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RESEARCH ARTICLE

KAMIAS FRUIT EXTRACT (*AVERRHOABILIMBI* LINN.) SUPPLEMENTATION FOR GROWTH PERFORMANCE OF BROILER

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ABSTRACT

Acidification of diets with organic acids found to decrease the colonization of gut microflora resulting to increase in feed consumption and weight gain of the animal thus, the search for alternative growth promotants with organic acids for poultry is on-going. The experiment was conducted to evaluate the potential of kamias fruit extract as supplement to the drinking water to enhance the growth performance of broiler. It was conducted in completely randomized design (CRD) with 20% KFE in 80% drinking water, 40% KFE in 60% drinking water, and 60% KFE in 40% drinking water. Results showed that dilution of KFE lowered the pH in the drinking water of broiler. Inclusion of KFE in the drinking water promoted significant increase in average feed consumption of the basal diet and average weight gain of broiler.

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INTRODUCTION

High levels of production and efficient feed conversion are the need of the modern broiler industry which to a certain extent could be achieved. This has given impetus to continued search for new feed additives, alternative feed ingredients and growth enhancers that could increase rate of growth and level of production in a least production cost and safer foods. Over the past few years, experts in the poultry industry have given the use of acidifier in a closer scrutiny. Putting weak acids in poultry feed and drinking water in many cases appears to have beneficial effects (Versteegh, and Jongbloed, 1999 as cited by Muzaffer *et al.*, 2003). Because of the growing concern over the transmission and proliferation of resistant bacteria via the food chain, the European Union (2006) banned antibiotic growth promoters to be used as additives in animal nutrition. So there aroused the need for alternative strategies to minimize the risk of spreading antibiotic resistance from animals to humans via food chain. The alternative way which has showed some potential in this regard are organic acids. Organic acids and their salts are generally regarded as safe (GRAS) and have been approved by most member states of the EU to be used as feed additives in animal production. Organic acids have growth promoting properties and can be used as alternatives to antibiotics (Patten and Waldroup, 1988). The addition of organic acids to the broiler diet reduces the production of toxic

components by bacteria and the colonization of pathogens in the GIT (Langhout, 2000; Denli *et al.*, 2003 as cited by S Adil *et al.*, 2011). Organic acid supplementation have been reported to decrease colonization of pathogens and production of toxic metabolites, improve digestibility of protein and minerals like calcium, phosphorus, magnesium and zinc and also serve as substrates in the intermediary metabolism (Kirchgessner and Roth, 1988).

However, the knowledge of the effect from synergistically acting organic acid found in locally available plants of high biological value to the animals is relatively new. Thus, study with Kamias or Visayan name "iba" (*Averrhoabilimbi* Linn.) which is high in ascorbic acid and oxalic acid use as natural organic acidifier in drinking water in the growth of broiler is timely. Generally, the study aimed to evaluate the potential of kamias fruit extract as supplement to the drinking water on the growth performance of broilers. Specifically, to assess the effect of supplementation on the feed consumption and weight gain of broilers.

MATERIALS AND METHODS

The materials used in the study includes 120 heads of day-old broiler chicks, brooding pen, rearing pen, old newspapers, electric wiring, bamboo slots, three pieces of 100-watt bulb, watering trough, feeding trough, fresh kamias fruits, graduated cylinder, digital pen type pH meter, improvised heater, electrolytes, and weighing scale.

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Experimental Procedures

One hundred twenty heads of day-old broilers were used in the study. The study was conducted in a Completely Randomized Design (CRD) with four treatments replicated three times. Each replicates were composed of ten broiler chicks. Fresh kamias fruits were gathered from the locality. The juice was extracted manually. Preparation of the experimental treatments includes measuring and dilutions of kamias fruit extract (KFE) at the desired level of inclusion into the drinking water. Prepared dilutions were stored in a glass bottles and placed in a cool dry area properly to avoid contamination and chemical reactions. Analysis of pH was conducted using a digital pen type pH meter prior to utilization. The control group was given fresh drinking water without KFE. A 20%, 40%, and 60% ppm KFE diluted to drinking water comprised the three treatment groups.

Table 1. Actual measurement of fresh KFE taken after extraction of pure kamias Juice

| DESCRIPTION | pH |
|---|------|
| Pure Kamias Fruit Extract | 0.00 |
| 20% Kamias Fruit Extract and 80% drinking water | 0.43 |
| 40% Kamias Fruit Extract and 60% drinking water | 0.16 |
| 60% Kamias Fruit Extract and 40% drinking water | 0.10 |

Data gathered in the study includes average feed consumption (g) and average weight gain (g).

RESULTS AND DISCUSSION

Average Feed Consumption (g) and Average Weight Gain (g)

The results on the average feed consumption (AFC) and average weight gain (AWG) of broilers supplemented with different levels of Kamias fruit extract (KFE) in the drinking water as presented in Table 2. showed highly significant difference among treatments with p -value=0.000 and p -value=0.015, respectively. Broilers supplemented with different level of KFE in their drinking water found to have more feed consumed and weight gain than the control group. According to Kirchgessner and Roth, 1988 as cited by Hassan *et al.*, 2010, acidification with various weak organic acids to diets such as formic, fumaric, propionic, lactic and asorbic acid have been reported to decrease colonization of pathogen and production of toxic metabolites, improve digestibility of protein and of Ca, P, Mg and Zn and serve as substrates in the intermediary metabolism.

Table 2. Average feed consumption and average weight gain as affected by different levels of kamias fruit extract on the growth performance of broiler

| Treatment | Ave. Mean feed consumption (G) | Ave. mean weight gain (G) |
|------------------------------|--------------------------------|---------------------------|
| T0- 0% Kamias Fruit Extract | 1053.7 ^b | 666.83 ^b |
| T1- 20% Kamias Fruit Extract | 1237.4 ^a | 1103.1 ^a |
| T2- 40% Kamias Fruit Extract | 1237 ^a | 1052 ^a |
| T3- 60% Kamias Fruit Extract | 1235.9 ^a | 1090.3 ^a |
| <i>p</i> -value | 0.000** | 0.015* |
| CV(%) | 1.56 | 5.07 |

Means with similar letter superscripts are not significantly different

* p -value<0.05- significant

** p -value<0.01- highly significant

Due to pH reducing properties and direct antimicrobial effect, organic acids might have resulted in inhibition of intestinal bacteria leading to the reduced bacterial competition with the host for available nutrients and diminution in the level of toxic which bacterial metabolites as a results of lessened bacterial fermentation resulting in the improvement of protein and energy digestibility, thereby ameliorating the weight gain and performance of broiler chicken (Adil *et al.*, 2011). The low pH of the gastrointestinal gut caused by the intake of organic acid from the KFE allows faster digestion of feeds thus increases feed consumption and as a result, increase in weight gain of broilers.

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