BIBLIOGRAPHY

MARLON C. APLATEN. APRIL 2012. Response of Broilers Given Different Levels of Hot Pepper (*Capsicum frutescens)*. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study was conducted to determine the response of broilers given different levels of hot pepper. Generally, it aimed to determine the daily gain in weight, feed consumption and feed efficiency of broilers feed with hot pepper; determine the effect of hot pepper on the morbidity and mortality of broilers, and determine the best level of hot pepper that could be added to the ration of broilers without producing undesirable responses on growth.

High significant differences were noted in terms of gain in weight, feed consumption and feed efficiency. After 21 days of trial feeding, the birds fed with 25g ground hot pepper were heavier in final weights and had better feed efficiency. Better ROI's were obtained from the birds given hot pepper.

It is therefore concluded that hot pepper can be incorporated on the diet of broiler with advantage in terms of gain in weight, feed consumption and feed efficiency. Furthermore, it is recommended that hot pepper can be added in the broilers feed to increase weight.

INTRODUCTION

One of the goals in broiler production is to produce meat efficiency at the least possible cost. The common method is the use of feed additives such as antibiotics that would promote faster growth and better utilization of nutrients in feed. However, the use of antibiotics, which used to be uncontrolled and common among animal producers in the Philippines, must be, minimized if not stopped because of its possible side effects on human health, particularly on the issue of drug resistance.

According to some studies, synthetic chemicals such as antibiotics in small amount can pass through the food chain. At present almost all the food of the animals are full of chemicals and it can affect the health safety of the consumers.

The use of herbal and natural products is to prevent or cure diseases. Herbal and natural products have proven quite effective in treating certain diseases in animal and they are cost effective and available in the backyards.

Siling labuyo or hot pepper *(Capsicum frutescens)* is a small, spreading shrub found throughout the Philippines. Fruits can be used directly from the plant, can be kept in a refrigerator or can be dried and ground for long storage.

The fruits contain 0.1-0.15% capsaicin. This substance stimulates the circulation and alters temperature regulation. The seed contains capsicidins which are thought to have antibiotic properties (Anonymous, 2000). With this characteristic, it is of great importance therefore to study it with broilers.

It is also important to study the effects of this plant (*siling labuyo*) to poultry because of its medicinal value and common observation that native chickens like to pick

its fruit aside from the fact that it grows quickly and easily, requiring no special growing techniques.

According to Batay-an's study, having treatments of zero, five, ten, and fifteen grams of *Capsicum frutescens* incorporated with commercial feeds, fifteen grams of *siling labuyo* incorporated with commercial feeds show the best results.

The study generally aimed to investigate the performance of broilers if *siling labuyo* is given beyond the 15g level as feed supplement.

The study specifically aimed to:

1. determine the daily gain weight, feed consumption and feed efficiency of broilers feed with *siling labuyo*;
2. determine the effect of *siling labuyo* on the morbidity and mortality of broilers, and
3. determine the best level of *siling labuyo* that could be added to the ration of broilers without producing undesirable responses on growth.

This study was conducted at the Poultry Experimental Station of Benguet State University, La Trinidad Benguet from October to December 2011.

REVIEW OF LITERATURE

Antibiotics are substances added to feeds that are not included for their nutritional values, but are 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.

Capsicum frutescens or *siling labuyo* is a small, erect, branched, half-woody, with oblong-ovate leaves and flowers that are either solitary or several in 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 pectin, 2.33% (Quisumbing, 1978).

In folk medicine, oral capsicum has been used for relieving cold, fever and headaches. Because it causes the eyes and nose to run, it may indeed help to relieve congestion and associated headaches. Recently, several studies in animal and a few in humans, show that taking capsicum by mouth may increase the body's production of heat and energy for about a half hour after it is taken or eaten. This effect may make capsicum useful for treating obesity. Capsicum may also affect the breakdown of carbohydrates in the diet, thereby keeping blood sugar levels from widely fluctuating meals. This effect may be beneficial in helping to control diabetes. None of these uses for capsicum have been proved by clinical research (Simon, 1984).

The plant 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 risk of suffering stroke (Godwin, 2001).

Capsicum sp. is reported to be widely used to treat various unknown diseases, including Newcastle diseases. Capsaicin, the pungent agent in capsicum sp. was indeed found to increase bird's resistance against major threats (Gueye, 1998).

Capsicum is a common spicy flavoring for foods, and the peppers are eaten as a vegetable in many part of the world. Among other nutrients, capsicum contains potassium and vitamin C. Usually, the peppers are dried and ground into powder for medicine. The active ingredients include oily compounds called oleoresins, which temporarily irritate the eyes, so they in self-defense spray. Interestingly, birds do not have the ability to taste capsicum. Therefore, it may be added to birdseeds or feed for commercially-raised birds as a way to keep small mammals from eating the bird feed (Jensen and Curtis, 2003).

Siling labuyo or hot pepper is a good source of nutrients. Each 100g of edible portion contains, 86.0g of water, 1.9g protein, 1.9g fat, 9.2g carbohydrates, 1.2mg iron,14.4mg calcium, 700-21600IU (International Unit) vitamin A, 242.0mg vitamin C and 257.0 KJ (Kilo Joule) energy value (Agshan, 2005).

MATERIALS AND METHODS

Materials

The materials used in the study are the following: brooding-rearing pens, 132 day-old chicks (DOC's), commercials feeds, disinfectant, feeding trough, waterers, old newspaper, stick brooms, pails, dust pan, and record book.

Preparation of the Brooding-Rearing Pens

The brooding-rearing pens were divided into sixteen compartments to accommodate sixteen groups of birds (four replicates by four treatments). The Completely Randomized Design was used.

The brooding-rearing pens as well as other important facilities such as feeders and waterers were thoroughly cleaned and disinfected to prevent or minimize the growth of microorganism causing diseases to the birds. Electric bulbs were installed in the brooding-rearing pens and covered with clean used sacks and floor overlaid with newspaper to maintain the temperature requirement and prevent chick from tipping over the holes of the meshed wire flooring and minimize draft during the experimental study. The old newspaper was changed daily for a period of two weeks and removed thereafter.

Preparation of Hot Pepper Supplement

Matured fruit of hot pepper was bought from the market. The fruits were washed thoroughly to remove unnecessary particles to avoid contamination. After washing, the fruits were sun-dried. The hot pepper was then ground and incorporated to the commercial feeds.

Grouping and Weighing of the Birds

When broiler chicks reached 21 days of age, they were distributed at random into four treatments following the completely randomized design. The ration compositions per treatment are the following:

T_0 – Control (commercial feeds) + water with antibiotics

T_1 – 15g ground hot pepper + commercial feeds + plain water

T_2 – 20g ground hot pepper + commercial feeds + plain water

T_3 – 25g ground hot pepper + commercial feeds + plain water

Feeding and Watering

Ad libitum feeding was employed from the start up to the last day of the study using one brand of commercial feeds. Chick booster was given to the birds for the first two weeks and was shifted to feed starter crumbles on their third week until the fourth week. On the fifth week, finisher crumbles were given until forty-two days of age. Clean and safe water was available at all times.

Data Gathered

The following parameters were gathered from the study:

1. Initial weight (g). This is the weight of the broiler chicks at the start of the study.
2. Final weight (g). This is the weight of the birds forty-two days or at the end of the study.
3. Total gain in weight (kg). This was obtained by subtracting the initial weight from the final weight of the bird.

4. Average daily gain in weight (kg). This was obtained by dividing the total gain in weight by the number of experimental days.

5. Feed offered (kg). This is the amount of the feeds given to the birds in a day.

6. Feed left-over (kg). This is the amount of feeds left in the feeders offered day feeding.

7. Feed consumption (kg). The feeds consumed by the birds for forty-two days were obtained by subtracting the feed left-over from the feeds offered.

8. Average daily consumption (kg). This was obtained by dividing the total feed intake by the number of experimental days.

9. Feed conversion ratio (FCR). This measure the quantity of feed used to produce a kilogram of broiler meat. It was computed by dividing the total kilogram of feeds consumed by the total gain in weight of broilers.

10. Feed cost per kilogram of broiler produced (Php). This was obtained by multiplying the feed conversion ratio by the cost per kilogram of feeds.

11. Feed cost (Php). This is the prevailing cost of feeds at the time of the study.

12. Total cost per kilogram of broiler produced (Php). This was computed by dividing the total cost of production by the number of kilogram of live broiler produced.

13. Number of dead birds. This is the number of birds that died during the study.

14. Number of sick birds. This is the number of birds that showed signs of diseases.

15. Mortality. This parameter is the quotient of the number of dead birds by initial number multiplied by100.

16. Morbidity. This is quotient of the number of sick birds by their initial number multiplied by 100.

Data Analysis

Data was analyzed using the analysis of variance for Completely Randomized Design and Treatment means were compared using Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Initial and Final Weights

Table 1 presents the initial weights of the birds in all treatments. Statistical analysis revealed that there were no significant differences among the treatment means. This implies that the birds were homogenous at the start of the study.

The final weights of the birds in all treatments are also shown in Table 1. The result indicates that the final weights of the birds were affected by increasing the level of hot pepper. As the level of hot pepper added to the feeds was increased, the weight of the birds increased. This is due to the active compound of hot pepper which is capsaicin that is rich in vitamin C that involved in stress hormones structures and this will defense the immune system of birds and enhances diseases resistance.

Average Daily Gain in Weight

The average daily gain in weight of the birds for a period of 21 days is presented in Table 2. Statistical analysis showed high significant differences among treatment means. The birds fed commercial feeds supplemented with 25g hot pepper obtained a mean average daily gain in weight of 249.08g, which is numerically higher than that of the other treatments.

Total Gain in Weight

Total gain in weight of the birds is also presented in Table 2. Statistical analysis revealed a high significant difference among treatments. This implies that adding hot pepper to the feeds of birds have effect and improved their gain in weight. This was caused

by capsicum by speeding up of metabolism. It is believed to be useful in weight management.

Table 1. The initial weight at 21 days and final weight at 42 days of age of the birds

TREATMENT	WEIGHT	
	INITIAL (kg)	FINAL (kg)
Commercial feeds	0.49[a]	1.53[c]
15g ground hot pepper/day + CF + plain water	0.46[a]	1.53[bc]
20g ground hot pepper/day + CF + plain water	0.47[a]	1.65[b]
25g ground hot pepper/day + CF + plain water	0.46[a]	1.78[a]

Means with the same letter superscript are not significantly different

Table 2. Average daily gain in weight and total gain in weight of birds at 42 days

TREATMENT	AVERAGE DAILY GAIN IN WEIGHT (g)	TOTAL GAIN IN WEIGHT (g)
Commercial feeds	197.17[c]	1,035.17[c]
15g ground hot pepper/day + CF + plain water	210.00[bc]	1,102.50[bc]
20g ground hot pepper /day+ CF + plain water	223.84[b]	1,175.16[b]
25g ground hot pepper/day + CF + plain water	249.08[a]	1,307.66[a]

Means with the same letter superscript are not significantly different

Feed Consumption

Table 3 presents the feed consumption of birds under the different treatments in 21 days feeding. Statistical analysis revealed a high significant difference among treatment

means. Treatment 3 which is supplemented with 25g of hot pepper obtained the highest mean of 12.94kg. Thus adding hot pepper on the diet of broilers is economical.

Table 3. Feed consumption

TREATMENT	FEED CONSUMPTION (Kg)
Commercial feeds	13.27[b]
15g ground hot pepper/day + CF + plain water	13.50[a]
20g ground hot pepper/day + CF + plain water	13.09[c]
25g ground hot pepper/day + CF + plain water	12.94[c]

Means with the same letter superscript are not significantly different

Feed Conversion Ratio and Feed Cost per Kilogram of Broiler Produced

Table 4 present the mean feed conversion ratio and feed cost per kilogram of broiler produced of the birds given different levels of hot pepper. Statistical analysis showed that there were no significant differences among treatment 0 (control) and 1 (15g ground hot pepper/day + CF + plain water). Treatment 2 (20g ground hot pepper/day + CF + plain water) is significant while treatment 3 (25g ground hot pepper/day + CF + plain water) is highly significant among treatments. This implies that birds supplemented with 25g of hot pepper are efficient in converting feed due to higher capsicum received and reduces feed cost.

Morbidity and Mortality

Morbidity was observed during the study but the birds recovered during their 30th to 33rd day. No mortality was recorded which means the birds were kept healthy throughout the duration of the experiment.

Return on Investment

Table 5 presents the return on investment of the birds in the different treatments. Though this parameter was not subjected to statistical analysis, the result shows that the additions of hot pepper on the feeds of the birds have higher ROI than that of the commercial feeds.

Table 4. Feed conversion ratio and feed cost per kilogram of broiler produced

TREATMENT	FEED CONVERSION RATIO	FEED COST
Pure commercial feeds	1.61[a]	41.854[a]
15g ground hot pepper/day + CF	1.53[a]	39.826[a]
20g ground hot pepper/day + CF	1.39[b]	36.199[b]
25g ground hot pepper/day + CF	1.24[c]	32.208[c]

Means with the same letter superscript are not significantly different

Table 5. Return on investment

TREATMENT	TOTAL EXPENSES (Php)	TOTAL SALES (Php)	NET INCOME (Php)	ROI (%)
Pure commercial feeds	6417.42	6594.75	177.30	2.76
15g ground hot pepper/day + CF	6402.28	6763.50	361.22	5.64
20g ground hot pepper/day + CF	6400.66	7107.75	707.09	11.05
25g ground hot pepper/day + CF	6,406.47	7668.00	1261.53	19.6

Means with the same letter superscript are not significantly different

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted to determine the effect of different level of *siling labuyo* on the growth performance of broilers. One hundred thirty-two, 21 days broiler chicks were distributed at random following the completely randomized design (CRD) into four treatments. Each treatment was replicated four times with eight birds per replication, making a total of 32 birds per treatment. The treatments were T_0- control; T_1- 15g ground hot pepper + commercial feeds; T_2- 20g ground hot pepper + commercial feeds and lastly T_3- 25g ground hot pepper + commercial feeds.

Analysis of variance revealed that the birds given commercial feeds with 20-25g hot pepper had higher gain in weight, feed consumption and better feed efficiency. This indicates that consumption of hot pepper produce advantageous effects in the growth and performance of broilers.

In terms of return on investment (ROI), although it was not subjected to statistical analysis, higher ROI's was obtained from the birds supplemented with 25g ground hot pepper. On the contrary, lowest ROI was observed in the birds fed with commercial feeds.

Conclusion

Based on the result of the study, the addition of hot pepper on the diet of broilers enhances feed consumption, body weight increment and feed efficiency.

Recommendation

The researcher recommends the addition of hot pepper on the diet of broilers since economic gain was observed was observed as a result of the enhanced productivity of the birds.

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