The Pharma Innovation Journal 2019; 8(4): 1143-1145

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2019; 8(4): 1143-1145

www.thepharmajournal.com
Received: 16-02-2019
Accepted: 17-03-2019

A Varadharajan
Division of Animal Husbandry, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India

R Gnanasekar
Division of Animal Husbandry, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India

S Kothandaraman
Division of Animal Husbandry, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India

Correspondence
A Varadharajan
Division of Animal Husbandry, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu, India

Studies on feeding value of azolla in quails in relationship to its carcass traits

A Varadharajan, R Gnanasekar and S Kothandaraman

Abstract
An experiment was conducted to evaluate the effect of dietary incorporation of different levels of Azolla meal (AZM) on the production performance of Japanese quails. One week old 150 quails (*Coturnix coturnix japonica*) were randomly divided into 3 groups viz. T_1, T_2 and T_3 with 5 replicates of 10 birds each. T_1 served as control (0 % AZM) and T_2 and T_3 groups were fed with a diet containing 3% and 6% AZM, respectively for a period of 6 weeks. Feed consumption was calculated during the entire trial period. At the end of the trial period, randomly 5 birds from 5 replicates of T_1, T_2 and T_3 were slaughtered to study the carcass characteristics. There was significant difference in 3 groups' carcass characteristics with respect to giblet, back and wings percentage though other parameters were insignificant. It was concluded that AZM could be incorporated in quails' diet up to 6% without affecting the feed consumption and carcass traits. More importantly, it doesn't exhibit any untoward incidence and was considered safe and economical.

Keywords: Azolla meal, Japanese quails, carcass traits, dressing percentage

Introduction
Feeds of plant origin, as the green plants are recognized as excellent sources of protein, fat and pharmacologically active secondary metabolites. Aquatic plants are gaining much interest in food and biomedical research, resulting from its broad range of uses such as human food, animal feed and bio-fertilizers. Among aquatic plants floating fern Azolla (*Azolla pinnata*) can be used as unconventional high potential feed resource. Azolla is a free floating fresh water fern belonging to the family Azollaceae and order Pteridophyta. It contains almost all essential amino acids, minerals such as iron, calcium, magnesium, potassium, phosphorus, manganese etc. apart from appreciable quantities of vitamin A precursor beta carotene. Azolla have a symbiotic relationship with the nitrogen-fixing blue-green algae. It is this unique symbiotic relationship that makes Azolla, a wonderful "super plant" with high protein content, as it can readily colonize areas of fresh water and grow at great speed doubling its biomass every two to three days. It is also found to contain probiotics and biopolymers (Pillai *et al*., 2005) [14]. Thus, Azolla appears to be a potential source of nutrients. The bio-composition of Azolla makes it one of the most economic, efficient and sustainable feed substitute for poultry thus incorporation of Azolla as an alternative protein ingredient in quail ration could make quail production economical. The present study was, therefore, conducted to see the effect of inclusion of Azolla meal at different levels on the growth and performance of quails in relationship with its carcass traits. In poultry production, feed cost accounts for nearly 60% of the total cost of production (Shaikh and Zala, 2011) [16]. The shrinking feed resources of the world and their escalating cost has triggered search for cheap unconventional feeds for poultry production. There is a conscientious effort to switch on to non-conventional feed items to slash feed cost in poultry production.

Azolla has been established as a potential feed ingredient for livestock and poultry by many researchers (Pillai *et al.,* 2005) [14]. Azolla (*Azolla pinnata*), an aquatic fern, abundantly available in stagnant water in tropical and subtropical regions of the world, has been recommended for feeding broiler and layer chicken (Basak *et al.,* 2002) [4]. It is very rich in proteins, essential amino acids, vitamins, growth promoter intermediaries and minerals (Pillai *et al*., 2005; Henry *et al.,* 2017) [14, 9]. Inclusion of azolla in the poultry diet economizes production (Dhumal *et al.,* 2009) [7] but very limited studies have been conducted on evaluating its effects on the carcass traits of Japanese quails. Further, in the recent past, small and marginal poultry farmers of India are more interested in rearing Japanese quails rather than other species due to increasing consumer demand especially in urban areas.

Hence, an attempt was made to investigate the effect of feeding azolla (*Azolla pinnata*) meal (AZM) on carcass traits of Japanese quails (*Coturnix coturnix japonica*).

Materials and Methods

Azolla was collected from the ponds maintained at the farm, dried under shade, ground and stored in plastic bags. One hundred and fifty quails of 1 week belonging to single hatch were weighed individually and allotted randomly to 3 groups T1, T2 and T3 with 5 replicates of 10 quails each. Three experimental diets were prepared by incorporating 0%, 3% and 6% of azolla meal (AZM) in quail ration of groups T1, T2 and T3, respectively. Birds were kept in quail cages and feed and water were provided *ad lib*.

Ingredient composition and calculated nutrient content of three diets have been presented in Table 1. Weekly feed consumption was recorded for 6 weeks. At the end of feeding trial, 5 birds from each treatment (total 15 birds) were randomly selected and slaughtered to study the carcass characteristics like dressed weight, weight of legs, wings, breast, back, neck thigh, giblet and dressing percentage.

Table 1: Ingredient composition and calculated nutrient content

Feed ingredient	Level of Azolla meal (%)		
	0	3	6
Maize grits	40	38.8	37.6
Soyabean meal	24	23.3	22.5
Groundnut oil cake	12	11.6	11.3
Azolla meal (AZM)	0	3	6
Rice bran	15	14.5	14.1
Shell grit	7	6.85	6.6
DCP	1.5	1.45	1.4
Total	100	100	100

Data were statistically analyzed by one way ANOVA using SPSS windows (SPSS, Inc., 2002) [19]. Significant differences ($P<0.05$) between means were determined by Duncans multiple comparison test (Duncan, 1955) [8].

Results and Discussion

Table 2: Effect of different levels of AZM in quail ration on carcass traits

Group	Feed intake (g per bird/d)	Live wt (g)	Head, leg, wing (g)	Giblet (%)	Back (g)	Breast (g)	Wings (g)	Thigh (g)	Dressed weight (g)	Dressing (%)
T 1(0% AZM)	23.02	168.20	16.32	08.12^{b}	33.08^{ab}	39.12	10.02^{b}	24.02	110.32	65.588
T2 (3% AZM)	21.78	175.92	16.34	13.64^{a}	35.02^{a}	43.96	10.98^{a}	22.06	112.24	63.801
T 3(6% AZM)	23.12	175.14	16.46	10.02^{b}	28.12^{b}	37.92	9.02^{b}	23.16	105.64	60.317
SEM	0.459	4.222	0.415	0.675	1.218	1.358	0.425	1.576	1.982	1.240
P value	0.378	0.779	0.822	0.013	0.031	0.103	0.002	0.898	0.412	0.372

^{ab}means bearing different superscripts in a column differ significantly ($P<0.05$)

Incorporation of AZM in diets of quails up to 6% level did not affect feed intake for the experimental period of 6 weeks. However, Shamna *et al.* (2013) [17] reported that performance of broiler quails depressed beyond 5% by substitution of AZM in the diet. Inconsistent results on AZM inclusion have been reported which could be due to differences in species, physiological status, percent levels of AZM and type of concentrate replaced. Several workers (Basak *et al*., 2002; Bholka, 2011; Naghshi *et al*., 2014) [4, 5, 11] reported that feeding of AZM up to 5% level in diets of commercial broiler chicken had positive effect on production performance. Including AZM up to 7.5% of body weight increased body weight gain by 2.6% with higher Ranikhet virus titers in commercial broilers (Prabina and Kumar, 2010) [15]. However, Alalada *et al.* (2007) [2] observed non-significant variations in growth performance of Nera brown pullets when AZM was fed upto 10% level. Shaukat *et al.* (2015) [18] noticed a linear reduction in feed consumption of broiler chicken with increased AZM levels in the diets. Similar findings on production performance of ducks were reported elsewhere (Lawas *et al.*, 1998; Sujatha *et al.*, 2013) [10, 20]. Recently, Henry *et al.* (2017) [9] found that fresh azolla supplementation @ 30 g/bird/d reduced feed consumption without affecting the growth performance in turkeys at 7 weeks age which might be due to high protein and mineral content of azolla.

There was no significant influence of level of AZM on carcass traits except for giblet, back and wings percentage which were higher ($P<0.05$) in 3% AZM fed group (Table 2). Shaukat *et al.* (2015) [18] also reported no effect on carcass traits on feeding azolla up to 20% level. Basak *et al.* (2002) [4] reported higher dressing percentage of broiler chicken in treatment group fed 5% AZM due to the higher body weight gains. Naghshi *et al.* (2014) [11] also reported better carcass efficiency with 5% azolla feeding in commercial broilers except for abdominal fat, liver, gizzard and breast relative percentage.

Conclusion

It could be concluded that azolla meal might be fed to quails up to 6% as a replacement without affecting feed consumption and carcass traits. None of the birds in the 3 groups showed any untoward and adverse effect on feeding azolla meal and may be considered safe and economical.

References

1. Alalade OA, Iyayi EA. Chemical omposition and the feeding value of azolla (Azolla pinnata) meal for egg-type chicks. Int. J Poult. Sci. 2006; 5:137-141.
2. Alalade OA, Eustace A, Iyayi EA, Alalade TO. The nutritive value of azolla (Azolla pinnata) meal in diets for growing pullets and subsequent effect on laying performance. J Poult. Sci. 2007; 44:273-277.
3. AOAC. Official Methods of Analysis. 18th edn. Association of Official Analytical Chemists, Arlington, VA, USA, 2005.
4. Basak B, Pramanik MAH, Rahman MH, Tarafdar SU, Roy BC. Azolla (Azolla pinnata) as a feed ingredient in broiler ration. Int. J Poult. Sci. 2002; 1:29-34.
5. Bholka PC. Nutritional Evaluation of Azolla (Azolla pinnata) in Broilers and Layers. Ph.D. thesis, KVAFSU, Bidar, Karnataka, India, 2011.
6. Card LE, Nesheim MC. Poultry Production. 11th edn. Lea and Febiger, Philadelphia, 1972.
7. Dhumal MV, Siddiqui MF, Siddiqui MBA, Avari PE.

Performance of broilers fed on different levels of azolla meal. Indian J Poult. Sci. 2009; 44:65-68.
8. Duncan DB. Multiple range F-tests. Biometrics. 1955; 11:1-42.
9. Henry ACE, Reetha TL, Paramasivam A, Mehala C. Effect of azolla supplementation on production performance of nandanam–ii turkey growers. Indian Vet. J. 2017; 94:28-30.
10. Lawas MVP, Roxas DB, Lambio AL. Laying performance of Philippine Mallard ducks fed diets substituted with fresh azolla. In: Proc. Philippine Society of Animal Science. 35th Annual Convention, College, Laguna, Philippines, 1998, 220-225.
11. Naghshi H, Khojasteh S, Jafari M. Investigation of the effect of different levels of azolla (azolla pinnata) on performance and carcass characteristics of cobb broiler chicks. Int. J Farm. Alli Sci. 2014; 3:45-49.
12. NRC. Nutrient Requirements of Poultry. 9th edn. Natl. Acad. Press, Washington, DC, USA, 1994.
13. Parthasarathy R, Kadrivel R, Kathaperumal V. Chemical evaluation of azolla as a poultry feed ingredient. Cheiron. 2001; 30:35-37.
14. Pillai PK, Premalatha S, Rajamony S. Azolla: a sustainable feed for livestock. LEISA, Leusden. 2005; 21:26-27.
15. Prabina BJ, Kumar K. Dried azolla as a nutritionally rich cost effective and immuno-modulatory feed supplement for broilers. Asian J Anim. Sci. 2010; 5:20-22.
16. Shaikh AS, Zala YC. Production performance and economic appraisal of broiler farms in Anand district of Gujarat. Agric. Econ. Res. Rev. 2011; 24:317-323.
17. Shamna TP, Peethambaran PA, Jalaludeen A, Joseph L, Aslam MKM. Broiler characteristics of Japanese quails (coturnix coturnix japonica) at different levels of diet substitution with Azolla pinnata. Anim. Sci. Rep. 2013; 7:75-80.
18. Shaukat A, Adil S, Banday MT, Manzoor Khan A. Feeding potential of aquatic fern-azolla in broiler chicken ration. J Poult. Sci. Technol. 2015; 3:15-19.
19. SPSS Inc. Stastical Packages for Socail Sciences. SPSS for windows: release 11.5, standard version, 1982-2002. SPSS Inc, Chicago, II.
20. Sujatha T, Kundu A, Jeyakumar S, Kundu MS. Azolla supplementation: feed cost benefit in duck ration in andaman islands. Tamilnadu J Vet Anim. Sci. 2013; 9:130-136.