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Original Paper

Consumers' Assessment on Effect of Growth and Meat Quality of ZamPen Native Chicken Supplemented with Different Levels of Pounded Banana Stalk

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Abstract

The study sought to evaluate the effect of varying amounts of pounded banana stalk on ZamPen native chicken growths and meat quality, and utilized a total of 36 heads of 4-month-old ZamPen native chicken. And employed Complete Randomized Design (CRD) with four treatments, three replicates in each treatment consisting three bird heads per replication T_0 (Control) (100 percent Commercial Mash), T_1 (10 percent Pounded Banana Stalk + 90 percent Commercial Mash), T_2 (20 percent Pounded Banana Stalk + 80 percent Commercial Mash), and T_3 (30 percent Pounded Banana Stalk + 70 percent Commercial Mash) were the following dietary treatments. ANOVA evaluated the data and proceeded using Tukey 's Post Hoc Test by Pairwise Comparison, whether the outcome's difference was significant. Results showed no substantial difference in initial weight, average weight, average daily gain, and average efficiency of feed conversion ($p>0.05$). In terms of growth's effect, Treatment 3 showed favorable growth, but in terms of meat quality, Treatment 1 showed the best quality of meat in all parameters. In view of the above, the findings suggest that up to a 30 percent amount of PBS can be used to avoid harmful effects as a formulated ration of ZamPen native chicken.

Keywords: growth's effect, meat quality, pounded banana stalk, ZamPen native chicken

Introduction

Native chicken makes up 46 percent of the total chicken population in the world, which is about 76 million heads. In terms of additional revenue, food security, and the potential to convert agricultural waste and by-products into high-value products (i.e. meat and eggs), this local genetic resource provides a livelihood. Native chicken also offers socio-cultural services to rural communities (PCARRD, 2016).

ZamPen Native chickens have tender meat, sweet taste, and grow faster than the other native chickens in the Philippines, many customers prefer ZamPen native chickens. ZamPen native chicken, on the other hand, is a lifeline not only for farmers and micro-entrepreneurs of the Zamboanga Peninsula, but also for prisoners of the San Ramon Penal colony who expect fruitful reintegration after prison terms are completed (Dela Cruz et al., 2017).

Significance of the Study

It provides an avenue on how to generate cash through the study's outcome and opens the door to work prospects for unemployed people and others who want sideline and extra money. Educated and unemployed people can genuinely get higher income and job prospects for them by working in the poultry industry. Any individual with any kind of form and walks of life, along with their regular daily household chores, can handle this type of business as long as they are interested. The outcome of the study will therefore help and serve as a basis for potential researchers interested in pursuing or performing a follow-up study on the development of ZamPen native chicken.

Objectives

The conduction of this research was to determine the impact on growth effect's and meat quality of the various levels of pounded banana stalk supplemented by ZamPen native chickens. The evaluation of the variations between the commercial and pounded banana stalk feeds of these chickens is also studied. The thesis will be conducted during the 2019-2020 academic year.

Specifically, it sought to answer the following questions:

1. What are the effects of commercial feed supplemented by a pounded banana stalk (T_1 = 10 % PBS, T_2 = 20 % PBS, and T_3 = 30 % PBS) on the growth effect of ZamPen native chicken in terms of the following parameters; initial weight, daily gain, daily conversion efficiency and final live weight?
2. Is there a significant difference in the effects of commercial feed supplemented by a pounded banana stalk (T_1 = 10 % PBS, T_2 = 20 % PBS, and T_3 = 30 % PBS) on the growth effect of ZamPen native chicken in terms of the following parameters: initial weight, daily gain, feed conversion efficiency and final live weight?
3. What is the meat quality consumers' assessment of ZamPen native chicken supplemented with different levels of the pounded banana stalk (T_1 = 10 % PBS, T_2 = 20 % PBS, and T_3 = 30 % PBS) in terms of the following parameters: meat odor, meat texture, meat taste/flavor, meat tenderness, meat juiciness, meat color (cooked), meat color (fresh); and meat overall acceptability?
4. Is there a significant difference in the meat quality consumers' assessment of ZamPen native chicken supplemented with different levels of the pounded banana stalk (T_1 = 10 % PBS, T_2 = 20 % PBS, and T_3 = 30 % PBS in terms of the following parameters: meat odor, meat texture, meat taste/flavor, meat tenderness, meat juiciness, meat odor (cooked), meat color (fresh); and meat over-all acceptability.
5. What laboratory guide manual that can be designed to help and evaluate student's ability in determining and measuring the physiological responses of animals to nutrients?

Review of Literature

ZamPen Native Chicken

ZamPen Native Chicken refers to a new breed of native chicken and is the result of crossing throughout the Zamboanga Peninsula area the species of Joloano and Sasso and other existing poultry species, and was existing by the Western Mindanao State University (WMSU)-Zamboanga City in collaboration with the Philippine Council for Agriculture, Aquatic and Natural Resources, Research and Development (PCARRD, 2016).

Processing of low-economic plants would be a step towards improved utilization of global demand for additional food sources (Telek & Martin, 1993 as cited by Samkol, 2009). It is in line with the strategy of achieving sustainable animal production systems by matching them with local feed sources available (Preston and Sansoucy, 1987), as cited by Samkol.

Effect of Growth

Refers to the permanent and irreversible rise in body weight and size for the development of muscles, bones, visceral organs, and connective tissues over a given period in response to the quantity of specific feed and supplement given. (Taylor, et. al., 2001).

On the other hand, in Western Mindanao State University, the use of Jackfruit (*Artocarpus heterophyllus*, L.) seed meal as a feed alternative to ZamPen native chicken growers has recently been investigated. The research centered on the effect of Jackfruit seed as a supplement for ZamPen native chickens in terms of average feed intake, average weight gain, feed conversion ratio, and benefit over feed expenses. The research performed four treatments in a completely randomized design, where there were four replications. Statistically, T_3 showed the highest final live weight (2258 grams) at 45 days (Tubang, 2019), based on the outcome given.

Further research on Kabir chicken growth success using pounded banana stalk was conducted at the Western Mindanao State University-Tampilisan Campus. There are four different treatments

in the study: T_0 (Control), T_1 (10% PBS), T_2 (20% PBS), and T_3 (30 percent PBS). Results showed that T_3 had the highest mean weight (1979 grams) at 30 days after application of care (Sera, 2005).

In addition to, Visayas State University has investigated the use of *Trichantera gigantean* leaf meal (TGLM) as a supplement to the growth efficiency and meat quality of Philippine native chickens to assess its efficacy. 24 pens consisting of four treatments in three replications were assigned to ninety-six heads of three-month - old native chickens of two sexes. As a result, the highest initial weight of chickens was obtained by T_3 (Morbos, 2015).

Meat Quality

As used in the analysis, refers to the sensory features in terms of tenderness, conformation, marbling of taste, juiciness, and attractiveness (PCARRD, 2006).

Some feed ingredients derived from plants and animals have significant effects on the efficiency and quality of meat for domesticated animal growth (Cullison and Lowrey, 1975).

Furthermore, the application of banana peel to broiler chickens on their final body weight, percent carcass, and abdominal fat was investigated at the University of Padjajaran, Bandung, Malaysia. It was found that 20% of the banana peel on the ration of the broiler suffering from heat stress can still support and help the good results within normal limits in the final broiler weight, carcass percentage, and abdominal fat percentage (Widjastuti & Hernawan, 2012).

A study conducted at Jose Rizal Memorial State University-Tampilisan Campus on the growth production and visceral organ of ZamPen native chicken using formulated ration applied to drinking water supplemented with Oriental Herbal Nutrients (OHN). The findings showed that the effect of Oriental Herbal Nutrients as a supplement to the formulated ration was more specific in terms of meat odor, where T_0 (8.21) was interpreted as extremely like and T_2 (7.22) was interpreted as like moderately. And T_2 has a rating of 8.19 for the meat color (cooked) and is defined as extremely like (Capuno et al.,2017).

On the other hand, supplementation of different amounts of Cucumber Fruit Juice was applied to the commercial ration and via the drinking water at Central Mindanao University, Musuan, Bukidnon, to assess the meat quality of broiler chickens. There are four different treatments in the study: T_0 (Control), T_1 (10 percent CFJ), T_2 (20 percent CFJ), and T_3 (30 percent CFJ). Based on the results given, T_0 and T_1 in terms of meat texture, a numerical rating of 8.50, interpreted as extremely like, was perceived. And also, T_1 (8.45-extremely like), T_0 (8.32-extremely like), and T_3 (8.50-extremely like) in terms of meat juiciness, while T_2 scored 8.09 and perceived it,as like very much (Badilla, 2020).

Moreover, another research was conducted at Camiguin Polytechnic State College to evaluate the output characteristics of broiler chickens using fermented jute leaves *(Corchorus olitorius*) as a supplement with four treatments repeated four times in a Completely Randomized Design.As a result, T_4 reached the maximum average, 1.52 kg, in terms of Average Final Live Weight. As for meat quality, T_2 had the highest mean (4.65) particularly on meat texture and T_3 had the lowest mean (3.62). And as for meat tenderness, T_4 had the highest mean (4.18) in which it suggests that certain broiler meat parameters had been affected by jute supplementation (Siaboc, Nena, 2018).

Pounded Banana Stalk

Refers to the succulent portion of the banana stalk that is finely chopped, pounded, and mixed into commercial mash as chicken feed (Pearson et al., 1999).Providing vitamin supplements in most cases to meet the needs of fowls (Gapuz, 1992), where it is also necessary to supplement vitamins as there are studies that increase the use and quality of feed, as a requirement, in ordinary feed ingredients that contain insufficient amounts of vitamins.

In connection with this, 3.5 percent of digestible protein and 18.5 percent of total digestible nutrients are found in banana leaves without midribs, especially 'saba' (Castillo & Gerpacio, 1979). And PCARRD (1998) also reported that part of the banana can be transformed into animal feed and that it can provide good animal meat comparable to commercial feed consumption. Bananas play an important role in the field of human nutrition. It is important to study the protection of banana health as banana medicinal properties are part of the folk medicine of all tropical countries. Easy digestion, low fat, minerals, and vitamins were used in spatial diets (Fahrasmane et al., 2014).A significant portion of banana can also be processed into a banana composition after processing, showing that it can be a good source of 13.5 percent and 18.5 percent protein and digestible nutrients, respectively, and a good feed for any race of chickens (PCARRD, 1992).

Likewise, research was funded in Panama, Guatemala City, on the chemical composition of different banana products and the use of banana meal for poultry feeding. Up to 10% of maize rations for chickens have been estimated to be supplemented by green banana peel, where it is not desirable and acceptable to investigate ripe bananas due to reduced nutrient usage (Bressani et al., 1961).

Based on a previous review of the relevant literature, it was found that there is a lack of materials related to the relationships between the two variables. This study therefore suggested focusing on the relationships between the growth production of ZamPen native chicken and meat quality as supplemented by various levels of pounded banana stalk.

Conceptual Framework

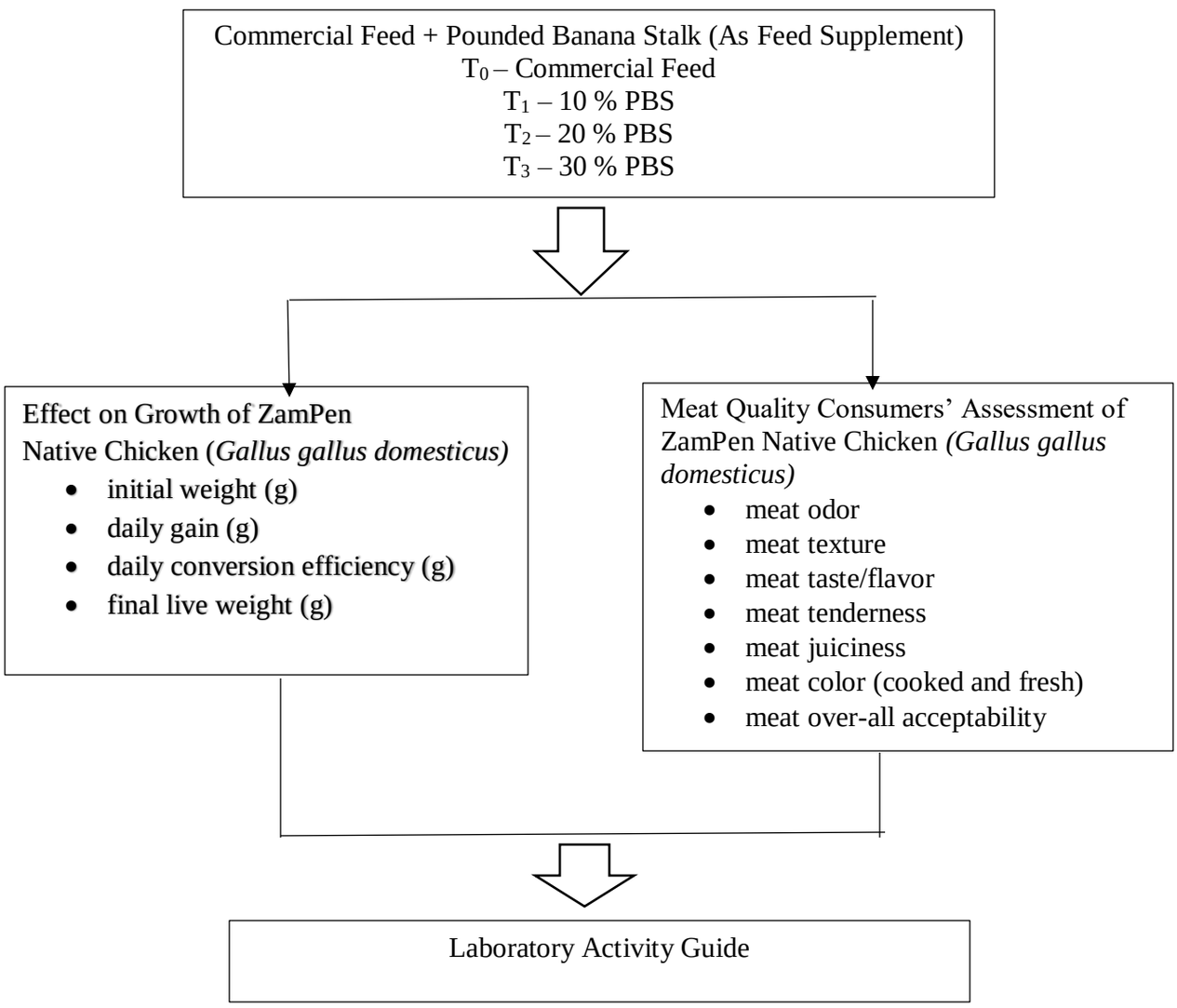

Figure 1: Conceptual Framework of the Study

As reflected in the conceptual framework of the analysis in Figure 1, which shows the percentage of the banana stalk as a feed supplement (as an independent variable) for ZamPen native chickens. The average initial weight (in grams), average daily gain (in grams), average daily conversion efficiency (in grams), and average final weight (in grams) as affected by the feed supplement were the first category of dependent variables. Meat odor, meat texture, meat taste / flavor, meat tenderness, meat juiciness, meat color (cooked), meat color (fresh), and overall acceptability of meat as also affected by the feed supplement were the second set of dependent variables. A manual of laboratory guidelines designed to really promote the use of scientific methods and expertise and thus improve the capacity of farmers and students to analyze and measure physiological responses. The real increase in the growth of native ZamPen chickens was enabled to be measured by students and their meat characteristics established as well.

This study is anchored on the concept of the R. A. 10068 or known as Organic Agriculture Act of 2010, particularly Section 6 which propagates, develops further, and implements the practice of organic agriculture in the Philippines and for other purposes. It includes enriching soil fertility, increasing farm productivity, preventing the depletion of natural resources, further protection of farmer's health, consumers and the public and saving on the imported farm inputs.

Materials and Methods

Research Design

The researcher pure experimental research design, research design where thirty-six (36) heads of native ZamPen chickens are randomly distributed into four (4) treatments and each treatment consists of three (3) heads of four (4) months of native ZamPen chickens after the Completely Randomized Designed (CRD) where they are fed with commercial mash supplemented with various levels of pounded banana stalk. The study centered on the growth's effect and meat quality consumer's assessment of ZamPen native chicken supplemented with different levels of pounded banana stalks (PBS). The initial weights were evaluated using Levene's Variance Homogeneity Test. In addition, the data collected and analyzed by ANOVA and checked by Tukey's Post Hoc Test (TPHT) for significant ANOVA.

Research Environment

The study was carried out at the residential address of the investigator in Tugop, San Francisco, Liloy, Zamboanga del Norte. The location and climate of the research study was an open field, so there was good shade, abundant sunlight, well-ventilated air, and favorable temperature. And appropriate medicine was required, of course.

The research, which consists of four (4) treatments, including Control, was conducted at this location. There were three (3) replications of each treatment, and each replication had three (3) heads of ZamPen native chickens, for a total of thirty-six (36) heads of chickens.

Research Subjects

The research subjects are the thirty-six heads (36) of ZamPen Native Chicken purchased from Mr. Manuel Jambaro who is registered, authorized, and affiliated with PCARRD, Region IX.

The study focused on the growth's effect and meat quality consumers' assessment of ZamPen native chicken supplemented specifically with different levels of pounded banana stalk on its average initial weight, average daily intake, average daily gain, average daily conversion efficiency and average final weight; and meat odor, meat texture, meat taste/flavor, meat tenderness, meat juiciness, meat color (cooked and fresh) and overall meat acceptability.

Research Materials

The materials, structures, and equipment that were used in the study are the following: poultry house,12 pieces of signages ,nipa shingles, 12 pieces of electric bulbs, nails,bamboo slats, poultry net, wood slab, 12 pieces of feeding throughs, 12 pieces of waterers, plastic screen, weighing scale, record book or field book, 36 heads of ZamPen native chickens, commercial mash (Gallimax brand), different brands of multivitamins, antibiotics, vaccine, leg bands, disinfectants,weighing scale, tape measure, tarpaulin, field notebook, ballpen, digital camera,sickles,mortar and pestle, and banana stalk.

Data Gathering Procedure

Pre-Experimental Procedure: Poultry House Construction

The poultry houses were two meters high, with the floor of the building one meter above ground level and one meter from the floor to the roof of the building. These were divided equally into four compartments, measuring six (6) feet in length by 4 1/2 feet in width. And each treatment was divided into three (3) small compartments, which also measured two (2) feet in length by one and a half (1 ½) feet in width, consisting in each treatment of three (3) replicates. There were nine (9) heads for each treatment, with three (3) heads for each replication, resulting in a total of thirty-six (36) heads of indigenous ZamPen chickens used in the analysis.

ZamPen Chicken Procurement

The chickens were purchased directly from poultry breed owner Mr. Manuel Jambaro of Poblacion, Naga, Zamboanga Sibugay. To ensure their physical health, they were chosen and vaccinated. The chickens were acclimatized for a total of one week to adjust to their survival to the climate of the new environment. They were allocated ready for study purposes in their respective compartments following the acclimatization.

Experimental Procedure: Treatment Preparation

The banana stem or pseudo-stem was collected for easy access in the preparation of the feed. The banana stalk was finely chopped using sickles. A section was weighed and put after cutting and pounding into the wooden mortar. Then, after pounding before it was given to the birds, the corresponding amount of commercial mash was thoroughly mixed. Planning must take place at any point during the feeding process.

The treatments were the following:
T_0 (the control) 100 % (1000 grams) commercial mash (Gallimax), T_1(treatment 1) 10 % (100 grams) pounded banana stalk as feed supplement and 90 % (900 grams) commercial mash (Gallimax), T_2 (treatment 2) 20 % (200 grams) pounded banana stalk as feed supplement and 80 % (800 grams) commercial mash (Gallimax), and T_3(treatment 3) 30 % (300 grams) pounded banana stalk and 70 % (700 grams) commercial mash (Gallimax).

Application of the Treatment

The recommended daily amount of feed fed or given to the chickens as they were now at the reproductive stage is 120-140 grams per chicken broiler finisher at the sixteen weeks (16) before slaughter with an average 16-20 percent protein level. And on its sixteen (16) weeks before slaughter, an average amount of water consumed, 7.2-15.2 liters per day/100 birds per day.

Consumer's Assessment on Meat Quality Flight Judging

The prepared 12 meat samples and 12 glasses full of water were set on the table. Then, the 12 evaluating and testing panels of which 6 males and 6 females where in, each of them was given 12

pieces of rating sheet and pencil. In similar manner, to ensure validity and eliminate biases, blind judging was applied in such a way, they were allowed to taste in a fast manner the given meat samples without prior knowledge as to what dietary treatments they belong by checking the rating sheets from 1, dislike extremely to 9, extremely like according to their own choice. And each panel was given a chance to rate the meat samples' using Hedonic Sensory Evaluation from meat odor to overall meat acceptability. Right after completing the task, rating sheets was collected, and analysis of results followed.

Post-Experimental Procedure

Care of the ZamPen Native Chickens. The feed was delivered to the four-month - old chicken three (3) times a day, up to five months old. The semi-free-range program was implemented at the beginning of the study, and the birds were fed three (3) times a day with ration according to their treatment during the study completion period. Feeding was carried out using the feeding scheme and, according to the respective care, was given at 6:00 in the morning, noon, and 5:00 in the late afternoon. Cleanliness at the poultry house and its surroundings should usually be maintained to prevent and protect the chicken from the disease.

Sampling Techniques

The study used a random sampling technique where every chicken had an equal chance of being picked. Numbers 1 to 36 were assigned to a total of thirty-six ZamPen native chickens at the age of four (4) months, regardless of size, sex, and physical appearance. Paper strips containing numbers 1 to 36 were also prepared and drawn by lot, of which the first three numbers obtained in the first treatment were the first three replication samples, tightened with a leg band containing coded numbers and names and held them in cage number 1 until all treatments were completed.

Experimental ZamPen native chicken was used and randomly distributed into four (4) lots adopting CRD in which each lot consists of three (3) heads of four (4) months old ZamPen native chicken in Lot 1 was fed commercial mash, while ZamPen native chicken in Lots 2 , 3 and 4 was fed commercial mash with 10% , 20%, and 30% of pounded banana stalk (PBS) added to commercial mash.

Research Measure

On the date on which this native ZamPen chicken turns four (4) months old, the data collection was completed. And this research was only good for 1 1/2 month. The first set of data was completed within fifteen (15) days before the application of the treatments. The second set of data was completed within fifteen (15) days after the application of the treatments. After another (15) days, the third data collection was completed. And eventually, the last data collection was done during the 45th production day of the ZamPen native chicken. It comprised six (6) weeks in total and three (3) days of observation in total.
The initial and final weight of the experimental ZamPen native chicken was acquired and measured using the weighing scale. The intake of feed was determined by weighing the feeds given and rejecting feed.

The various parameters used to determine the growth's effect and meat quality consumers' assessment of ZamPen native chicken supplemented with different levels of pounded banana stalk have been determined as follows:

1.Average initial weight. This was calculated as (g):

$$AIW = \frac{\text{Total weight of birds in replication}}{\text{Number of birds in replication}}$$

2.Average daily feed intake. The ADFI of the birds was calculated as (g):

$$\text{ADFI} = \frac{\text{Average feed consumed}}{\text{Feeding period (days)}}$$

3.Average daily gain (g). This was computed using the formula:

$$\text{ADG} = \frac{\text{Final live weight} - \text{Initial weight}}{\text{Feeding period (days)}}$$

4.Average feed conversion efficiency (AFCE). This was calculated as:

$$\text{AFCE} = \frac{\text{Average daily feed intake}}{\text{Average daily gain}}$$

5.Average final live weight (AFLW). This was calculated as:

$$\text{AFLW} = \frac{\text{Live weight / replication}}{\text{Birds / replication}}$$

Meat Quality

Meat quality was assessed during the termination process, but immediately after the 45th day of growth of the ZamPen native chicken, in which all the necessary growth parameters were determined. Using the portion of the breast and legs of the chicken, meat quality was measured. To establish odor, texture, taste / flavour, juiciness, tenderness, meat color (fresh), meat color (cooked), and overall acceptability, the samples were roasted in a lechon grilling stand and placed on coded plates. By panel checking via the Sensory Hedonic's Rating Scale, meat quality was measured. The selection panel consisted of 12 participants; non-smokers and non-drinkers, preferably, and concentrated until the test was carried out.

Hedonic's Rating Scale:

1-dislike extremely	4 – dislike slightly	7 – like moderately
2-dislike very much	5-neither like / dislike	8- like very much
3- dislike moderately	6-like slightly	9-extremely like

Treatment No. ___ (1-9)

	Meat Odor	Meat Texture	Meat Taste	Meat Tenderness	Meat Juiciness	Meat Color (Fresh)	Meat Color (Cooked)	Over -all acceptability
9								
8								
7								
6								
5								
4								
3								
2								
1								

Statistical Treatment

The data collected was tabulated and analyzed using the One-Way Classification Variance Analysis (ANOVA) to determine the substantial difference between the means of treatment in terms of initial weight, daily gain, daily feed conversion efficiency, and final live weight. And in terms of meat quality, meat odor, texture, taste/flavour, juiciness, tenderness, meat color (fresh), meat color (cooked). Using the Sensory Hedonic Rating Scale, meat quality was assessed by the

evaluation panel. The Tukey's Post Hoc test was used to further determine the means of treatment vary significantly from each other because substantial results were seen in the variance analysis (ANOVA) test.

Ethical Considerations in Research

From the beginning of the research, this study observed the correct ethics, especially in obtaining the native ZamPen chickens in which the chicken source/producer was a TESDA and PCARRD certified distributor, affiliated and approved, and linked to WMSU-Zamboanga City during their piloting phase of the said program. And as what according to the Bureau of Animal Industry and Animal Welfare Law using just as much as possible, sharp knife or bolo, not using mallet, hammer, axe or even euthanasia tool. It was not recommended that this operation be implemented. However, as recommended by the Animal Welfare Act, it is important to provide dark space during chicken stunning before dressed chicken passes through the feathering machine, cutting and chilling processes. Any poultry dressing plants that do not comply with the order should be penalized. Domesticated animals, like human beings, should also be respected and protected as well.

Results and Discussion

The data on the effect of growth and meat assessment of ZamPen Native Chicken as affected by varying amounts of pounded banana stalk as feed supplement are presented, analyzed, and interpreted in this chapter. The findings of the study of variations as well as its interpretation of statistical results on the effects of pounded banana stalk are also discussed here. Initial weight, average daily gain, average feed conversion efficiency, and average final weight are the components of the growth's effect of ZamPen Native Chicken. ZamPen Native Chicken's meat quality consumers' assessment indicators are: meat odor, meat texture, meat taste, meat tenderness, meat juiciness, meat color (fresh), meat color (cooked), and overall meat acceptability.

Table 1. Initial Weight (in gram) of ZamPen Native Chicken at the start of the Treatment Application.

Replications	Treatments					
	T_0	T_1	T_2	T_3	Total	Mean
1	1000.00	1050.00	1003.33	1140.00		
2	1083.33	1090.00	1103.33	970.00		
3	1053.33	1013.33	1173.33	1100.00		
Total	3,136.66	3,153.33	3,279.99	3,210.00	12,779.98	
Mean	**1,045.55**	**1,051.11**	**1,093.33**	**1,070.00**		**1,065.00**

Note:

T_0 = Control treatment, 100% Commercial feed (Gallimax 3 Brand)
T_1 =10% pounded BS, 90 % Commercial feed (Gallimax 3 Brand)
T_2 = 20% pounded BS, 80 % Commercial feed (Gallimax 3 Brand)
T_3 = 30% pounded BS, 70 % Commercial feed (Gallimax 3 Brand)

The initial weight (in grams) of ZamPen Native Chicken at the beginning of treatment application, as affected by different levels of pounded banana stalk, is shown in Table 1 above. The total weighted average initial weight, as shown on the table, is 1065.00 grams. It also indicates those birds that obtained the highest initial weight of 1093.33 grams on T_2, followed by T_3 (1070.00 grams), T_1 (1051.11 grams) and the lowest initial weight of 1045.55 grams was obtained from those birds on T_0. T_3 was the highest initial weight compared to T_1 and other treatments, as reflected on the table, since the cockerel weights heavier than the pullet.

And this is comparable with the work of Abel, et al. (2015) who reported T_0 = 0 percent (Control), T_1 = 10 percent, T_2 = 20 percent, and T_3 = 30 percent applied banana meal in which T_2 obtained the highest initial weight of 586.43 grams before feeding banana.

The Levene's Variance Homogeneity Test (p-value = .348) for Table 1 Data for the initial weight of ZamPen Native Chicken as affected by different amounts of pounded banana stalk at the beginning of treatment application. There was no substantial difference in the implication that the experimental animals used in all treatments before the start of the research were all homogenous.

Table 2. Average Weight (in grams) of ZamPen Native Chicken at the 15th ,30th and 45th day after Treatment Application

Replication	Treatments																	
	T_0			T_1			T_2			T_3			Total			Mean		
	15	30	45	15	30	45	15	30	45	15	30	45	15	30	45	15	30	45
1	1341.67	1693.33	2053.33	1303.33	1563.33	1913.33	1480.00	1696.67	1883.33	1476.67	1835.00	2193.33						
2	1463.33	1856.67	2163.33	1456.67	1840.00	2200.00	1626.67	2020.00	2406.67	1373.33	1790.00	2190.00						
3	1345.00	1646.67	1980.00	1313.33	1603.33	1893.33	1476.67	1788.33	2113.33	1596.67	1883.33	2213.33						
Total	4,150.00	5,196.67	6,196.66	4,073.33	5,006.66	6,006.66	4,583.34	5,505.00	6,403.33	4,446.67	5,508.33	6,596.66	17,253.34	21,216.66	25,203.31			
Mean	1,383.33	1,732.22	2,065.00	1,357.78	1,668.89	2,002.22	1,527.78	1,835.00	2,134.44	1,482.22	1,836.11	2,198.89				1,437.78	1,768.05	2,100.27

As shown on Table 2, the average weight (in grams) of ZamPen Native Chicken at the 15th ,30th and 45th day after Treatment Application, the mean weight (in grams) of ZamPen Native Chicken as affected by the different levels of pounded banana stalk as a feed supplement is shown in Table 2 above on the 15th day after treatment application. It has a weighted average total of 1437.78 grams. It also indicates that those birds on T_2 had the highest average weight of 1527.78 grams, followed by those birds on T_3 (1482.22 grams), then T_0 (1383.33 grams), and that those birds had the lowest average weight of 1357.78 grams on T_1. T_2 had obtained the highest average weight compared to T_3 and other treatments, as reflected on the table, since cockerel eats more feed and grows faster than the pullet.

Ndegwa, et al. (2012), is followed by this observation as cited by Morbos, et al. (2018), who said that cockerels grow faster than pullets in general. And this finding is consistent with Tewe's (1983) work, which stated that feeding banana peel meal to broiler chickens above 7.5 percent showed a substantial reduction in body weight ($p<0.05$). Some authors have stated that, compared to other treatments, broiler chickens fed 30% banana meal (usually in T3) gained the greatest weight. In comparison, this negates that the amount of banana peel meal above 10% is detrimental to the growth of broiler chickens by the observation stated by Gohl (1982).

Besides, the mean weight (in grams) of ZamPen Native Chicken as affected by the different levels of pounded banana stalk as a feed supplement is shown in Table 2 on the 30th day after application of treatment. It has an overall weighted average of 1768.05 grams as shown on the table. It also indicates that the highest average weight of those birds in T_3 was 1836.11 grams, followed by T_2 (1835.00 grams), then T_0 (1732.22 grams), and the lowest average weight of those birds in T_1 was 1668.89 grams. Results showed that if sufficient supplementation is applied or given to their feedstuff, T_3 has the highest average weight relative to T_1 and other treatments, since cockerel grows faster and weights heavier than the pullet.

This agrees with the study in WMSU-ZNAC, Tampilisan Campus, Sera (2005) research on the performance of Kabir chicken using varying amounts of pounded banana stalk in which T_3 (1979 grams) reported the highest average weight on the 30^{th} day after, given the 30 percent pounded banana stalk treatment application.

Apart from that, the average final weight of ZamPen Native Chicken as affected by the various levels of pounded banana stalk as a feed supplement on the 45^{th} day after treatment application is shown in Table 4 above. It has a weighted average total of 2100.27 grams. It also indicates that the highest mean live weight of those birds was 2198.89 grams in T_3, followed by T_2 (2134.44 grams), T_0 (2065.55 grams), and the lowest mean live weight of those birds was obtained in T_1 (2002.22 grams). As seen on the table, relative to T_2 and other treatments, T_3 obtained the highest final live weight, this is attributed to cockerel increasing faster and weighing heavier than the pullet if proper supplementation is applied or given to their feedstuff and reaching their maturity.

That negates the work of Duwa, et al., in Nigeria, et al., (2014) on the growth, haematological, and serum biochemical indices of broiler chickens fed banana peel meal as a substitute for maize, in which T_3 obtained the lowest final weight (981.70 grams) consisting of 15 percent banana peel levels in chicken diets instead of maize. It is therefore due to the anti-nutritional factor (tannins) in banana peel that may influence poultry utilization (Ahwange, 2008). However, on the other hand, it agrees with Camiguin Polytechnic State College's Siaboc (2018) analysis using fermented jute leaves (*Corchorus olitorius*) to evaluate broiler chicken characteristics in which T_4 obtained the highest result, 1.52 kg.

Table 3. Average Daily Gain (in grams) of ZamPen Native Chicken at the 15th ,30th and 45th day after Treatment Application

Replication	Treatments																	
	T_0			T_1			T_2			T_3			Total			Mean		
	15	30	45	15	30	45	15	30	45	15	30	45	15	30	45	15	30	45
1	22.78	23.44	24.00	16.89	17.34	23.33	31.78	14.44	12.44	22.45	23.89	23.89						
2	25.33	26.22	20.44	24.44	25.55	24.00	34.89	26.22	25.78	26.89	27.78	26.67						
3	19.44	20.11	22.22	20.00	19.33	19.33	20.22	20.78	21.67	33.11	19.11	22.00						
Total	67.55	69.77	66.66	61.33	62.22	66.66	86.89	61.44	59.89	82.45	70.78	72.56	298.22	264.21	265.77			
Mean	22.52	23.26	22.22	20.44	20.74	22.22	28.96	20.48	19.96	27.48	23.59	24.19				24.85	22.02	22.15

As shown on Table 3, the average daily gain (in grams) of ZamPen Native Chicken as affected by different levels of pounded banana stalk on the 15th day after application of the treatment is shown in Table 5 above. The total weighted average is 24.85 grams, as seen. The table also reveals that the maximum mean weight was 28.96 grams for those birds on T_2, followed by T_3 (27.48 grams), T_0 (22.52 grams) and T_1 (20.44 grams) for those birds on T_2. These birds in T_1 obtained the lowest daily gain. This agrees with Nigeria 's work of Banjo (2012) in which the highest body gain was reported by birds fed in T_2 (27.50 grams). Compared to other diets as stated by (Daarol, 1986), the explanation for this was attributable to the high protein content of the diet (Kulangi & Olugbemi, 2010).

On the hand, the average daily gain (in grams) of ZamPen Native Chicken as affected by the various levels of pounded banana stalk as a feed supplement is shown in Table 3 above on the 30th day after application of treatment. It has a weighted average total of 22.02 grams. And also, the table reveals that the highest weighted mean of 23.59 grams was found in those birds found on T_3, then T_0 (23.26 grams), T_1 (20.74 grams) and the lowest weighted mean of 20.48 grams was found in T_2.With the analysis of Zanu, et al. (2012), in Ghana on the use of *Moringa oleifera* as a replacement for fish meal in broiler chicken diets, resulting in the lowest daily gain of T_3 (29.97) grams consisting of 15% of MOLM. This is because, in the analysis of the inclusion of leaf meals in broiler diets above 5-10% created a depressed efficiency in the study of Ash, et al. (1992).

Likewise, the average daily gain (in grams) of ZamPen Native Chicken as affected by the different levels of pounded banana stalk as a feed supplement on the 45th day after application of the treatment is shown in Table 3 above. It has a weighted average total of 22.15 grams. The table also reveals that the birds found on T_3 had the highest weighted mean of 24.19 grams, followed by T_0 and T_1, both of which were 22.22 grams, and the lowest weighted mean of 19.96 grams was found on T_2.This agrees with the work of Zhou et.al, (2010) in China on the application of *Bacillus coagulans* to Guangxi Yellow chicken for growth performance and meat quality, in which T_3 reported the highest average daily gain (12.9 grams) of 10 6 cfu^{-g--1}.

Table 4. Average Feed Conversion Efficiency (in grams) of ZamPen Native Chicken at the 15th ,30th and 45th day after Treatment Application

Replication	Treatments																	
	T_0			T_1			T_2			T_3			Total			Mean		
	15	30	45	15	30	45	15	30	45	15	30	45	15	30	45	15	30	45
1	5.78	5.59	5.40	7.12	6.94	5.63	5.21	9.91	34.53	5.79	5.44	5.44						
2	17.49	12.46	12.87	32.65	14.53	14.65	3.79	12.46	14.48	7.52	6.83	12.40						
3	32.97	22.82	7.46	14.93	62.57	22.94	8.50	8.16	7.90	3.76	15.05	8.77						
Total	56.24	40.87	25.73	54.70	84.04	43.22	17.50	30.53	56.91	17.07	27.32	26.61	145.51	182.76	152.47			
Mean	18.75	13.62	8.58	18.23	28.01	14.41	5.83	10.18	18.97	5.69	9.11	8.87				12.13	15.23	12.71

As shown on Table 4, the average feed conversion efficiency (in grams) of ZamPen Native Chicken as affected by the different levels of pounded banana stalk on the 15th day after application of the treatment is shown in Table 8 above. The table indicates a weighted average of 12.13 grams in total. It also indicates that certain birds found on T_0 had the highest mean of 18.75 grams, followed by T_1 (18.23 grams),T_2 (5.83 grams), and T_3 had the lowest mean of 5.69 grams. And this is also confirmed by the Ignacio (2019)-WMSU-San Ramon Campus report on the use of indigenous Indigofera (*Indigofera tinctonia Linn*) leaf meal as feed replacement in native ZamPen chicken in which T_3, 8% ILM, among the other treatments, has the lowest feed conversion efficiency (4.75 grams). And related research has also been reported by Alam, et al. (2018) on the effect of banana leaf meal on growth performance and broiler hemato-biochemical parameters in which the best FCR (5.69 grams) was obtained by T_3.

The average feed conversion efficiency (in grams) of ZamPen Native Chicken as affected by different levels of pounded banana stalk on the 30th day after application of treatment is shown in Table 9 above. The table indicates a weighted average of 15.23 grams overall. It also indicates that those birds found on T_1 had the highest mean of 28.01 grams, followed by T_0 (13.62 grams), T_2 (10.18 grams), and the lowest mean of 9.11 grams on T_3.It coincides with the research carried out in Nigeria by Abel, et al. (2015) on the effects of treated banana peel on the feed efficiency, digestibility and cost-effectiveness of the broiler chicken diet in which T_3 (0.29 gram) consisting of 30 percent banana peel content was found to have the lowest feed efficiency.

The average feed conversion efficiency (in grams) of ZamPen Native Chicken as affected by the different levels of pounded banana stalk on the 45th day after application of treatment is shown in Table 10 above. The table indicates a weighted average of 12.71 grams in total. It further reveals that those birds found on T_2 had the highest mean of 18.97 grams, followed by T_1 (14.41 grams), T_3 (8.87 grams), and T_0 had the lowest mean of 8.58 grams. This is the line in the study agreement by Ige, et al. (2006) in Nigeria, using Gliricidia Leaf Meal in the layer diet to evaluate the performance's effect, digestibility of nutrients and economic production, resulting in T_0 obtaining the lowest average mean of 2.45 grams.

Table 5. Summary on Consumers' Meat Quality Assessment of ZamPen native chicken Fed with Ration Supplemented with different levels of Pounded Banana Stalk.

Parameters	Treatment (Different Levels of Pounded Banana Stalk)							
	0 (Control)		I (10% PBS)		II (20% PBS)		III (30% PBS)	
	NR	DR	NR	DR	NR	DR	NR	DR
Meat Odor	8.25[a]	EL	7.92[a]	LVM	7.22[b]	LM	7.97[a]	LVM
Meat Texture	8.25[a]	EL	8.25[a]	EL	7.55[b]	LVM	8.22[a]	EL
Meat Taste	8.64 [a]	EL	8.50[a]	EL	7.50[b]	LVM	8.47[a]	EL
Meat Tenderness	8.03[a]	LVM	8.14[a]	EL	7.36[b]	LVM	8.14[a]	EL
Meat Juiciness	8.47[a]	EL	8.55[a]	EL	7.72[b]	LVM	8.41[a]	EL
Meat Color (Fresh)	8.64[a]	EL	8.58[a]	EL	7.78[b]	LVM	8.59[a]	EL
Meat Color (Cooked)	8.56[a]	EL	8.39[ab]	EL	7.47[c]	LVM	8.28[b]	EL
Meat Overall Acceptability	8.50[a]	EL	8.47[a]	EL	7.45[b]	LVM	8.31[a]	EL

Note: Treatment means with the same letter superscript horizontally do not significantly differ using Tukey's test.

The summary on the meat quality consumers' assessment of ZamPen native chicken is shown in Table 5 above, especially on meat odor, meat texture, meat texture, meat taste, meat tenderness, meat juiciness, meat color (fresh), meat color (cooked) and overall acceptability of meat. Results showed that during the termination period, T_1 had provided the best result on meat quality parameters. This guarantees that the alternative hypothesis 4 is accepted. Therefore, in terms of meat quality, except for Treatment 2, there is a significant difference in the effects of different levels of pounded banana stalk on the meat quality consumers' assessment of ZamPen native chicken, particularly on meat odor, meat texture, meat taste, meat tenderness, meat juiciness, meat color (fresh), meat color (cooked), and overall meat acceptability during the time of termination.

Conclusion

Based on the findings on the effects of different levels of pounded banana stalk as a feed supplement on the growth effect and meat quality consumers' assessment of ZamPen native chicken, the following conclusions were drawn: pounded banana stalk stimulated and increased ZamPen native chicken growth, specifically in terms of daily gain, daily feed conversion efficiency and final weight; in which there is significant effects of different levels of pounded banana stalk as feed supplements on the growth of ZamPen native chicken ; Treatment III (T_3) with 30% (300 grams) of PBS showed favorable growth's effect specifically in terms of daily gain, daily feed conversion efficiency and final weight of ZamPen native chicken in all sampling periods, this is because incorporating 30% of pounded banana stalk to the commercial poultry feeds gives an adequate amount of vitamins and minerals which enhance hormone production and increase energy supply and metabolism.

Apart from that, the pounded banana stalk also enhanced and promoted the meat quality of ZamPen native chicken specifically in terms of meat odor, meat texture, meat taste/flavour, meat tenderness, meat juiciness, meat color (fresh), meat color (cooked), and meat overall acceptability ; there is a significant difference on the effects of pounded banana stalk on the

meat quality consumers' assessment of ZamPen native chicken ; Treatment I (T_1) with 10% (100 grams) of PBS showed the favourable meat quality in all parameters of ZamPen native chicken ,this is because incorporating10% of pounded banana stalk to the commercial poultry feeds provides an enough amount of dietary fiber which aids to develop thick layer of meat and better muscle development . And those systems of measurements of animal's growth mechanism and development is a better prerequisite knowledge and hands on activity for a learner who loves biology, physiology, zoology, animal husbandry and other allied agricultural science subjects.

Recommendations

Based on the findings, the researcher endorses the following recommendations:

1. Same study be conducted, and the supplementation must start after two months old period whether the same result would suffice.
2. Further study be conducted utilizing small amounts (4%- 8%) of pounded banana stalk to be mixed with commercial feeds in raising ZamPen native chicken and using other succulents vegetables' stems compared to commercial feed whether the same result would warrant.
3. Another study be conducted using another strain or species of chicken and methods of choosing the research (gender and health status) if the result would be the similar.
4. Final copy of study's result be furnished and forwarded to Department of Agriculture, for public information, confirmation, and widest dissemination.

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