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Short Communication

The effect of dietary inclusion of *Mansonia altissima* on egg production and fertility of laying hens

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An experiment was conducted in Port Harcourt to determine the effect of dietary inclusion of *Mansonia altissima* on egg production and fertility of laying hens, using a total of 45 birds consisting of 36 layers and 9 cocks in a randomized block of groups A, B, C of 15 birds each. Each treatment group was replicated thrice each containing 5 birds of both sexes (4 females and 1 male). Birds in group A were used as control while those in treatments B, C were fed *M. altissima* powder at the rate of 30 and 50 g per kg feed daily, respectively, for eight weeks. Results showed a significant difference (P<0.05) in egg production with group C showing the highest egg production but decreased fertility. It was therefore concluded that *M. altissima* can be used to increase egg production in layers at the level of 50 g/kg feed but the reduced fertility, which it causes should be borne in mind while doing so.

Key words: *Mansonia altissima*, egg, production, fertility, hens, cocks.

INTRODUCTION

The significance of poultry farming keeps assuming greater levels in the developing countries where protein availability poses a great problem. This is because of its quick returns on investment and also for the reason that poultry can grow anywhere as no particular micro-climate is required; yet poultry products (poultry meat and eggs in particular) go a long way in providing the much required protein with the essential amino acids. Egg products are therefore an important means of rapidly increasing the availability of animal protein in the developing countries where malnutrition is a great problem. The need of increasing egg production in order to achieve this aim has evoked many researches in this direction. Many researchers have used antibiotics, various chemical agents, some trees, shrubs and browses in a bid to achieve this. That an antibiotic can be used to increase egg production was first demonstrated by Juke and Mcginis (1949), who reported that chlortetracycline (aureomycin) increased egg production in laying hens and caused weight gain as well. Following this finding, Coates (1955), reported an increase in growth rate of conventional chicks and other animals fed antibiotic supplemented diet. Similar increases in growth rate were also reported by Forbes and Park (1955). Morrison (1959) reported that significant improvements in egg production with no effect on hatchability and fertility were secured in some experiments, by the addition of dietary furazolidone to laying and breeder hen rations, often with a reduction in feed required per dozen eggs. Also Morrison (1959) reported that in laying hens a deficiency of riboflavin results in low hatchability of eggs and that riboflavin and vitamin B_{12} are essential for hatchability of eggs. Algeier et al. (1967) reported that the timber tree, Mansonia, contains mansonin, a cardenolide derived from strophanthidin, which was many years later found to have growth effects on broilers and laying hens. King (1968), working with growing and laying ducks, reported that feeding a diet supplemented with oxytetracycline (terramycin) tended to increase live weight gain during the first 4 weeks, increased egg production significantly

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in laying ducks, and produced thinness of the alimentary canal. In recent times, research on the use of plant sources as growth promoting agents and stimulants has continued to increase. A variety of edible forages available to animals have been shown to provide not only nutritional but also medicinal benefits. For example, *Allium sativum* (garlic), possesses antibacterial properties, and also is a powerful antidote against all kinds of poisons (Oliver, 1980). Oliver (1980) reported on *Alchornia cordifolia,* a browse plant, as a stimulant, intoxicant, and aphrodisiac.

Mansonia altissima (African black walnut, also called Ofun in Nigeria), is a popular West African timber tree. It has been used in Ivory Coast as arrow poison and in the treatment of leprosy, as well as an aphrodisiac in man. Reports indicate that *M. altissima* contains mansonin, a 2-3-di(O-methyl)-6-deoxy-β-D-glucopyranoside of strophanthidin. It also contains a series of haphthoquinones, one of which is mansonin E10, an optically active reagent (Wayne and Wege, 1981). Uku (2002) reported that response of testis to *M. altissima* by adult indigenous birds fed a diet at 10 and 20 g/kg feed inclusion levels, respectively, was not consistent but caused decreased egg production, fertility, and hatchability in hens. Although these observations were indications that *M. altissima* has effect on the ovary of laying hens. Nevertheless, there is relevance for further investigations. The objectives of this study therefore are to evaluate the effects of dietary inclusion of *M. altissima* on laying hens at higher inclusion levels of 30 and 50 g/kg feed based on egg production and fertility.

MATERIALS AND METHODS

Standard poultry equipment and sanitary conditions for the rearing of layers were applied in this study which lasted for 10 weeks, with two weeks serving as an equilibrization period. The birds were reared in deep litter in the Teaching and Research Farm of Rivers State University of Science and Technology, Nkpolu, Port Harcourt. A total of 45 birds consisting of 36 Isa-Brown layers and 9 cocks were completely randomized into three treatment groups, A, B, C of 15 birds each. Each treatment group was replicated thrice, each containing 5 birds of both sexes (4 females and 1 male). Birds in group A were used as control, while those in treatments B, C were fed *M. altissima* powder which had been weighed and graded, at the rate of 30 and 50 g per kilogram feed daily, respectively, for eight weeks. The exact quantity of feed consumed daily by each replicate or group was determined by weighing the left-over feed and subtracting it from the initial weighed quantity that was given. The layers mash used was TOP FEEDS, containing 16% crude protein (CP), 3.3% (Ca), 0.33% (P), 4.5% (Fibre), and 10.5 (MJ) metabolizable energy. The initial weight of each bird was taken using a mechanical table scale and subsequently the birds were weighed weekly. The *M. altissima* barks were obtained from Nkpolu-Port Harcourt timber market. The quantity obtained was washed, sun-dried for two weeks, and ground into powder using motorized grinder at the Port Harcourt (Diobu, Mile 1) market. The pulverized *M. altissima* was weighed with Mettler Electro Balance Model AE 163 electronic weighing scale into required dosages of 30 and 50 g, for ease of administration (inclusion). The eggs laid per replicate or group were recorded and incubated, using a table incubator and candled at day 7, 14, and 21 for fertility.

The data collected was subjected to statistical analysis using the analysis of variance (ANOVA) according to Steel and Torrie (1980) and where differences existed, means were compared using Duncan Multiple Range Test (DMRT) according to Statistical Analysis System Procedures of SAS (1999).

Table 1. Effect of *M. altissima* on weekly egg production.

Week	A (kg)	B (kg)	C (kg)
1	7.33 ± 0.33	7.00 ± 0.57	8.00 ± 0.57
2	6.00 ± 1.00	9.00 ± 0.57	10.67 ± 0.67
3	3.00 ± 1.05	5.33 ± 1.33	10.00 ± 1.73
4	3.67 ± 1.85	6.00 ± 1.09	10.67 ± 1.76
5	4.00 ± 1.52	8.00 ± 1.15	10.33 ± 2.02
6	3.67 ± 0.33	6.67 ± 2.02	9.33 ± 0.33
Overall mean	5.00 ± 1.00[a]	7.00 ± 1.00[b]	10.00 ± 1.00[a]

Group A were fed 0 g/kg feed; B, 30 g/kg feed; and C, 50 g/kg feed.
a, b, c: Means along the same row with different superscripts are significantly different (P<0.05).

Table 2. Effect of *M. altissima* on fertility status of hens.

Week	A (%)	B (%)	C (%)
1	80.00 ± 14.69	66.67 ± 19.25	87.50 ± 16.7
2	55.57 ± 29.39	69.47 ± 2.76	80.00 ± 37.3
3	33.33 ± 7.35	47.33 ± 28.96	50.00 ± 0.0
4	80.00 ± 11.09	38.90 ± 20.04	61.10 ± 5.6
Overall mean	62.2 ± 9.6[a]	56.7 ± 9.4[a]	69.38 ± 8.5[a]

Group A were fed 0 g/kg feed; B, 30 g/kg feed; and C, 50 g/kg feed.
a: Means with the same superscripts are not significantly different (P>0.05).

RESULTS AND DISCUSSION

The egg production figures were: A (control), 83 eggs, group B, 126 eggs; and group C, 177 eggs. Total number of eggs laid was 386 eggs. There were significant differences (P<0.05) in the level of egg production between the treatment groups (Table 1). The egg size was also seen to have reduced from 100 g in the control group (A), to 60.3 g in group C. The mean weight of the eggs was A, 100 g; B, 65 g; and C 60.3 g. Egg production was noticed to have dropped in week 3 due to diagnosed salmonellosis. The results also showed that the feeding of pulverized bark of *M. altissima* did not increase fertility significantly (P>0.05) (Table 2). Egg fertility recorded (%) was: A (Control), 80%; B, 40%; and C, 60%. This suggests that *M. altissima* caused a

reduction in egg fertility. The finding that there was a significant difference ($P<0.05$) in egg production between the treatment groups, with group C showing the highest egg production (Table 1), means that *M. altissima* inclusion in layers ration produced an increase in egg production at both levels (30 and 50 g/kg feed). The fact that there was an increasing level of egg production in B (126) and C (177), shows that *M. altissima* at the dosage of 30 and 50 g/kg feed stimulates egg production. This finding is inconsistent with the report of Uku (2002) where *M. altissima* dietary inclusion caused a depression in egg production at the dosages of 10 and 20 g/kg feed, respectively. It could be therefore that at higher doses of 30 and 50 g/kg feed, *M. altissima* may have caused increased blood flow to the ovaries thereby leading to more ovarian follicle formation and ultimately increased egg production, whereas at the dosages of 10 and 20 g/kg feed, as reported by Uku (2002), it caused depression of ovarian activity, hence depression on egg production. Results also showed that fertility decreased with prolonged administration (Table 2). The decrease in egg fertility may have been due to a degenerative effect of *M. altissima* on the testicular tissue thereby causing decreased production of testosterone. This, however, corroborates the works of Uku (2002) who showed that *M. altissima* dietary inclusion caused decreased egg fertility and hatchability.

We, therefore, recommend that *M. altissima* can be used as a feed additive to increase egg production. If it is to be used for this purpose, the level of inclusion should not exceed 50 g/kg feed which is the highest level in this study.

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