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GROWTH PERFORMANCE OF NATIVE CHICKEN (*Gallus gallus domesticus*) USING VARIED LEVELS OF WATER SPINACH (*Ipomoea aquatica)* LEAF MEAL AS FEED SUPPLEMENT

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ABSTRACT

The study aimed to determine the effect of water spinach leaf meal (WSLM) to the growth performance of native chicken. An Experimental Research in Randomized Complete Block Design (RCBD) was used in this study of varied levels of water spinach leaf meal as feed supplement. The treatments used were as follows: during grower stage (6-14 weeks old), Treatment 1(Control)- SBM-29 kg+ WSLM- 0 kg, Treatment 2- SBM-27.5 kg+ WSLM- 1.5 kg, Treatment 3- SBM-26 kg+ WSLM- 3 kg, and Treatment 4- SBM-24.5 kg+ WSLM- 4.5 kg. And during their finisher stage (15-17 weeks old), the treatment was as follows Treatment 1(Control)- SBM-28 kg+ WSLM- 0 kg, Treatment 2- SBM-26 kg+ WSLM- 2 kg, Treatment 3- SBM-24 kg+ WSLM- 4kg, and Treatment 4- Finisher: SBM-22kg+ WSLM- 6kg. Results showed that the growth performance of native chicken such as body weight, weekly body weight, and average daily gain in weight, and feed conversion ratio did not show difference among treatment means and were not affected by varied levels of water spinach leaf meal. However, average daily feed consumption had significant effect on its 7th to 8th weeks of age only due to the water spinach's high fiber content that led to stimulated intake. It can be concluded that varying levels of water spinach leaf meal did not affect the growth performance of native chickens. However, it can be used as cheaper alternative feed ingredients. It is also recommended to find other way of

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processing of WSLM where its price can be lessened.

KEY WORDS: Native chicken, Varied levels of water spinach leaf meal,

INTRODUCTION

Poultry raising offers numerous opportunities for success. It is the most exploited species of poultry. Native chickens are commonly raised in our country as source of meat and egg. And it is believed to be descended from the domesticated red jungle fowl (*Gallus* gallus) which is usually single combed with shanks that varies from colors yellow, white, and gray, black to reddish-brown. It has plumage color that varies from reddish-brown, silver laced with bluish-green tint, alternate barring of black, white, and gray and reddish-brown, solid white, smoky white, to brownish gray, brown to gray with white spots, and solid black. (Agatep 2007; Argana 2001). Philippine native chicken are tough birds, resistant to illness, with good foraging ability and free-ranging and typically docile, quiet, and friendly (Tutor 2019; Morales 2012). Under improved condition and management, native hen can lay 130 to 200 eggs per year at the start of their laying period (18 to 20 weeks) and can reach 1.0 kilograms of body weight within 12 weeks. They are known to be hardy and resistant to diseases, however they are vulnerable to fowl pox, fowl cholera. (Agatep 2007; Argana 2001).

According to Lopez et. al., (2014), the importance of the native chicken does not rely to the contribution on the gross national income, but rather as a source of protein for some rural areas and as a support for their immediate needs. For better production, native chicken requires balance nutrients for their body to function. The 70-75% of total cost production goes to their feeds (Maung et. al, 2020) due to high value of ingredients for feeds, including soybean meal which is the premier source of protein in poultry industry
(Iji et. al, 2017). That is why using local feed ingredients with cheaper, but quality nutritional supplements should be considered (Teguia and Beynen, 2005; Maung et. al 2020).

Water Spinach (*Ipomoea aquatica*) or Kangkong is an annual or perennial, aquatic herb with hollow and spongy stems that floats on the water (Shaikh 2017). It is abundantly growing in stagnant streams, freshwater swamps, and pools. Water spinach is forage that is protein-rich that can replace part, or the whole of the fish or soybean meal (Phiny et. al

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2008). The foliage contains protein in the range of 23.6 to 36.30% (NhuyXuan Dung 1996; Nguyen et al., 2006).

Aside from what usually used in formulation of feeds, alternative plants that are available in local can become its substitute that have the same nutrients for growing native chicken in an economical way.

OBJECTIVE OF THE STUDY

The objective of the study was to investigate the effects of water spinach leaf meal (WSLM) to the growth performance of native chicken.

MATERIALS AND METHODS

Research Design

Experimental research following the Randomized Complete Block Design (RCBD) was employed in this study. Four treatments were used, and each treatment was replicated four times with 8 native chickens per replication.

Procurement of Stocks

One hundred twenty-eight-day old chicks were purchased from Brgy. Coralan, Sta. Maria, Laguna. They were divided into 16 cages based on the experimental design at the age of 6 weeks old and they were reared until the 17 weeks of age. The native chickens were fed using basal diet at ad libitum.

Brooding Management

One tablespoon of sugar per 2 litters of water was given to the newly arrived chicks to lessen the stress due to long travel. The lighting during the first week of the chicks was continuously provided to control their body temperature until their 3rd week of age. The behavior of the chicks were observed from time to time to determine if the temperature inside the brooding cages was enough. At brooding time, all birds were taken good care and handling management. The 60 watts incandescent bulb was used in brooding time of chicks to provide enough temperature. After this period the chicks were transferred to their experimental cages.

Poultry House

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The poultry house used in this study were elevated cages. Cages per replication was measured 1 m^2. A total of 16 m^2 was use for the 16 cages. Fish net was used not only as cover but also to provide a better air circulation. There were enough waterer and feeding trough per replication. The poultry house was sanitized before the study started.

Supply of Drinking Water

Drinking water came from a spring at Barangay Kapatalan, Siniloan, Laguna where the supply of barangay water came from, thus, it is safe and un-chlorinated.

Feed Formulation

The varying amounts of water spinach leaf meal and soybean meal per treatment was presented at Table 1. While the other feed ingredients that were used were shown at Table 2.

Table 1. Composition and nutrient contents of the basal diet in grower adapted from Leydia (2018)

Feed Ingredients	A. Grower			
	T1 (kg)	T2 (kg)	T3 (kg)	T4 (kg)
1. Water Spinach Leaf Meal	0	1.5	3	4.5
2. Soybean Meal	29	27.5	26	24.5
3. Rice bran D1	31	31	31	31
4. Yellow corn meal	18	18	18	18
5. Copra Meal	18	18	18	18
6. Molasses	2.4	2.4	2.4	2.4
7. Salt (NaCl)	1	1	1	1
8. Vitamin	0.3	0.3	0.3	0.3

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9. Minerals	0.3	0.3	0.3	0.3
TOTAL (KG)	100	100	100	100
TOTAL PROXIMATE ANALYSIS				
CRUDE PROTEIN (CP%)	21.52	21.29	21.07	20.84
ME, kca;/kg	2376.6	2343.70	2318.77	2289.84
Cost, Php/kg	22.57	22.55	22.54	22.53

Table 2. Composition and nutrient contents of the basal diet in finisher adapted from Leydia (2018)

Feed Ingredients	B. Finisher			
	T1 (kg)	T2 (kg)	T3 (kg)	T4 (kg)
1. Water Spinach Leaf Meal	0	2	4	6
2. Soybean Meal	28	26	24	22
3. Rice bran D1	30	30	30	30
4. Yellow corn meal	20	20	20	20
5. Copra Meal	16	16	16	16
6. Molasses	2.6	2.6	2.6	2.6
7. Salt (NaCl)	1	1	1	1
8. Vitamin	0.2	0.2	0.2	0.2
9. Minerals	0.2	0.2	0.2	0.2
TOTAL (KG)	100	100	100	100

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TOTAL PROXIMATE ANALYSIS				
CRUDE PROTEIN (CP%)	13.95	17.65	17.35	17.05
ME, kca;/kg	2414.16	2375.58	2337.01	2298.43
Cost, Php/kg	22.22	22.20	22.18	22.17

Application of Treatment	
Treatment 1	(Control) Grower: SBM-29 kg+ WSLM- 0 kg
	Finisher: SBM-28 kg+ WSLM- 0 kg
Treatment 2	Grower: SBM-27.5 kg+ WSLM- 1.5 kg
	Finisher: SBM-26 kg+ WSLM- 2 kg
Treatment 3	Grower: SBM-26 kg+ WSLM- 3 kg
	Finisher: SBM-24 kg+ WSLM- 4kg
Treatment 4	Grower: SBM-24.5 kg+ WSLM- 4.5 kg
	Finisher: SBM-22kg+ WSLM- 6kg

The fresh water spinach leaves were collected from selected areas of Siniloan, Laguna. Prior to chopping, the stalk and leaves were separated and washed the leaves thoroughly. The leaves were sun-dried for 48 hours or until it reaches approximately 4.75% moisture content (Adedokun et.,al 2019; Fasakin 2004). It was pulverized with the use of blender and mixed with other ingredients such as Soybean Meal, Rice Bran D1, Yellow Corn Meal, Copra Meal, Molasses, Salt, Vitamin and Mineral Premix with their respective amount according from the feed formulation. The native chicken was fed using grower mash from 6 – 14 weeks of age while 15-17 weeks of age was fed with finisher mash.

Feeding Management

The 128 native chickens were fed by basal diet with varying levels of water spinach leaf meal from 6 weeks old until the end of the experiment. Every 6 o' clock in the morning the chickens were given with basal diet and was refilled every 4 to 6 hours to maintain the ad libitum amount. The remaining feeds were measured at 5 o' clock in the afternoon and for data gathering. It was refilled with measured feeds enough for them to eat until the next morning.

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Waste Management

The manure of the native chicken was collected using materials such as rake, shovel and old sacks, and it was placed at dry area away from the poultry house and can be used on other purposes like fertilizer for plants.

Data Collection and Analysis

Weekly body weight was measured with the use of calibrated digital weighting scale. It was measured after brooding and continuously every 7 days of experiment until the last day of experiment.

Daily feed consumption was monitored every day. Data were obtained by weighing the left-over feeds in the feeder and subtracting it from the total feeds that was given within the day.

Body weight was measured by weighing the chickens before selling.

Feed Conversion Ratio is the efficiency of chickens by converting the feed to meat and it was computed by dividing feed consumption by its body weight.

Cost of Production in this study the cost of production refers to the cost of feeds from brooding until the last day of the experimental period as well as the cost of the native chicken at day old. To determine the feed cost the price of raw materials was divided to the amount of feeds produced. The labor cost in producing the basal diet was added to the feed cost. In the end of the experiment, the price of native chicken was determined based on the prevailing price in the market.

Data Analysis

All the data gathered was analyzed using the Analysis of Variance (ANOVA) for Randomized Complete Block Design to determine the significant differences among treatment means. Significant results were further analyzed using Least Significant Differences (LSD). The data collected was analyzed using Statistical Tool for Agricultural Research (STAR) software.

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RESULTS AND DISCUSSION

Body Weight

From age of 6 weeks old, the heaviest body weight was noted on the native chickens from Treatment 3 with the mean of 466.94 grams and followed by Treatment 4 with 466.12 grams. On the final body weight with the age of 17 weeks old, Treatment 3 got the highest mean in terms of final body weight with the amount of 1153.94 grams. However, analysis of variance showed no significant differences among the treatments. This indicates that the supplementation of WSLM in the ration of native chickens has no significant effect on the body weight of native chickens.

Weekly Body Weight

After the application of grower mash basal diet at 14 weeks, Treatment 4 got the heaviest body weight with the amount of 1084.25 grams. But on week 17, Treatment 3 got the heaviest body weight with the amount of 1153.94 grams. However, analysis of variance failed to determine the significant differences between the treatments. This result means that the inclusion of varying levels of WSLM has no significant effect on the weekly body weight of the experimental native chicken.

Average Daily Feed Consumption

The highest amount of average daily feed consumption was during their 12^{th} to 13^{th} weeks of age with the amount of 82.25 grams per chicken that belongs to Treatment 4. Those with the lowest amount of average daily feed consumption was during their 6 to 7 weeks of age with the amount of 44.97 grams per chicken which came from Treatment 1. However, the analysis of variance did not show any significant differences between the treatments except on their 7 to 8 weeks of age which means that the daily feed consumption during this age were affected by water spinach leaf meal. These results imply that the supplementation of WSLM in the ration of native chickens have significantly influenced the average daily feed consumption of native chickens.

Average Daily Gain Weight

Only Treatment 4 got the most consistent gain in weight especially from week 10 to 11 of age which was 16.50 and 17.11 in grams. But in their 12 weeks of age, all Treatments start

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decreasing their gain in weight until the end of the experiment. Analysis of variance has shown unavailing significant difference among the Treatments. It means that WSLM did not affect the body weight of native chicken.

Feed Conversion Ratio

Based on the result, Treatment 2 got the lowest FCR with 7.12 followed by Treatment 3 with the amount of 7.43. The control or Treatment 1 got the highest FCR with the amount of 8.12. Analysis of variance failed to show significant differences among the treatments. The results mean that the applying of WSLM did not affect the feed conversion ratio of native chicken.

Cost of Production

The cost of production and return of investment of the study were presented in Tables 8, 9, 10, 11 and 12. The native chickens were sold alive at the end of the experiment with the cost of Php 250.00 per head. Data shows that the highest net income was obtained on native chickens fed with Treatment 2 with the amount of Php 1,499.48, followed by Treatment 1 with Php 1,302.45, then, Treatment 4 with Php 1,270.00, and the lowest income was noted on Treatment 3 with Php 1,268.93.

CONCLUSION

Based on the foregoing findings, WSLM did not affect the growth performance of the paraoakan native chicken in terms of body weight, weekly body weight, average weekly gain weight and feed conversion ratio. However, their average daily feed consumption had a significant effect during their 7^{th} to 8^{th} weeks of age only could be the cause of high fiber in the WSLM that hastened the passage of food that led to stimulated intake. The most net income was observed at 2 kg (grower) and 1.5 kg (finisher) inclusion of water spinach leaf meal (T2). Therefore, it concludes that using formulated feeds with different varying levels of water spinach leaf meal as feed supplement to the native chickens lessen the cost.

RECOMMENDATION

In view of the above-stated findings and conclusion, it is recommended to use WSLM as substitute for soybean meal because based on the study, its effect on the growth performance of the native chicken is not far. WSLM can also be used with higher inclusion rate than the

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researcher applied in this study and apply it on other animals for further research. It is also recommended to find other ways of preparing WSLM to make it more affordable and look on other parameters aside from its growth performance.

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