg, respectively. The birds in the control group hadthe lowest final weight with a mean of 1.139 kg.

Table 1. Body weights of birds in the different treatment at 7 and 60 days of age

TREATMENT	INITIAL WEIGHT (kg)	FINAL WEIGHT (kg)
0g hot pepper per kg feeds	0.117[a]	1.139[c]
5g hot pepper per kg feeds	0.120[a]	1.219[b]
10g hot pepper per kg feeds	0.120[a]	1.196[b]
15g hot pepper per kg feeds	0.120[a]	1.328[a]

Means with the same superscript are not significantly different at 0.05 level DMRT

Gain in Weight

Table 2 shows the gains in weight of the birds in the different treatments. Statistical analysis revealed that there were significant differences among the treatment means. The gains in weight follow the trend in a final weight where the birds given diced hot pepper, most especially those given higher levels, had higher gains in weight compared to the control birds or those that were not given diced hot pepper. Birds given 15 grams of hot pepper per kilogram of feeds had the highest gain in weight with a mean of 1.193kg, followed by the birds given 5 and 10 grams of hot pepper per kilogram of feeds with means of 1.099kg and 1.148kg, respectively. Birds in the control had the lowest gain in weight with a mean of 1.022 kg. The birds given diced hot pepper most especially those given at the level of 15g/kg feed did not suffer from any illness, hence, their growth was not disturbed or affected. On the other hand, some of the birds in the control group suffered from respiratory problem and this affected their growth and hence the lower gains in weight obtained.

Table 2. Total gains in weight of the birds in the different treatments

TREATMENT	TOTAL GAIN (kg)
0g hot pepper per kg feeds	1.022[c]
5g hot pepper per kg feeds	1.099[b]
10g hot pepper per kg feeds	1.148[b]
15g hot pepper per kg feeds	1.193[a]

Means with the same superscript are not significantly different at 0.05 level DMRT

Feed Consumption

The total feed consumptions of the birds in the different treatments are shown in Table 3. Statistical analysis revealed that there were significant differences among treatments. Birds fed with diced hot pepper given at the level of 15g per kilogram feeds had the highest feed consumption with a mean of 3.250kg, followed by those given levels of 5 and 10 grams diced hot pepper per kilogram feeds with means of 3.150kg and 3.125kg, respectively. Birds in the control group had the lowest feed consumption with a mean of 2.981kg. This implies that the diced hot pepper mixed into the ration had made the ration more palatable, hence, higher feed consumptions were observed from the birds given diced hot pepper.

Table 3.Total feed consumption of the birds per treatment

TREATMENT (kg)	TOTAL FEED CONSUMPTION
0g hot pepper per kg feeds	2.981[c]
5g hot pepper per kg feeds	3.125[b]
10g hot pepper per kg feeds	3.150[b]
15g hot pepper per kg feeds	3.250[a]

Means with the same superscript are not significantly different at 0.05 level DMRT

Feed Conversion Ratio

Presented in Table 4 are the feed conversion ratios of the birds in all the treatments. Statistical analysis revealed that there were no significant differences in all the treatments. This means that the birds in all the treatments had consumed more or less the same amount of feeds to produce a unit gain in weight. Generally, the birds given ground hot pepper had higher feed consumptions compared to those not given ground hot pepper (control birds). However, they had higher gains in weight and so their feed conversion ratios were not greatly affected. The overall mean feed conversion ratio of the birds was 2.81.

Morbidity and Mortality

Presented in Table 5 are the morbidity and mortality rates in the different treatments. It is revealed in the Table that 25% or 10 of the 40 birds in the control group suffered from a disease specifically colds. This was also true to the birds given diced hot pepper at the level of 5g/kg feed. From the 10 that got sick in the control birds, 8 died.

Table 4. Feed conversion ratio of the birds in the different treatments

TREATMENT RATIO	FEED CONVERTION
0g hot pepper per kg feeds	2.92[a]
5g hot pepper per kg feeds	2.84[a]
10g hot pepper per kg feeds	2.76[a]
15g hot pepper per kg feeds	2.72[a]

Means with the same superscript are not significantly different at 0.05 level DMRT

Table 5. Morbidity and mortality rates of the birds

TREATMENT	MORBIDITY	MORTALITY
0g hot pepper per kg feeds	25	20
5g hot pepper per kg feeds	10	5
10g hot pepper per kg feeds	0	0
15g hot pepper per kg feeds	0	0

Also from the birds given diced hot pepper at the level of 5g/kg feed, 2 out of the eight that got sick, died. On the other hand, neither mortality nor even morbidity was observed from the birds given diced hot peppers at the levels of 10-15g/kg feed.

The above results reveal that giving diced hot peppers to the birds improved the resistance of the birds to combat diseases. This finding agrees with Gueye (1999) who reported that capsaicin, the pungent agent in Capsicum sp or hot pepper increases the birds resistance against major threats.

Return on Investment

The returns on investment in the different treatments are shown in Table 6. Even though this was not subjected to statistical analysis, it is shown in the Table that the highest profit was obtained from the birds given 15g diced hot pepper which had an ROI of 12.55%. This was followed by given those given 5 and 10g diced hot pepper with ROI's of 2.9% and 2.15%, respectively. The birds in the control group or those that were not given diced hot pepper had a zero ROI.

Higher profits were observed from the birds given diced hot pepper most especially those given at the level of 15g/kg feed because the birds under this group had heavier final weights. As such, higher sales were obtained from them.

Table 6. Return on investment

TREATMENT	TOTAL SALES (Php)	TOTAL COST (Php)	NET INCOME (Php)	ROI (%)
Pure commercial feeds	5,925	6,066	0	0
5g hot pepper per kg Commercial feed	6,360	6,205	155	2.49
10g hot pepper per kg Commercial feed	6,433	6,297	136	2.15
15g hot pepper per kg Commercial feed	7,273	6,462	811	12.55

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted to determine the effect of diced hot pepper as feed additive on colored broiler chickens. Specifically, it aimed to determine the feed consumption; gain in weight; feed conversion ratio; morbidity and mortality rates; and the profitability of raising colored broiler chickens when diced hot pepper are mixed into their feeds.

A total of 160 seven (7) days old colored broiler chickens were used in the study. Following the Completely Randomized Design (CRD), the birds were distributed into four treatments. Each treatment was replicated four times with 10 birds per replication. The different treatments were as follows: 0g diced hot pepper or pure commercial feeds (C.F); 5g diced hot pepper per 1 kilogram of commercial feeds; 10g of diced hot pepper per 1 kilogram of commercial feeds; and 15g diced hot pepper per 1 kilogram of commercial feeds.

Results of the study revealed that there were no significant differences between the two treatments in terms of initial weight and feed conversion ratio. Significant differences were observed in the final weights, gains in weight and feed consumptions of the birds. Birds given diced hot pepper most especially those given at the level of 15g/kg feed, were heavier in weights at the end of the study and had higher gains in weight compared to those birds that were not given diced hot pepper. The birds given diced hot pepper had better resistance also which resulted to a higher profit.

Although the return on investments (ROI) was not subjected to statistical analysis, result of the study showed that better ROI were obtained from the birds given hot pepper.

Those birds given diced hot pepper at the level of 15g had an ROI of 12.55% and birds given 5g and 10g had ROI's of 2.49% and 2.15%, respectively.

Conclusion

Based on the results and observations in the study, it is therefore concluded that diced hot pepper when added into the bird's ration at the level of 5-15g/kg feed, results to higher gains in weight. However, to have higher income, diced hot pepper should be added into the birds ration at the level of 15g/kg feed.

Recommendation

Based on the outcome of the study, the researcher recommends that diced hot pepper may be incorporated into the ration of the birds at the level of 15g/kg feed to improve the gains in weight and resistance of the birds and to increase profit.

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