

WATERLEAF (TALINUM TRIANGULARE) EXTRACT IN DRINKING WATER: EFFECTS ON LAYING HENS

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Abstract

Animal productivity is significantly influenced by genetic makeup and the prevailing environmental conditions of their habitat. In Nigeria, the livestock sector faces a substantial feed supply deficit, leading to increased prices for animal products. Feed costs account for over 70% of total production expenses in intensive systems, exacerbating the challenge. This study evaluates the performance of laying hens provided with drinking water fortified with waterleaf (*Talinum triangulare* (Jacq.) Willd) aqueous extract. The findings highlight the potential of this supplementation to improve egg production and feed conversion rates, addressing the strain-specific variations observed among commercial layers. The results suggest that integrating waterleaf extract into poultry management practices could offer a cost-effective solution to enhance productivity in the face of feed shortages and rising costs.

INTRODUCTION

The productivity of animals depends to a large extent on its genetic constitution, and also on the environmental conditions which prevail in the vegetation zone where the animal lives (Gwaza and Egahi, 2009). The livestock sector in Nigeria has been characterized by a supply deficit in feed and inputs, which has led to a wide spread rise in prices for most animal products (Fetuga, 1979) and feed cost is estimated to represent over 70 percent of the total cost of production under intensive system (Oluyemi, 1984; Ogunfowora, 1984). It is generally believed that egg production and the rate of feed conversion to eggs or meat vary among strains of commercial layers (Zamans et al., 2004; Olawumi, 2011).

Eggs are sources of complete protein, which man needs in his diet to enable the body, make new cells and repair damaged ones. Eggs can therefore be a part of a healthy diet. One large egg contains around 6.29 g of high-quality protein. According to Sefcik (2010), dietary protein is vital during certain stages of growth.

The protein in eggs is a unique type of protein. There are two types of dietary protein: complete proteins and incomplete proteins (Sefcik, 2010). Sources of incomplete proteins come from plant-based foods such as beans, peas, nuts and grains. These foods are absent of one or more of the essential amino acids man needs. On the other hand, sources of complete protein come from animal foods, such as meat, chicken, milk and eggs, as well as from

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soy foods. These contain the nine essential amino acids man needs in his daily diet. The level of animal protein in the food is a primary indicator of the quality of life and standard of living (Ogundipe, 1996).

Various food categories as part of a nutritious diet, provide usable energy and heat to animals and humans through intestinal degradation and biochemical transformations while all sorts of other compounds serve unlimited metabolic functions of organs. One of these categories is fruits and vegetables which have been known to be an excellent source of vitamins and carbohydrates. These two are by themselves, enzymatic co-factors and glycolysis substrates, respectively, among other things. (Burgos and Burgos, 2006).

Waterleaf (*Talinum triangulare* (Jacq.) Willd) belongs to the plant family *portulacaceae*. It is a short-lived perennial herb growing to 30-60 cm in height. The leaf is greenish in colour with succulent stem and alternate leaf arrangement. Amongst its other names are *Talinum fruticosum*, *Portulacafruticosa* L., *Portulaca triangularis* (Jacq.) and *Talinum crassifolium* (Jacq.) Willd. The plant is mostly found in Southeast Asia, South America and Africa (Brunken et al., 2008; Ezekwe et al., 2001).

According to Aja et al. (2010), Waterleaf (*Talinum triangulare* (Jacq.) Willd) which is fast growing and easily reseeding itself contains appreciable amounts of protein, carbohydrates, steroids, carotenoids, among others and low level of oil content. In addition, Leung et al. (1968) reported that Waterleaf leaves contain per 100 g edible portion: water 90.8 g, energy 105 kJ (25 kcal), protein 2.4 g, fat 0.4 g, carbohydrates 4.4 g, fibre 1.0 g, calcium 121 mg, phosphorus 67 mg, iron 5.0 mg, thiamin 0.08 mg, riboflavin 0.18 mg, niacin 0.3 mg and ascorbic acid 31 mg.

Ezekwe et al. (2001) reported that nutritionally, waterleaf has been shown to possess the essential nutrients like β – carotene, minerals (such as calcium, potassium and magnesium) pectin, protein and vitamins. The vitamin A content (900ug) is comparable to other medium green leafy vegetables. Since it contains substantial amount of nutrients, there is a high indication that *Talinum triangulare* (Jacq.) Willd leaves can contribute significantly to the nutrient requirements and health management of poultry.

The objective of this study was to evaluate the performance response of laying birds supplied drinking water fortified with the aqueous extract of Waterleaf (*Talinum triangulare* (Jacq.) Willd).

MATERIALS AND METHODS

The study was carried out at the Poultry Unit of the Teaching and Research Farm, Department of Animal Production, Kogi State University, Anyigba, Kogi State. Anyigba is located in the derived Savanna zone of Nigeria.

Waterleaf (*Talinum triangulare* (Jacq.) Willd) leaves used were harvested from the mature plants at the Teaching and Research Farm of the Kogi State University, Anyigba. The harvested waterleaf was washed with clean water, cut into slices and then blended. Two (2) litres of water was added per kilogram of waterleaf to facilitate the extraction of the aqueous extract during sieving.

Forty (40) Nera Black Layers at 24 weeks old were purchased from a reputable breeder and used for the study. They were allotted on similar weight basis into five groups namely T₁, T₂, T₃, T₄ and T₅ of two replicates each, such that there were four birds per replicate. Waterleaf aqueous extract was added to drinking water at the ratio of 0:1000 ml, 50:1000 ml, 100:1000 ml, 150:1000 ml and 200:1000 ml in T₁, T₂, T₃, T₄ and T₅, respectively.

The experiment used a completely randomized design. Feed and water were supplied *ad libitum*. The birds were housed in deep litter system and each group was placed in a separate room. Laying performance was evaluated by collecting egg laid daily. The henday egg production (HDEP) was calculated as: HDEP = Daily egg collected / No. of live layers

Feed intake was obtained by subtracting the weight of left over feed (ort) from the quantity served daily. Body weight gain was obtained by subtracting previous week body weight from present body weight. Apparent water

consumption was obtained by subtracting water volume left over from the volume served 24 hours earlier. The ratio of feed intake to a dozen eggs was calculated as the feed conversion ratio.

RESULTS AND DISCUSSION

The effect of the waterleaf aqueous extract in drinking water on growth performance is as presented in Table 1. Daily feed intake was significantly higher ($P < 0.05$) in T2 than other treatment groups and control, while T3 was significantly higher ($P < 0.05$) than T5 but not significantly higher than T4 and the control. The Feed Conversion Ratio (FCR) of T3 (100 ml aqueous extract) was significantly higher ($P < 0.05$) than those of the other treatment groups (T2, T4 and T5) and the control (T1). Also, FCR of T2 (50 ml aqueous extract) was significantly higher ($P < 0.05$) than T4 and T5 but not significantly higher than the control. The feed conversion ratio was calculated on the feed consumed per dozen eggs laid.

Furthermore, Table 1 reveals that the hen day egg production was significantly higher ($P < 0.05$) in T2 than other treatment groups and the control while T3 is significantly higher ($P < 0.05$) than T4, T5 and Control. T2 and T3 seemed to utilize their feed better than other groups as revealed in their hen day production 96.45 and 93.35% respectively. This is better than other treatment groups and the control.

Both daily feed intake and daily water intake were significantly higher ($P < 0.05$) in T2 than other groups and had a corresponding higher hen day production than all other groups.

T2 appeared to have the best feed utilization in that the hens had a good weight as revealed by the weight gain and final weight and the group also had the best hen day production of 96.45%. It may therefore be deduced from the above that it will be more economical to raise hens on 50 ml WAE in their drinking water than using 100 ml, 150 ml or 200 ml or without WAE.

Oloyede (2005) explained that the phytochemical analysis is very helpful in the evaluation of some active biological components of some vegetables and plants. He also explained that the qualitative and quantitative analyses of water leaf (*Talinum triangulare* (Jacq.) Willd) carried out in both dry and wet samples revealed that it contains alkaloids, flavonoids, saponins amongst others. He argued that the presence of these substances shows its possible medicinal and dietary values.

Saponins have been reported to be used widely for their effects on ammonia emissions in animal feeding, also animal trials have shown that a reduced ammonia level in farming operatives causes less damage to the respiratory tract of animals and may help them to be less vulnerable to diseases (Zentner, 2011).

Furthermore, Heikens et al. (1995) explained that the valuable pharmaceutical properties of *Talinum triangulare* (Jacq.) Willd may be attributed to the presence of bioactive compound like alkaloid, which has been used as central nervous system (CNS) stimulant, topical anaesthetic in ophthalmology and powerful pain relievers among other uses and concluded that *Talinum triangulare* (Jacq.) Willd leaves can contribute significantly to the health management of man and should be recommended in our daily nutritional intake.

In conclusion, 50 and 100 ml WAE gave better weight gain, daily feed intake, feed conversion ratio and, better hen day egg production. It is therefore recommended that WAE be included in layers' drinking water at levels between 50 and 100 ml for high hen day egg production.

Conflict of interests

The authors did not declare any conflict of interest.

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