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Impact of adding powdered Azolla (Azolla pinnata) leaves to the diet on the carcass and economic characteristics of turkey poults

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Abstract— *The current study was planned to examine the "Impact of adding powdered Azolla (Azolla pinnata) leaves to the diet on the carcass and economic characteristics of turkey poults". One hundred and twenty-eight-day-old turkey poults were randomly assigned to four treatment groups, each consisting of eight poults and four replicates. Azolla meal was added to the basal diet at 2.5% (T2), 5% (T3), and 7.5% (T4) levels to create three experimental diets. The control group (T1) was fed a basal diet without azolla supplementation. The dietary treatments were arranged in complete randomized design and analysed for the carcass traits and economics of rearing turkey poults. The findings ascribed to improved live weight, eviscerated weight, dressed weight and B: C ratio. The results indicate that up to 5% of Azolla leaf powder can be added to turkey feed as an unusual feed item without causing any negative side effects.*

Keywords— ***Azolla, poults, live weight, organ and economics***

I. INTRODUCTION

Turkey farming is still relatively new in India. However, the Central Poultry Development Organization (Southern Region), located in Hessarghatta, Bangalore, is working hard to increase turkey farming. Tamil Nadu and Kerala are the two states that generate the most turkeys. Turkey farming is quickly becoming more and more popular in the South. Red meat consumption is declining while white meat consumption—which includes chicken and turkey—is rapidly increasing. In India, this pattern has also been noted. Turkey meat has less fat and cholesterol than red meat and other fowl meats. The remarkable growth in chicken production has led to competition with traditional human food supplies, resulting in a shortage of conventional feed ingredients and an increase in their cost (CAST, 2013). According to **Johari and Hussain** (1996), 65–75% of the total broiler output is spent on feed alone, which eventually drives up the price of poultry meat. The ability of chicken to obtain protein from non-protein sources is extremely limited. The average broiler feed has between 22 and 24 percent protein. Protein synthesis in chickens is required at a very rapid rate for compensating the broken tissues of the adult body (Banerjee, 2000). The amount of study on the usage of green feed and forages has increased dramatically in recent years. Compared to other poultry, turkeys are known to consume more green feed, or vegetables. Therefore, the feed component is crucial since turkeys raised in intensive settings do not directly interact with plant feeds, especially green feeds. Additionally, the exponential growth in chicken production has led to a shortage and an increase in the cost of conventional feed ingredients due to competition with traditional human food supplies. Changing from conventional to unconventional feedstuffs will reduce the cost of turkey feed and increase the profit margin because feed costs nearly 75% of the total cost of producing a turkey.

II. METHODOLOGY

Preparation of Azolla meal: The Poultry Farm, Department of Animal Production, Rajasthan College of Agriculture, MPUAT, Udaipur provided the Azolla culture. After maturing, a fresh Azolla culture was harvested and collected, covering the tank's water. The harvested azolla was washed and dried using a brine solution. The dried Azolla was pulverized in a grinder to a uniform size prior to being added to the feed.

Experimental bird details: The day-old turkey poults were purchased for Rs 90 each from the hatchery section of the poultry farm inside the department of animal production of the Rajasthan College of Agriculture, MPUAT, Udaipur. A basic meal and different dosages of Azolla leaf powder were given to them, and they were split up into different dietary treatment groups. The cost of feeding was determined for each treatment group based on the materials' composition and the current market pricing of each feed ingredient.

Statistical analysis

The experiment was carried out using a completely randomized design (CRD), and Snedecor and Cochran's (1994) analysis of variance were used to examine the data pertaining to various parameters that were gathered during the current study.

III. RESULTS AND DISCUSSION

Carcass characteristics: The information on the carcass characteristics of the young turkeys in the various treatment groups is presented in Table 1. Significantly highest live weight was observed in T3 (1225.77±26.93 g) and T4 (1185.23±8.89 g), followed by T2 (1024.44±9.56 g) and significantly lowest in T1 (916.86±9.33 g). The difference between T3 and T4 were found statistically non-significant. The mean dressed weight was 711.94±4.22, 801.62±0.00, 968.97±1.83 and 933.36±4.76 g respectively in T1, T2, T3 and T4. Significantly highest dressed weight was observed in T3 (968.97±1.83 g) followed by T4 (933.36±4.76 g) followed by T2 (801.62±0.00 g) and significantly lowest in T1 (711.94±4.22 g). The eviscerated weight was significantly highest in T3 (856.04±8.12 g) followed by T4 (820.29±19.64 g), T2 (715.28±19.49 g) and significantly lowest eviscerated weight was observed in T1 (633.90±2.34 g). The differences between the various treatments were determined to be statistically insignificant. The differences in the weights of the liver, heart, and gizzard as a percentage of live weight between the various treatments were minimal and were deemed to be statistically insignificant.

The results obtained in current study fall in line with the findings of Naghshi *et al*. (2014) observed that supplementation of 5% Azolla powder significantly (p<0.05) increased the carcass efficiency and thigh relative percentage. Tawasoli *et al.* (2020) reported positive and beneficial effects of herbals like Azolla meal feeding on dressing percentage up to 6% inclusion of Azolla in poultry diets which is in close agreement with the present study. Shinde *et al.* (2017) revealed that supplementation of Azolla at the rate of 5% showed significant increase (p<0.05) in dressing percentage which is closely in agreement with the results of present study. Kashyap *et al.* (2018) and Bhattacharya *et al*. (2016) reported there was no significant difference among the treatment groups on the carcass traits.

Table 1: Effect of feeding Azolla leaf powder on carcass traits of turkey poults

Parameters / Treatments	**T1**	**T2**	**T3**	**T4**	**SEm±**	**CD at 5%**
Live weight (g)	916.86±9.33^{c}	1024.44±9.56^{b}	1225.77±26.93^{a}	1185.23±8.89^{a}	14.61	45.02
Dressed weight (g)	711.94±4.22^{d}	801.62±0.00^{c}	968.97±1.83^{a}	933.36±4.76^{b}	3.07	9.47
Eviscerated weight (g)	633.90±2.34^{d}	715.28±19.49^{c}	856.04±8.12^{a}	820.29±19.64^{b}	10.40	32.06
Dressing weight (%)	77.65±0.84	78.25±0.72	79.05±1.81	78.75±0.82	1.07	NS
Organ weight as percent of live weight						
Liver weight (%)	2.14±0.04	2.13±0.01	2.12±0.01	2.17±0.02	0.02	NS
Heart weight (%)	1.16±0.01	1.17±0.01	1.12±0.02	1.13±0.02	0.01	NS
Gizzard weight (%)	3.01±0.03	3.06±0.03	3.09±0.03	2.99±0.02	0.03	NS

Means with the same superscripts in a particular row do not differ significantly (p<0.05) from each other.

Economics

The data pertaining to economic parameters of turkey poults in different treatment groups are tabulated in Table-2. Feed efficiency during entire period of study was significantly higher in T_4 group which were fed with 7.5% ALP as compared to rest of the treatment groups. The total

feed cost per poults was significantly higher in T_4 and significantly lowest feed cost was observed in T1. B:C ratio was significantly higher in T_3 (5% Azolla) group. The results of present investigation revealed that inclusion of 5% Azolla had positive effect on economic performance of turkey. However, beyond this level (5% Azolla) slightly decrease in production parameter in terms of gross income and net income was reported in the present study. Data revealed that the benefit cost ratio was significantly highest in T_3 as compared to rest of the treatment groups. However, the difference in benefit cost ratio among T_1, T_2 and T_4 was found to be non- significant. The present results are in agreement with those reported by Borkar *et al*. (2021) who observed that feeding of Azolla meal up to 7.5% in Kadakanath poultry have positive impact in terms of profit as compared to control. Kamel and Hamed (2021) reported significantly highest total return and net return on inclusion of 12% dried azolla in the ration of broilers. Shinde *et al.* (2017) and Ara *et al.* (2015) reported that net profit per bird was maximum in 5% Azolla fed treatment group and beyond this level there was decrease in term of profit in poultry farming. Rathod *et al*. (2013) observed that the use of 7.5% Azolla meal is profitable as compare to other feeding groups. Dhumal *et al.* (2009) and Basak *et al.* (2002) reported that Azolla could be included up to 5% for better profit which is similar to findings of present study.

Table 2: Economics of rearing of turkey poults on feeding Azolla leaf powder

Parameters / Treatments	T1	T2	T3	T4	**SEm±**	**CD at 5%**
Poult cost (Rs/bird)	90	90	90	90		
Feed intake (kg/bird)	2.23±0.01^{d}	2.45±0.01^{c}	2.53±0.01^{b}	2.62±0.01^{a}	0.01	0.02
Total feed cost (Rs/bird)	65.82±0.16^{d}	79.55±0.25^{c}	89.71±0.36^{b}	100.90±0.09^{a}	0.21	0.65
Miscellaneous cost (Rs/bird)	15	15	15	15		
Total cost (Rs/bird)	170.82±0.16^{d}	184.55±0.25^{c}	194.71±0.36^{b}	205.90±0.09^{a}	0.21	0.65
Body weight (g)	907.92±3.08^{d}	1014.50±15.67^{c}	1215.76±19.85^{a}	1116.48±6.20^{b}	9.99	30.79
Gross income (Rs/bird)	226.98±4.62^{d}	253.62±9.17^{c}	303.94±3.95^{a}	279.12±1.93^{b}	4.54	13.99
Net return (Rs/bird)	56.16±4.62^{c}	69.07±9.00^{bc}	109.23±4.08^{a}	73.22±1.97^{b}	4.55	14.01
B:C ratio	1.33±0.03^{b}	1.37±0.05^{b}	1.56±0.02^{a}	1.36±0.01^{b}	0.02	0.08

Means with the same superscripts in a particular row do not differ significantly (p<0.05) from each other.

IV. CONCLUSION

The experiment's findings showed that adding 5% of Azolla leaf powder to the diet increased live weight, dressed weight, and eviscerated weight, all of which were comparable to those of a typical basal diet. Azolla leaf powder added at a quantity of 5% demonstrated the greatest economic advantage.

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