



Azolla: Nutritionally Rich Non-Conventional Feed for Backyard Poultry Farming

Sangeeta Jadhav ^{a++*} and Jayashree Pattar ^{b++}

^a *Department of Animal Science, ICAR-KVK, Vijayapura, University of Agricultural Sciences, Dharwad, India.*

^b *Department of Animal Science, ICAR-KVK, Dharwad, University of Agricultural Sciences, Dharwad, India.*

Authors' contributions

This work was carried out in collaboration between both authors. Author SJ designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author JP managed the analyses of the study, literature searches and revision of manuscript. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JEAI/2024/v46i52396

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/114865>

Original Research Article

Received: 17/01/2024

Accepted: 23/03/2024

Published: 01/04/2024

ABSTRACT

The major cost of production in poultry farming is towards the feed cost. It shares around 80 per cent of total cost of production incurred during the poultry rearing. In order to reduce the cost of production, low cost feed formulation by using locally available feeds is the need of the hour. In this regard the present study was conducted to analyze the effect of feeding azolla on the performance of backyard poultry farming. For this one week old 30 chicks of Swarnadhara were selected for each group and 3 such groups were made. The first group (T1- control) was fed with the only recommended Desi starter feed (commercial feed), second group(T2) was fed with wet azolla by replacing 30% of desi starter and the third group(T3) was fed with the dry azolla by replacing 30% of the desi starter. After the 21 days feeding trial, it was found that the weight gain of second and third trial was at par with the control group indicating the azolla can be used as a partial substitute

⁺⁺ Scientist;

^{*}Corresponding author: E-mail: drjadhavsangeeta@gmail.com;

J. Exp. Agric. Int., vol. 46, no. 5, pp. 459-462, 2024

to the desi feed which is used by the farmers to feed the chicks at early stage. By this way the feeding cost can be reduced by 30 per cent, which directly will be added to the total profit gain.

Keywords: Backyard poultry; azolla; body weight gain.

1. INTRODUCTION

In present scenario livestock and poultry farming are gaining utmost importance as these are having important role in the sustainable livelihood and socio economic equality of rural families [1] and are the major contributors to the Indian economy. Among the different farming system the poultry farming is growing exponentially in order to meet out the daily requirements of meat and the eggs. For the rural poor backyard poultry is an important component for their nutritional supplement as well as it has become a source of subsidiary income.

The Northern part of Karnataka comes under dry zone in which we cannot expect the continuous income from only agriculture sector, in addition to this the livestock enterprises such as sheep and goat farming and poultry enterprises are the feasible ones. In this part of state there is increased demand for the meat from locally reared poultry. To meet out this, rural families are rearing improved strains and breeds suitable for backyard farming as these local breeds exhibit poor production performance. However the production performance of these birds depends upon the type of feed fed to them. To meet the nutritional requirements of these birds, farmers are depending on the feed supplied by the local vendors which is increasing the cost of production. Feed formulated by using locally available food ingredients which is nutritionally rich for growth of these birds can reduce the burden of cost incurred on purchase of ready to use feed. Among the different locally available feed resources, azolla is one of the plant resources with high biomass and protein content. Azolla has several pharmacological effects and can be used as antioxidant, immune-stimulating, hepato-protective, phytoremediation, bioremediation and also as nutritious material. Azolla contains vitamins (B12, beta carotene, vitamin A) and biopolymers [2]. Azolla's nutritive benefits and nutritional values have been well demonstrated, indicating it as a high-protein product that contains, practically all amino acids, including essential (55%) and non-essential (45%) amino acids, minerals like calcium, magnesium, and potassium, and vitamins like vitamin A and B12, are used in animal and poultry diets [3].

It is an abundantly available aquatic fern in ponds, ditches, and paddy fields in tropical and subtropical regions of the world. In view of the qualities of azolla, this experiment was conducted to evaluate the growth performance of broiler chickens fed with dry and wet azolla.

2. MATERIALS AND METHODS

2.1 Azolla Production

Three pits of size 10 ft length× 3ft width×2ft height were made underneath a shaded area. Polythene sheets were spread in these pits, slurry prepared from fertile soil and dung (3:1) was poured to a height of two inches. Water with pH of 6-7 was poured up to 1.5ft high and was made stagnant. Then azolla culture was put in the pit. For dry azolla preparation the wet azolla from the pits was sun dried for a whole day in the partially shaded area till 15% moisture content was gotten. There was neither breakage nor powdering of azolla leaves. After the drying process it was stored in dry and moisture free condition.

2.2 Selection of Poultry Chicks

One week old 90 Swarnadhara chicks which were vaccinated against Marek disease and Ranikhet disease were selected and made in three groups T1, T2, T3 so that each group comprising 30 chicks. All the three group chickens were kept in an open sided partitioned deep litter pens with adequate ventilation. Ground nut husk was used as bedding material, over that a layer of news paper covering was made. The body weight was taken for the randomly selected 10 poultry chicks before starting feeding trial.

2.3 Feeding Trial

For all the three groups the total feed given during first week was 20 g/chick/day and during second week 25 g/chick/day. For the first group only the desi feed (commercial feed) was given. Second group (T2) was fed by replacing 30 per cent of desi feed with wet azolla. The third group (T3) was fed by replacing 30 per cent (W/w) of desi feed with dry azolla. This feeding trial was carried out for 15 days as seen in Table.

Table 1. Feeding trial for 7th to 21st day

Particulars	7-15 th day(@20g/day/chick) for one week		15 th – 21 st day(@25g/day/chick) for one week	
	Desi feed (g)	Azolla (g)	Desi feed (g)	Azolla (g)
T1	4200	-	5250	-
T2 (Wet azolla)	2940	1260	3675	1575
T3(Dry azolla)	2940	1260	3675	1575

3. RESULTS AND DISCUSSION

The azolla pits were entirely filled after the 15 days of inoculation of azolla culture in the pits. The growth of azolla depends mainly on the quality of water utilized in-terms of its pH. Azolla grows best at pH of 6-7. This is a statement of fact that had been also established by Swain et al., that azolla can grow at arrange of 3-10 pH but the favorable growth was observed at 4.5-7 pH [4]. For easy understanding to farmers, it is said that, the water which is suitable for human consumption in-terms of its taste can be utilized for growing azolla. We use to get 1.1 kg of dry azolla after drying the 5 kgs of wet azolla. The average body weight gain from randomly selected 10 chicks before starting the feeding trial was 67.1 g /chick. After the first week of feeding trial it was observed that T1 was having comparatively higher weight gain of 141.4g /chick than T2 (124.1g/chick) and T3 (125.1g/chick). At the end of second week, it was observed that there was not much difference in the weight gain of T2 as compared to T1 group, where as there was significant difference in the weight gain of T3 and T1 groups.

Either it may be wet or dry azolla, during the feeding trial, we observed that the one week old chicks were reluctant to take up the azolla. In second week of feeding trial chicks were taking up wet azolla without any reluctance whereas, the chicks were not relishing the dry azolla. This may had in the lower weight gain by the third group in comparison with the other two groups.

Although there is not much difference observed in the weight gain during the experiment, but there was difference in the feed type which we

had given. The cost spent for 30 per cent replaced feed can be included in the total profit gain.

In the previously published works, researchers concluded that Azolla could be used in poultry feed up to 15% to enhance performance and growth without any side effects and also, supplementation of Azolla can decrease production costs in the broiler industry by more than 30% [5]. On the contrary, findings of Yadav et al. [6] who found highest body weight on 5% inclusion of Azolla in diet of Narmadanidhi birds and reported that beyond this level of dietary inclusion of Azolla depression the body weight and body weight gain. According to Kamel and Hamed [7], dietary supplementation of dried azolla (DA) at each level significantly improved the average final body weight gain (BWG). Broilers group fed with 12% DA had increased BWG by (166.4 g/broiler) in group fed with 12% DA as compared with the control groups. As per the study conducted by Singh *et al.*(2023), the supplementation of azolla at the rate 90 gram (dry matter percent 9%) per day per bird in RIR birds shows significant higher body weight gain [8]. Kumara et al., studies suggested that feeding Azolla to broilers resulted in equivalent growth and body weight levels to soya bean meal [9].

Namra et al. (2010) reported that when commercial diet was offered to broilers from 2-16 weeks at 15-45%, supplemented with fresh azolla given *ad libitum* led to reduction in performance and slaughtering parameters and the group fed fresh azolla *ad libitum* supplementing the diet restricted at 45% exhibited optimal economical efficiency [10].

Table 2. Effect of feeding azolla on body weight gain of Swarnadhara poultry breed

Random wt gain of 10 chicks from each group	Initial wt (g)	T1(g)		T2(g)		T3(g)	
		1 st week	2 nd week	1 st week	2 nd week	1 st week	2 nd week
1	67	135	162	125	186	119	162
2	66	135	165	116	153	118	160
3	68	154	180	101	174	143	175
4	68	130	175	141	160	134	162
5	67	138	150	117	154	130	154
6	72	140	159	121	167	109	153

7	66	158	163	117	172	151	179
8	67	149	180	137	168	112	157
9	64	134	164	131	155	128	161
10	66	147	188	135	164	107	145
Average wt	67.1	141.4	168.6	124.1	165.3	125.1	160.8

4. CONCLUSION

Azolla has been a very popular source of green feed because of its high nutritional value in terms of protein, essential amino acids, vitamins and minerals and by this study we can understand that the feed cost incurred in the rearing of poultry can be reduced by utilizing the locally available feeds which will not have any difference in the growth and production performance of the birds. Azolla production through lowcost technology can be popularized and supplemented in the diets of chicken for economic production of meat and egg.

ACKNOWLEDGEMENT

The authors are grateful to the Senior scientist and Head, KVK Vijayapura, Director Extension, UAS, Dharwad and Director, ATARI, Bengaluru for providing the facilities and financial assistance to carry out this work.

COMPETING INTERESTS

I declare that authors do not have competing interest. Both the authors don't have any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work.

REFERENCES

1. Tisdell C, Gali J. Trends and developments in India's livestock industry. Econ. Ecol. and Env. Working Paper. 2000;43.
2. Riaz A, Khan MS, Saeed M, Kamboh AA, Khan RU, Farooq Z et al. Importance of azolla plant in poultry production. World's Poultry Science Journal. 2022;78(3):789-802
3. Riaz A, Khan MS, Saeed M, Kamboh AA, Khan RU, Farooq Z, Imran S, Farid MU.

Importance of Azolla plant in poultry production. World's Poultry Science Journal. 2022;1-14.

4. Swain BK, Naik PK, and Beura CK. Nutritive Value of Azolla as Poultry Feed-A Review. Indian J. Anim. Nutr. 2022;39(1): 1-11.
5. Samad FA, Idris LH, Abu Hassim H, Goh YM, Loh TC. Effects of *Azolla* spp. as feed ingredient on the growth performance and nutrient digestibility of broiler chicken. J Anim Physiol Anim Nutr. 2020;104(6): 1704-1711.
6. Yadav SK, Mishra AK, Gupta NM, Singh AK, Goyal G, Gaur S. Effect of *Azolla* supplementation on production performance of narmadanidhi birds. Journal of Animal Research. 2022;12(1): 131-134.
7. Kamel ER, Hamed, E. Effect of dried azolla on growth performance, hematological, biochemical, antioxidant parameters, and economic efficiency of broiler chickens. Advances in Animal and Veterinary Sciences. 2021;9(11):1886-1894.
8. Singh S, Singh N, Proch A, and Khan N. Influence of supplementing fresh Azolla (*Azolla caroliniana*) on the growth rate of Rhode Islands Red (RIR) chicks reared under backyard poultry farming. The Pharma Innovation Journal. 2023;SP-12(9):1970-1973.
9. Kumar M. Dhuria RK, Jain D, Sharma T, Nehra R, and Prajapat UK. Effect of Feeding Azolla pinnata on the Growth and Performance of Broiler Chicks. International Journal of Chemical Study. 2018;6(3):3284-3290.
10. Namra MMM, Hataba NA, Wahed HMA. The productive performance of growing fayoumi chicks fed restricteddiets supplemented with free fresh azolla. Egyptian Poultry Science Journal. 2010;30 (3):747-762.

© Copyright (2024): Author(s). The licensee is the journal publisher. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/114865>