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Growth Performance of Broilers Fed with *Piper betle* L. Leaves as Soilage

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ABSTRACT

The study evaluated the growth performance of broilers fed with *Piper betle* leaves as soilage. Specifically, it aimed to determine the effects of betel leaves as soilage in feed consumption, body weight, water consumption, weight gain, percentage growth rate, feed conversion efficiency, feed conversion ratio, dressing percentage, pancreas, and liver weight. Results revealed that 12% Piper betle as soilage (T4) consistently outgrown the broilers fed with 8% (T3), 4% (T2) and control (T1) in terms of body weight, feed consumption, gain in weight, and income overfeeds, soilage, chick cost, and miscellaneous cost. Percentage growth rate, feed conversion ratio (FCR), feed conversion efficiency (FCE), dressing percentage with and without giblets were comparable among treatments. Similarly, data showed that pancreas and liver weights did not differ

among treatments and did not exceed within the maximum limits of toxicity, indicating no toxic substances and deleterious effects in feeding Piper betle as soilage regardless of the level of inclusion. Hence, safe as feed for broiler's.

KEYWORDS

Broiler, Piper betle L., soilage, Philippines

INTRODUCTION

The *Piper betle* is a leaf of a vine belonging to the piperaceae family (Guha, 2006). It is valued both as a mild stimulant and for its medicinal properties. Betel leaf is mostly consumed in Asia and elsewhere in the world by some Asian emigrant, as betel quid or in paan, with or without tobacco, in additive psycho-stimulating and euphoria-inducing formulations with adverse health effects. Betel leaf is notable for staining regular users (Rimando et al., 1986).

In the Cordillera, the *Piper betle* grows everywhere, especially in the uppermost elevation. It is important for is widely used as a betel quid that give color and aroma to their chewed betel nut "moma." The leaf can be sold in the market for Php 5.00/35 medium leaves.

The Kalinga's used the leaves as masticator, together with scraped areca nut and homemade lime from powdered burned native snails. This is known as "momma" in local dialect3. Moreover, they chew the leaves and use it as a poultice for boils and as antiseptic for cuts and wounds both for human and farm animals6. The leaves of the betel plant are also included in the preparation of cooked food for native pigs. If the piglets' ration is dry, they crush the leaves until juicy, soft and tender, and use as binder for a dry mashed feed to form tiny ball just enough for the mouth of the animals to chew shallow3.

Piper betle contains tannins, sugar, diastases, and essential oil. An analysis of the betel leaf shows that it consist of moisture 85.5 percent, protein 3.1 percent, fat 0.8 percent, minerals 2.3 percent, fiber 2.4 percent, and carbohydrates 6.1 percent per 100 grams1. It›s mineral and vitamin contents are the calcium, thiamine, riboflavin, niacin, and vitamin E. Essential oil of betel leaf is commonly used as antibiotic7. To better facilitate the absorption of the elements contained in the betel leaf by broiler chicken, it is necessary to do the extraction of the betel leaf (Arambewela, Arawwawala, & Rajapaksa, 2006).

However, the literature search has not retrieved any detailed information on the use of *Piper betle* as a poultry diet, particularly in a broiler. Hence, this study›s objective was: 1) Determine the growth performance of broilers fed with *Piper betle* as soilage. 2) find out the level of *Piper betle* as soilage that enhances growth in feed consumption, body weight, weight gain, feed conversion efficiency, and feed conversion ratio. 3) Evaluate the effects of feeding *Piper betle* as soilage in terms of dressing percentage with and without giblets, liver and pancreas weight; and lastly, 4) evaluate the income over feed, soilage, chick, and miscellaneous cost of feeding *Piper betle* as soilage.

OBJECTIVES OF THE STUDY

The study evaluated the growth performance of broilers fed with Piper betle leaves as soilage. Specifically, it aimed to determine the effects of betel leaves as soilage in terms of feed consumption, body weight, water consumption, gain in weight, percentage growth rate, feed conversion efficiency, feed conversion ratio, dressing percentage, pancreas, and liver weight.

MATERIALS AND METHODS

Plant Material: *Piper betle L.* leaves were gathered from the different municipalities in Kalinga.

Preparation of the *Piper betle L.* as Soilage: Young and fresh *Piper betle L.* leaves were cleaned, chopped finely and mixed with the desired percentage of home mixed feeds following the treatment imposed.

Determination of the growth performance of broilers fed with *Piper betle* as Soilage

Body Weight: The body weight of broilers was taken before they were distributed in their experimental units. Weekly body weight was taken and recorded until the end of the experimental period. Body weight was expressed in grams.

Feed Consumption: The weekly feed consumption of the birds was recorded by taking the amount of feeds offered and the amount of feeds consumed. The amount of leftover was subtracted from the amount of feed offered to determine the actual feed consumption.

Gain in weight: this was taken by subtracting the initial weight from the weight of the birds at the end of every week after giving the treatments. This was repeated until the end of the study. Likewise, the percentage growth of the birds was computed.

Feed Conversion efficiency (FCE) & ratio (FCR): The feed conversion efficiency and ratio was determined by using the Biddle and Juerguenson's formula as follows:

$$FCR = \frac{\text{Feed Consumed}}{\text{Gain in weight}}$$

$$FCE = \frac{\text{Gain in weight}}{\text{Feed Consumption}} \times 100$$

Dressed Weight: The dressed weight with giblets was determined by dividing the dressed weight without giblets over the broiler's live weight and then multiplying by one hundred. Likewise, the dressed weight without giblets is taken by following the formula the same as with giblets.

Liver and Pancreas weight: The liver and pancreas weight were taken by using the weighing scale. If the liver and pancreas were inflamed or enlarged and exceeded in the normal range of weight, possible toxicity in the treatments could be considered.

Income over feed, soilage, chick, and miscellaneous cost: The income over feed, soilage, chicks, and the miscellaneous cost was computed by subtracting the costs of feeds, soilage consumed, chick and miscellaneous cost from the value of the birds that was provided.

Statistical Analysis: All data on the growth parameters were tabulated and analyzed using the Analysis of Variance (ANOVA) following the Complete Randomized Design (CRD). Comparison among treatment means was made using the Least Significant Differences (LSD)

RESULTS AND DISCUSSION

Piper betle leaves fed as soilage at 12% (T4) inclusion in the homed mixed feeds ration marked significant in terms of body weight and gain in weight while highly significant in terms of feed consumption, and return over feed, soilage, chick and miscellaneous cost over T3, T2, and T1 at 8%, 4% and 0% Piper betle leaves as soilage, respectively.

Based on the data, it was observed that the higher the percentage inclusion of Piper betle leaves fed as soilage, the heavier the broiler's weight. It was also observed that it took a week or two for the birds to show significant differences in their body weight when fed with Piper betle as soilage. The higher the betel leaves extract, broilers got remarkable results in terms of body weight, gain in weight, and feed consumption2.

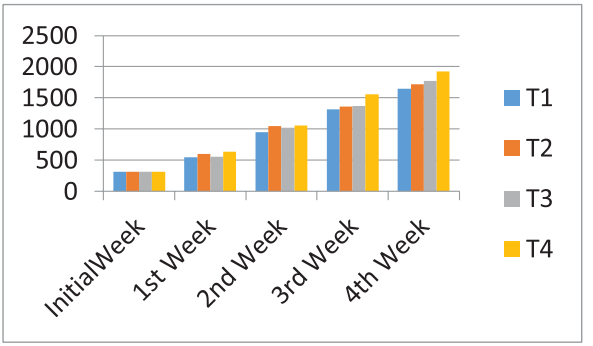

Fig. 1. Graphical Presentation on Weekly Body Weight of Broilers Fed with Betel leaves as Soilage (g).

Similar trends in weekly body weights were observed on the gain in weight of broilers. Based on the data, it was observed that the cumulative gain in weight of broilers fed with 12% *Piper betle* as soilage (T4) gain more weight compared to 8%(T3), (T2)4% and control (T1). Such differences might be contributed to the fiber content in the *Piper betle* as soilage for broilers that enhances the digestion. The inclusion of a moderate amount of fiber in the broiler diet has a positive effect on the gizzard activity, improving the mixing ingesta and motility of the GIT, gut health preventing adhesion of particular pathogen bacterial population to the epithelial mucosa and growth performance4. Nevertheless, percentage growth revealed no significant differences among treatments means

throughout the study (P< 0.05). But based on the treatment means, experimental birds showed a remarkable growth rate on the first two weeks of feeding trial and started to decline towards the 3rd and 4th week of the study, as per observation on the graphical presentation (Fig.2), the experimental broilers fed with *Piper betle* as soilage follow the normal descending trend of growth rate for broilers throughout the feeding trial5.

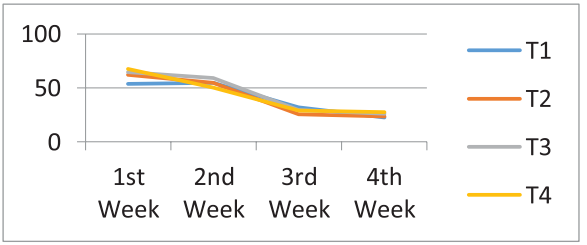

Fig. 2. Graphical Presentation on Weekly Percentage Growth of Broilers Fed with Betel Leaves as Soilage (%).

Consistent to body weight and gain in weight, feed consumption data showed that treatment four (T4)at 12% Piper betle leaves as soilage showed a highly significant difference towards the end of feeding trial (3rd &4th week) over other treatments. This is attributed to the aromatic odor and sharp burning in taste (www.online-vitamins-guide.com) of Piper betle leaves that enhance the appetite of broilers to eat more feeds.

Feed Conversion Ratio (FCR) or the ability of broilers to convert feeds into meat or flesh is presented in Table 1. In contrast, the higher the FCR values, means better the feed utilization. Data revealed that no significant variation existed (P<0.5) among treatments fed with Piper betle as soilage throughout the study's duration with a means ranging from 1.43 to 1.72. Consistent with FCR, FCE showed no significant differences (P<0.5) among treatments throughout the feeding trial.

Table 1. Comparison between FCR & FCE of broilers fed with *Piper betle* as soilage.

TREATMENTS		FCE
T_1 – Control	1.72	64.81
T_2 – 2.5% SSM	1.46	73.72
T_3 – 5% SSM	1.58	69.37
T_4 – 7.5% SSM	1.43	74.19
ANOVA	ns	ns
C.V. (%)	10.12	13.56

Dressing percentage with and without giblets of broilers fed with *Piper betle* as soilage showed no significant differences with a mean ranging from 83.23 to 85.09 percent and 72.45 to 77.32 percent, respectively. It was also noted that dressing percentage with giblets surpassed the standard range (70% - 76%) of dressed yield values for broiler chicken5. As a rule, appearance, color, size, and weight of the liver and pancreas served as indicators of the presence of toxic substances in broilers ration. Any discoloration, unnecessary appearance, and deviation from size or weights would mean that birds have intake high levels of toxic substances. Based on the result, no significant differences were observed in the liver and pancreas of the broilers. This signifies that feeding *Piper betle* as soilage in broilers ration did not contain any harmful or deleterious toxic substances that could affect the broilers' growth performance.

The economy of feeding betel leaves as soilage on broilers ration was expressed in the income over feed, soilage, chick, and miscellaneous costs. Results revealed that the inclusion of 12% *Piper betle* leaves as soilage (T4) has the highest income of Php 58.01only per bird or return on investment of 31.57 percent. This means that in every peso invested (at the current price) in feeding *Piper betle* as soilage, it has a return of 0.32 centavos. Furthermore, it can be noted that the price of *Piper betle* leaves as soilage does not impact the total costs of production though feed consumption increases. Yet, it tremendously boosts the growth performance of broilers in terms of body weight. This means that the broiler raiser could add *Piper betle* as soilage in broilers ration to gain more profit.

CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. The inclusion of 12% betel leaves as soilage (T4) on the ration of broilers outgrown and out yield all other treatment (T1 to T3) and economically reduced the cost of production, thus realizing a higher profits.

2. Inclusion of betel leaves as soilage is safe to be used in feed ration.

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