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Effect of Dietary Incorporation of Shatavari (*Asparagus racemosus*) on Production Performance of Japanese quail

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ABSTRACT

The present research was conducted to evaluate the effect of incorporation of Shatavari (*Asparagus racemosus*) root powder (SRP)in the diet on the performance and carcass yield of Japanese quail. 150-day old quail chicks were randomly allotted to 5 dietary treatment groups with 3 replicates of 10 birds for 7 wk. The SRP was ground and included at 0% (Ts0; Control), 1.0 (Ts1), 1.5 (Ts2), 2.0 (Ts3) and 2.5% (Ts4) levels in iso-caloric and iso-nitrogenous quailchick's diets to meet the nutrient requirements as per NRC (1994).There was a significant increase (P<0.05) in BWG, overall feed intake and improved (P<0.05) FCR with incorporation of SRP at 2.5% in the diet compared to the control group. There was a significant difference (P<0.05) in the carcass traits with respect to dressing wt, eviscerated wt, edible wt and giblet wt(i.e. liver, heart and gizzard). However, incorporation of SRP at 2.5% level had higher carcass yield (P<0.05) compared to the control group. Thus, it is concluded that SRP can be safely incorporated at 2.5% level in quail diets without any adverse effects.

Key words: *Carcass, Production, Performance, Shatavari root powder (SRP), Quail*

Introduction

Increase in demand for good quality animal protein, health consciousness, and change in food habits, moving trend towards fast foods of the consumer hasten the entrepreneur to seek for fast growing birds other than chicken. Quail is the one among the alternative in poultry with 24% protein in meat, and comes to market age by the end of 5thwk, lesser the investment required for production. Now-a-days, most of the research work is concentrated on use of phytobiotics in poultry diets both for improving the production as well as value addition. On the other hand, medicinal herbs are believed to have valuable properties such as antioxidant, antifungal, and anti-microbial properties as supplements to animal and poultry feeds (Hardy, 2002). Herbal feed additive also improves nutrient utilization, absorption and the stimulation of the immune system (Gohel*et al*. 2019). The utilization of herbs and therapeutic plants in poultry feeding could be more beneficial as growth promotors and prevent many common poultry diseases. Moreover, these herbs would be easily available and can be used effectively in poultry diets (Deka *et al*. 2019). However, there is no concrete information about using Shatavari in the quail diet and their possible effects on the health and performance of the quails. This study is an effort to explore the possibility of using SRP in the diet of Japanese quail.

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Materials and Methods

150 day-old quail chicks were procured and randomly allotted into 5 groups, each with 3 replicates of 10 chicks. The experiment was carried out for 7wks in a completely randomized design (CRD). During the experiment, Shatavari root was ground and was included at 0% (Ts0; Control), 1.0 (Ts1), 1.5 (Ts2), 2.0 (Ts3) and 2.5 % (Ts4) levels in quail diets (Table 1) formulated to meet nutrient requirements as per NRC (1994).

All the chicks were housed in battery cages under uniform management conditions. Feed and water were provided ad libitum. The feed offered and feed leftover was weighed daily, to quantify the amount of feed consumed. The data for growth rate was recorded at weekly intervals. At the end of study period (7th week), 2 birds per replicate and thus a total of 6 birds per experimental diet were randomly selected, weighed and slaughtered. The data on different carcass yield was recorded. All the data were analyzed statistically (SPSS, 17th Version) as per Snedecor and Cochran (1993) and comparison of means was done using DMRT (Duncan, 1955).

Results

Data pertaining to BWG, feed intake, FCR and PI under different dietary treatments are presented in Table 2. The mean BWG in (g) increased significantly (P<0.05) with increased level of SRP from 1.0 to 2.5% in the diet of quails as compared to the control group. The maximum value of BWG was observed in group Ts4 with SRP supplementation in feed @ 2.5% and minimum in treatment Ts0, respectively.

Feed intake for overall growth period (0-7wk)was higher (P<0.05) in quails diets incorporated with SRP at 0.0% as compared to supplemented group at 1.0, 1.5, 2.0, 2.5 % in Ts1, Ts2, Ts3 and Ts4 group, respectively. Treatment Ts4 having SRP @ 2.5% showed least cumulative feed intake (623.67±6.33g) as compared to the control diet (766.17±17.42g).

The lowest FCR had been seen in Ts4 and highest FCR was observed in Ts0 (control group). These groups also differed significantly (P<0.05) among themselves. The overall results observed that the feed efficiency was better at maximum level of in-

Table 1. Ingredient (%) and chemical composition (% DM basis) of quail diets

Ingredients	Ts0 (control)	Ts1 (1.0% SRP)	Ts2 (1.5% SRP)	Ts3 (2.0% SRP)	Ts4 (2.5% SRP)
Maize	48.00	47.00	47.00	46.50	46.00
SRP	0.00	1.00	1.50	2.00	2.50
GNDOC*	7.00	7.00	7.00	7.00	7.00
DORB*	12.32	12.32	12.32	12.32	12.32
Rice Polish	9.00	9.00	8.50	8..50	8.50
Mineral Mixture	2.50	2.50	2.50	2.50	2.50
Shell grit	1.00	1.00	1.00	1.00	1.00
Soybean	18.00	18.00	18.00	18.00	18.00
DCP*	1.50	1.50	1.50	1.50	1.50
Salt	0.30	0.30	0.30	0.30	0.30
Feed additives	0.38	0.38	0.38	0.38	0.38
Total	100	100	100	100	100

*DM = Dry Matter GNDOC = Groundnut Deoiled Cake
DORB = Deoiled Rice Bran DCP = Digestible Crude Protein

Table 2. Effect of incorporation of SRP in diet on body weight gain, feed intake, FCR and performance index of Japanese quail.

Parameters	Ts0	Ts1	Ts2	Ts3	Ts4	SEm	CD 5%
Body wt. gain (g)	183.55±3.39^{d}	206.15±6.29^{c}	223.08±5.76^{bc}	237.30±2.04^{ab}	255.68±2.80^{a}	4.39	13.82
Overall feed intake (g)	766.17±17.42^{a}	721.17±7.82^{ab}	676.17±13.48^{bc}	632.87±32.43^{c}	623.67±6.33^{c}	18.10	57.04
FCR	4.18±0.15^{a}	3.50±0.07^{b}	3.03±0.07^{bc}	2.67±0.13^{cd}	2.44±0.05^{d}	0.10	0.32
Performance Index	44.09±2.38^{d}	58.97±2.96^{cd}	73.67±3.23^{c}	89.42±4.39^{b}	104.90±3.30^{a}	3.32	10.45

* Levels not connected by same letter are significantly different (P<0.05)
SEm = Standard error of mean, CD 5% = Critical difference at 5% level

clusion of SRP than lower rate of treatment and untreated group.

Results pertaining from the data Table 2, the maximum value of PI was observed in Ts4 group (104.90±3.30) and minimum in the Ts0 (44.09±2.38) diet group. All the treatment group was differed significantly (P<0.05) among the treatment and with control group.

Data pertaining to carcass characteristics are presented in Table 3. Incorporation of SRP at 2.5% levelin the diet of quails resulted in increased (P<0.05) carcass yield (g) i.e. dressing yield, eviscerated weight, edible meat and giblet weight (including liver, heart and gizzard weight) as compared to the control.

Discussion

The present results regarding to body weight gain (BWG) (g) are presented in Table 2. These results are higher than reported by Jothie, (2014) on feeding of SRP to Japanes equail in different levels, i.e. 0, 0.5, 1.0 and 1.5 per cent in Japanese quails and observed body weigh 203.47, 211.89, 210.52 and 207.17 g, respectively. Similarly, Singh and Jaswal (2018) reported the total cumulative weight gain (g) of experimental birds supplemented with SRP was significantly (P<0.05) higher as compared to the control group. The results also accordance with Kant *et al*. (2015) reported significant increase overall body weights, weekly gain in body weight of broilers when inclusion of different level of herbs in the diet.

The results of the present experiment regarding cumulative feed intake (Table 2) are in accordance with the findings of the Bhardwaj, (2009a) investigated effect of SRP and ARP on quail birds. Mane *et al.* (2012) observed the feed intake was significantly higher in T1 (control) than T2 (Ashwagandha @ 5kg/ton), T3 (shatavari @10kg/ton) and T4 (ashwagandha and shatavari @ 10kg/ton) group. The decrease in feed intake during phase of growth might be due to bitterness which has no adverse effect of smell and/or taste of Shatavari in the diets of broilers observed by Kumar *et al*. (2022) and also reported significantly (p≥0.05) lower feed intake and better FCR in the birds fed with SRP compared to control group from sixth week to end of the experiment (56th day).

The overall significantly better (P<0.05) FCR was recorded in Ts4 group (2.5% SRP) followed by Ts3 (2.0% SRP) group as compared to control group. Jothie, (2014) also reported similar FCR as 3.16, 3.05, 2.98 and 2.96, respectively when supplementing SRP at graded levels of 0, 0.5, 1.0 and 1.5 per cent in Japanese quail diet. The present investigation also supported by Sundaramanna and Seshadri (1986) who found better FCR with increasing levels of SRP, Shisodiya *et al.* (2008) fed diet with ARP, Ansari *et al*. (2008) observed the lowest results as regards FCR were recorded for *Ipomea digitata* (2.394) and *Boerhavia diffusa* (2.396) and Bhardwaj *et al.* (2012) reported improved average BW with better FCR in Japanese quail birds due to the supplementation of ARP.

The results on supplementation of SRP on PI of Japanese quails in the present experiment (Table 2) were higher than the finding of Bhardwaj, (2009a) and lower than the finding of Pandey *et al*. (2013) reported performance efficiency (121.90±0.18%) in chicken.

The results of the present study regarding dressed wt. (Table 3) are line with the findings of Pandey *et al*. (2013) who studied the effect of supplementation of ARP and SRP, and found higher dressing% in treatment groups. In contrast, Algawany *et al.* (2020) revealed that supplementation of herbs exhibited non-significant difference among various treatments on percent dressing weight.

Table 3. Effect of incorporation of SRP in diet on carcass characteristics of Japanese quail

Carcass Characteristics (Wt. in gm)	Ts0	Ts1	Ts2	Ts3	Ts4	SEM	CD 5%
Live Wt.	191.84±2.61^{d}	206.93±2.12^{c}	213.33±3.07^{bc}	224.67±3.18^{b}	248.00±4.36^{a}	3.16	9.95
Dressed Wt.	159.97±5.32^{b}	179.47±12.98^{ab}	164.65±2.81^{b}	174.52±3.83^{ab}	197.67±1.10^{a}	6.64	20.92
Eviscerated Wt.	132.18±2.55^{b}	128.10±1.77^{b}	135.20±0.95^{b}	157.77±3.07^{a}	168.13±2.52^{a}	2.29	7.23
Edible Wt.	141.35±2.04^{b}	145.17±3.70^{b}	153.67±4.20^{b}	170.47±2.92^{a}	181.87±1.73^{a}	3.06	9.66
Giblet Wt.	9.90±0.34^{c}	10.96±0.27^{bc}	12.53±0.05^{a}	12.19±0.32^{ab}	12.80±0.52^{a}	0.33	1.05

* Levels not connected by same letter are significantly different (P<0.05)
SEm = Standard error of mean, CD 5% = Critical difference at 5% level

The present results supported by Jothie, (2014) reported that significant increase in eviscerated yield with supplementation of medicinal herb at different levels in poultry diet. In contrast, Mohanty *et al.* (2018) examined the mean carcass characteristics of slaughtered Japanese quails from different treatments and found that yield in was significantly lower ($P<0.05$) in treatments having varied level of acid treated silage incorporation. Similarly, edible wt. from carcass in our study was higher (avg 158.5g) than earlier reported by Bhardwaj (2009a) observed mean value of edible wt. was 142.5g in Japanese quails.

Conclusion

Results of the present study indicate that incorporation of SRP at 2.5% in the diet resulted improved BWG, PI, minimize the cumulative feed intake and FCR and also improve the overall carcass yield. Thus, it would be beneficial to incorporate Shatavari root extract at 2.5% or in between 2.0 – 2.5% in the diet of Japanese quails.

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Conflict of Interest

The authors declare that they do not have any conflict of interest. Every author participated and approved in drafting this manuscript.

References

Alagawany, M., Nasr, A.A., Alhotan, R.A., Azzam, A.A. and Reda, F.M. 2020. Impact of dietary cold-pressed chia oil on growth, blood chemistry, haematology, immunity and antioxidant status of growing Japanese quail. *Italian Journal of Animal Science.* **19**(1): 896-904.

Ansari, J.Z., Haq, A., Yousaf, M., Ahmad, T. and Khan S. 2008. Evaluation of different medicinal plants as growth promoters for broiler chicks. *Sarhad Journal Agriculture*. **24**(2): 323-330.

Bhardwaj, R.K. 2009a. Study on efficiency of shatavari and ashwagandha root powder supplementation on production, reproduction and carcass traits of Japanese quails. Ph.D. Thesis submitted to Govind Ballabh University of Agriculture and Technology, Pantnagar. Uttarakhand, India.

Bhardwaj, R.K., Bhardwaj, A. and Gangwar, S.K. 2012. Efficacy of ashwagandha (*Withania somnifera*) supplementation on haematological and immunological parameters of Japanese quails. *International Journal of Science and Nature*. **3**(2): 476-478.

Deka, J., Mahanta, J.D., Kalita, K.P., Choudhury, D., Tamuly, H.A. 2019. Effect of dietary supplementation of NLM on the performance of commercial broiler chicken. *Journal of Entomology and Zoology Studies*. **7**(3): 658-663.

Duncan, D.B. 1955. Multiple range and multiple F-tests. *Biometrics.* 11: 1-42.

Gohel, B.C., Garg, D.D., Patil, S.S., Savsani, H.H. Trivedi, S.P. 2019. Efficacy of *Ocimum sanctum* and *Aloe vera*leaves powder as phytogenic growth promoter in diet of broiler chickens. *Journal of Entomology and Zoology Studies*. **7**(2): 379-383.

Hardy, B. 2002. The issue of antibiotic use in the livestock industry: what have we learned. *Animal Biotechnology*. **13**(1):129- 147.

Jothie, K.A. 2014. *Effect of Asparagus Racemosus (Shatavari) root powder on the reproductive perfrormance of Japanese quails* (*Coturnix Coturnix Japonica*), MVSc. Thesis submitted to Tamil Nadu Veterinary and Animal Science University, Channai-51.

Kant, S., Ali, N., Chandra and Singh, R.K. 2015. Effect of Shatavari and vitamin E on growth performance, biochemical profile and dressing percentage of broiler during winter season. *Indian Journal of Poultry Science*. **50**(2): 158-162.

Kumar, B., Krishnamurthy, T.N., Manegar, A., Indresh, H.C., Jayanaik, U.B. and Ruban, W. 2022. Supplementation of *Asparagus racemosus* (Shatavari) on the growth performance and carcass traits in Giriraja birds.*The Pharma Innovation Journal*. **11**(3): 616-619.

Mane, A.G., Kulkarni, A.N., Korake, R.L. and Bhutkar, S.S. 2012. Effect of supplementation of Ashwagandha (*Withania somnifera*) and Shatavari (*Aspargusracemosus*) on growth performance of broiler. *Research Journal of Animal Husbandry and Dairy Sciences*. 3(2): 94-96.

Mohanty, A., Babu, L.K., Sahoo, B., Tanuja, S., Samal, P. and Panda, A.K. 2018. Effect of dietary incorporation of acid treated fish silage on the performance and carcass characteristics of broiler Japanese quails. *International Journal of Livestock Research*. 8(11): 138-148.

NRC 1994. *Nutrient Requirements of Poultry.* 9th Edition. National Research Council. National Academy Press, Washington, DC., U.S.A.

Pal, V., Gobade, M., Ravikanth, K., Thakur, A. and Maini, S. 2013. Comparative efficiency of supplementation of herbal liver tonic products on growth and performance in broilers. *International Journal of Advanced*

Science and Technology. **3**(6): 808-816.

Pandey, N.K., Singh, D.P. and Ram Niwas, R. 2013. Broiler characteristics, sensory qualities, and economic efficiency in vencobb-400 chicks supplemented with a conjugated herbal feed additive in diet. *Animal Science Reporter*. 7(4): 128-132.

Patel, R.M., Garg, D.D., Patel, V.R., Vahora, S.G., Katariya, M.A and Choubey, M. 2014. Effect of dietary supplementation of garlic (*Allium sativum*) and fenugreek (*Trigonellafoenum-graecum*) seed powder on growth performance and blood biochemical parameters in broilers. *Indian Journal of Poultry Science*. **49**(1) : 17-20.

Reddy, N.B.C., Kumar, D.S., Kishore, K.R. and Kumari, K.N.R. 2019. Effect of Dietary Incorporation of *Coriander Seed Meal* on Production Performance of Japanese Quail. *Indian Journal of Animal Nutrition*. 36(2): 198-201.

Shisodiya, J.M., Chpoade, S.S., Rajput, A.B., Chandankhede, J.M., Ingale, K.S. and Kolte,B.R. 2008. Comparative study of Ashwagandha and commercial synthetic compound on performance of broilers during hot weather. *Veterinary World*. 1(10): 310-11.

Singh, A. and Jaswal, A. 2018. Effect of dietary supplementation of Shatavari root powder (*Asparagus racemosus*) on growth performance and meat quality of broilers. *Annals of Biology.* 34(2) : 215-217.

Snedecor, G.W. and Cochran, W.G. 1993. *Statistical Methods.* 9th ed. IOWA, USA: Iowa State University press.

Sundaramanna, G.J. and Seshadri, S.J. 1986. Nutritional care avoidable lapses and maximizing returns. *Indian Poultry Review.* (June): 37-40.