



Effect of Supplementation of Fresh Green Azolla with Low Crude Protein Diets on Growth Performance in Native Vanaraja Chicks

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Abstract

An experiment was conducted with 108 numbers of one week old straight run native Vanaraja chicks randomly divided into three groups with three replicates to assess the growth performance by feeding fresh azolla with low CP level. The experimental diets contained T1: Basal diet with 16 % CP without azolla supplementation, T2: Experimental diet with 15.5 % of CP with fresh azolla supplementation @ 9 g / day / chick and T3: Experimental diet with 15 % of CP with fresh azolla supplementation @ 18 g / day / chick and fed upto 9 weeks. Data on bird's body weight revealed significant reduction in body weight and body weight gain in low crude protein with fresh azolla supplemented groups in T2 and T3 compared to control diet (T1). Hence, it could be concluded that supplementation of fresh green azolla in low crude protein diets did not have any positive effect on growth of Vanaraja chicks.

Keywords: Azolla, Crude Protein, Vanaraja Chicks, Growth Performance



Introduction

Azolla is a free-floating fresh water fern belonging to the family Azollaceae. It grows in stagnant water and can be easily cultivated by the farmers in field. *Anabaena azollae*, living in the cavity of Azolla leaf, can fix high amount of atmospheric dinitrogen due to the presence of symbiotic algae in the leaves (Becking, 1979). The proximate composition of green fresh azolla viz., dry matter, crude protein, ether extract, crude fibre, and the total ash is 6.6, 21.17, 3.39, 14.6, 19.91 per cent respectively (Sujatha *et al.*, 2013). Similar results of total ash (14.77%) with higher crude protein (23.96 %) and crude fibre (6.05%) were observed in fresh azolla by Nallathambi *et al.*, 2019. Khursheed *et al.* 2019 have reported the nutrient content of sun-dried azolla meal as 22.79, 3.59, 15.49 and 19.46 % of crude protein, ether extract, crude fibre and total ash respectively. Because of high percentage of crude protein content, it is used as unconventional feed ingredient in poultry farming.

Most of the studies have highlighted the usage of nutrient rich dried azolla meal as an alternate unconventional protein supplement in poultry (Alalade and Iyayi (2006); Mohammad *et al.*, 2018). Many farmers feed fresh azolla in poultry in southern most part of India particularly Kerala and Tamil Nadu with mixed results. Mahanthesh *et al.*, 2018 have stated that azolla fresh biomass can be used as poultry feed with no side effects. Singh and Subudhi, 1978 have also reported that azolla can be used as good fodder supplement, because of its high productivity and high nutritive value. Further, studies on the effect of supplementing fresh green azolla in the growth performance of meat type chicks are less explored. Hence, this experiment was carried out to study the effect of growth performance in Vanaraja chicks supplemented with fresh green azolla with reduced crude protein content.

Materials and Methods

Azolla pinnata were cultivated in farmer's field in tank with size of 6' x 3' x 1'. For cultivation of azolla, tank layered with 30 kg of red soil and three fourth of the tank filled with water mixed with 3 kg of fresh cow dung. In which, half kg of azolla inoculum was added and after 7 days, mature azolla was harvested, washed three times to remove dung smell, fed to chicks as per treatment.

Three experimental groups were designed to assess the effect of supplementation of fresh green azolla with reduced crude protein (CP) diet in the growth performance of Vanaraja chicks in juvenile stage in farmer's field. The experimental groups were as follows T1: Basal diet with 16 % CP without azolla supplementation, T2: Experimental diet with 15.5 % of CP with fresh azolla supplementation @ 9 g / day / chick and T3: Experimental diet with 15 % of CP with fresh azolla supplementation @ 18 g / day / chick. All the diets were formulated to have similar levels of metabolizable energy, calcium and phosphorus. The chemical composition of the experimental diets is given in Table 1. One-week old straight run Vanaraja chicks (108 numbers) were weighed individually, wing banded and distributed randomly into three groups with three replicates (12 chicks in each replicate) in each group. The chicks were reared in deep litter system with free access to feed and water. Chick mash was fed from first week to 9 weeks of age. Standard managemental practices were followed uniformly for all the groups except the feed and supplementation of fresh green azolla. Vaccination was done as per the schedule. Weekly body weight and feed intake were recorded.

Table 1: Feed ingredient composition of experimental chick mash and their nutrient composition

Feed Ingredients	Quantity in Kg		
	T1	T2	T3
Maize	30.56	31.08	31.57
De-oiled rice bran	55	56.4	57.5
Soyabean meal	11.2	9.3	7.7
Di calcium phosphate	0.4	0.3	0.3
Trace mineral mix	2	2	2
Methionine	0.12	0.14	0.145
Lysine	0.2	0.26	0.265
Salt	0.25	0.25	0.25
Vitamin AB ₂ D ₃ K	0.01	0.01	0.01
Toxin binder	0.05	0.05	0.05
Liver tonic	0.05	0.05	0.05
Maduracox	0.05	0.05	0.05
Ultra B ₁₂	0.01	0.01	0.01
Sodium bi-carbonate	0.05	0.05	0.05
Spectra DFM	0.05	0.05	0.05
Total	100	100	100
Nutrient composition (%)			
Crude Protein	16	15.5	15
ME, Mcal/Kg	2.399	2.4	2.4
Crude Fibre	10.08	10.21	10.3
Lysine	0.77	0.78	0.75
Methionine	0.35	0.36	0.36
Calcium	0.76	0.74	0.74
Total Phosphorus	1.06	1.05	1.06
Available Phosphorus	0.35	0.34	0.34

Trace minerals mix contains; Mn – 0.40 %, Zn – 0.40 %, Fe – 2000 ppm, I – 0.01 %, Cu – 500 ppm. *Vitamin AB₂D₃K*- 10g (each gram contains Vitamin A -82500 IU, B₂ -50 mg, D₃ -12000 IU, K derivative -10 mg). *Toxin binder* contains mixture of Mixture of silicates and organic acid. *Maduracox* (coccidiostat) contains Maduramycin Ammonium – 1 %. *Spectra DFM* contains selected beneficial organism: *Pediococcus acidilactici*, *enterococcus faecium*, *Bacillus subtilis*, *Lactobacillus spp.*, *Bacillus licheniformis*, *bacillus amyloliquefaciens*.

Results and Discussion

The body weight from 1 - 9 weeks of age (Table 2) show significant reduction in reduced crude protein with fresh green azolla supplemented groups compared to control group ($P < 0.05$).

Table 2: Effect of supplementing fresh green azolla with reduced crude protein diet in the body weight of Vanaraja chicks

Age of birds (in Weeks)	Body weight, g		
	T ₁	T ₂	T ₃
1	64.84 ± 1.88	60.36 ± 1.81	62.30 ± 1.85
2	82.96 ± 4.79	83.06 ± 3.59	74.00 ± 2.99
3	142.08 ^a ± 9.49	116.54 ^b ± 7.11	121.52 ^{ab} ± 8.15
4	224.74 ^a ± 15.54	167.45 ^b ± 13.06	172.73 ^b ± 13.11
5	342.96 ^a ± 18.15	282.29 ^b ± 19.50	257.82 ^b ± 18.61
6	443.74 ^a ± 20.01	395.05 ^{ab} ± 20.55	343.73 ^b ± 20.41
7	571.65 ^a ± 21.40	484.29 ^b ± 21.01	450.45 ^b ± 22.97
8	659.13 ^a ± 24.40	546.95 ^b ± 23.05	539.82 ^b ± 22.60
9	711.83 ^a ± 27.15	619.71 ^b ± 25.29	601.73 ^b ± 27.32

*Each value is the mean of thirty-six observations; (Means with different superscript in a row differ significantly at $P < 0.05$)

Namra *et al.*, 2010 also reported similar results in Fayoumi growing chicks which could tolerate fresh free azolla supplementation with 85 % of control diet. They further concluded that restriction in control diet by 30 and 45 % fed along with fresh free azolla supplementation would produce deleterious effects in body weight compared to

control diet. However, Nallathambi *et al.*, 2019 observed no significant difference in the body weight of the Vanaraja chicks fed different levels of fresh azolla with grain from 4th week to 10th week of their age. Similar results was also observed by Acharya *et al.*, 2015 in body weight of white pekin broiler ducks fed with 5 and 10 % of fresh azolla with basal diet.

Data on body weight gain (Figure 1) reveals lower body weight gain in the experimental groups of T₂ and T₃ compared to T₁ during the entire trial period except during 6th and 9th week. Feed intake was significantly higher ($p < 0.05$) in vanaraja chicks in T₂ group than in control and T₃ chicks during the entire trial period except in second week (Table 3). Significantly lower feed intake ($P < 0.05$) was observed in chicks in T₃ group compared to chicks in control and T₂ group during the last three weeks of trial period (Table 3). Similar results of lower feed consumption were reported in ducks fed commercial layer mash supplemented with 200 g of fresh azolla (Sujatha *et al.*, 2013).

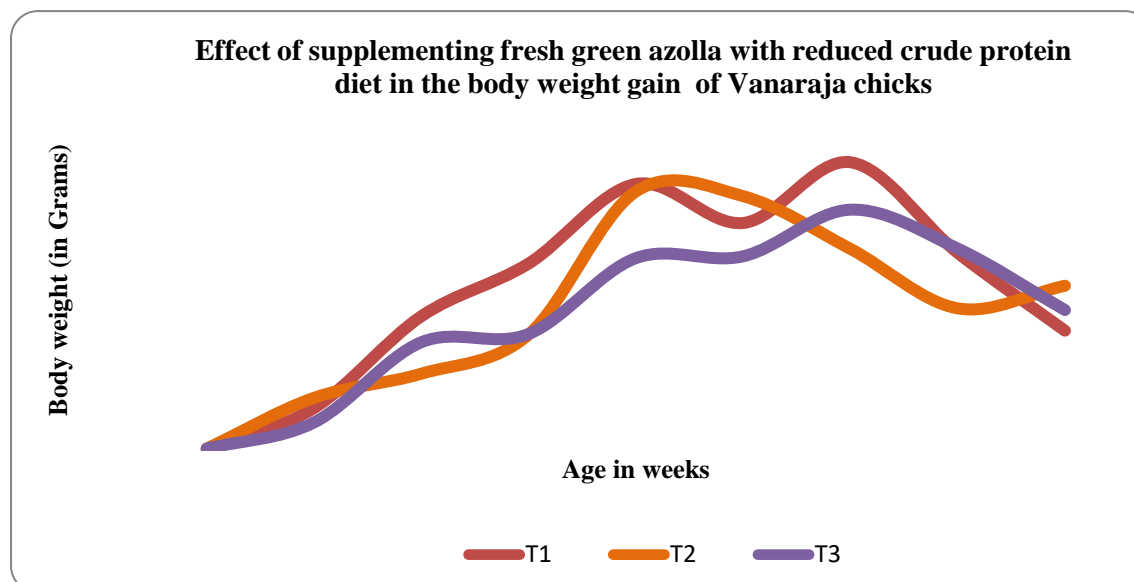


Figure 1: Effect of supplementing fresh green azolla with reduced crude protein diet in the body weight gain of Vanaraja chicks

Table 3: Effect of supplementing fresh green azolla with reduced crude protein diet in feed intake of Vanaraja chicks

Age of birds (in Weeks)	Feed intake, g		
	T ₁	T ₂	T ₃
2	141.33 ^c ± 1.20	102.00 ^a ± 1.15	133.00 ^b ± 1.73
3	234.00 ^a ± 7.09	254.00 ^b ± 1.15	250.33 ^b ± 2.02
4	396.66 ^a ± 12.01	477.33 ^b ± 1.45	415.66 ^a ± 2.02
5	443.33 ^a ± 8.81	490.33 ^b ± 1.76	449.67 ^a ± 2.02
6	426.00 ^a ± 2.31	501.33 ^b ± 1.45	426.66 ^a ± 2.03
7	429.35 ^b ± 2.33	471.66 ^c ± 1.85	418.00 ^a ± 2.31
8	691.00 ^b ± 2.08	756.33 ^c ± 2.40	661.66 ^a ± 2.02
9	919.66 ^b ± 1.45	1006.67 ^c ± 2.02	883.67 ^a ± 2.40

*Each value is the mean of thirty-six observations; (Means with different superscript in a row differ significantly at $P < 0.05$)

The reason for reduction in body weight of chicks in T₂ and T₃ groups compared to chicks in control group may be attributed to less availability of nutrients required for growth particularly crude protein levels (15.5 and 15 per cent respectively) compared to 16 per cent crude protein level in control group.

Conclusion

The results revealed that supplementation of fresh green azolla in low crude protein diets did not have any beneficial effect on growth performance in Vanaraja chicks during juvenile phase.

Conflict of Interests

There is no conflict of interest.

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