The Pharma Innovation Journal 2022; SP-11(2): 1223-1225

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(2): 1223-1225

www.thepharmajournal.com
Received: 28-12-2021
Accepted: 30-01-2022

DS Goswami
Ph.D. Scholar, Department of Animal Production, Rajasthan College of Agriculture (MPUAT), Udaipur, Rajasthan, India

JL Choudhary
Professor, Department of Animal Production, Rajasthan College of Agriculture (MPUAT), Udaipur, Rajasthan, India

DK Bagri
Ph.D. Scholar, Department of Animal Production, Rajasthan College of Agriculture (MPUAT), Udaipur, Rajasthan, India

JP Meena
Ph.D. Scholar, Department of Animal Production, Rajasthan College of Agriculture (MPUAT), Udaipur, Rajasthan, India

Lokesh Gupta
Associate Professor and Head, Department of Animal Production, Rajasthan College of Agriculture (MPUAT), Udaipur, Rajasthan, India

Corresponding Author
DS Goswami
Ph.D. Scholar, Department of Animal Production, Rajasthan College of Agriculture (MPUAT), Udaipur, Rajasthan, India

Effect of dietary supplementation of shatavari on egg production and egg quality parameters in Japanese quails

DS Goswami, JL Choudhary, DK Bagri, JP Meena and Lokesh Gupta

Abstract
An experiment was conducted on laying quails to determine optimum dietary level of Shatavari (*Asparagus racemosus*) supplementation on egg production and egg quality traits at Poultry Farm Rajasthan College of Agriculture, Udaipur (Raj). A hundred quails were randomly distributed in 4 treatments and reared on standard managemental conditions. The root powder of Shatavari was added over the basal ration at 1.0% level (Ts1), 1.5% (Ts2), 2.0% level (Ts3), whereas the Ts0 was the control group. A maize, soybean and rice bran-based quail layer basal diet having all the nutrients in the required quantity was prepared. Each of such diets was offered as mash *ad libitum* to Japanese laying quails reared in laying cages for a period of 15 weeks (8-23 weeks of age) significantly ($P< 0.05$) higher per cent egg production was observed in diet Ts2 containing 1.5 per cent Shatavari groups, but the groups Ts1 & Ts3 in diet did not differ significantly from each other. Egg weight was also significantly ($P< 0.05$) higher in the diet containing 1.5 percent Shatavari than Control group. Cumulative feed intake (g/b) for the 8-23 weeks feeding period was significantly ($P < 0.05$) higher in Ts0 and lower in the entire Shatavari treated groups. FCR (feed intake/egg mass) and net FCR were significantly ($P< 0.05$) poor in Ts1 group than other Shatavari supplemented groups. Shell thickness weight was found higher in birds fed with Shatavari @ 1.5 per cent (Ts2) group than Ts0, Ts1 and Ts3 group, whereas groups fed Ts1, Ts2 and Ts3 diet did not differ significantly from each other. Shell weight on per cent of egg weight was significantly ($P< 0.05$) higher in diet fed Ts2 than other dietary groups. The results of the present study on production performance of laying quails indicated that supplementing the dietary level of 1.5 percent Shatavari (*Asparagus racemosus*) in diet to common feedstuffs is sufficient to support the optimum egg production, performance of laying quails under sub-humid and humid regions of Rajasthan and there is no need to supplement the diet with additional ingredients.

Keywords: Japanese laying quail, shatavari, egg production, egg quality

1. Introduction
Asparagus racemosus also known as "Shatavari, means "she who possesses a hundred husbands" which indicates that this herb is highly effective in problems related to the female reproductive system (Hasan *et al*., 2016) [6]. In modern Ayurvedic practices the roots of the plant are considered to be effective as an antispasmodic, appetizer, stomach tonic, aphrodisiac, galactagogue, astringent, antidiarrhoeal, antidysenteric, laxative, anticancer, anti-inflammatory, blood purifier, antitubercular, antiepileptic and also in night blindness, kidney problems and in throat complaints (Garde, & Sarth 1970) [5]. The plant contains triterpene saponins, Shatavarin I, II, III and IV which are phytoestrogen compounds (Roots) Quercetin, rutin and hyperoside (Flowers and fruits), Diosgenin and Quercetin–3. Glucuronide (Leaves). Rani *et al*. (2019) [14] reported that Shatavari root powder has an ash content of 6.13 per cent and a moisture content of 6.03 per cent. Protein content 2.65 per cent and fat 3.52 per cent. Dietary fiber estimated by the AOAC enzymatic – gravimetric method and total dietary fibre was 16.06 per cent while insoluble and soluble dietary fibre were 13.4 and 2.66 per cent, respectively in SRP (Babat 2006) [2]. Shatavari root powder contained 5.44 percent saponins, 212 Kcal energy, and 2.17 mg of iron and 26mg of calcium (Kumari and Gupta 2016) [11]. Ahmad *et al*. 2008 [1] reported that Satavar (*Asparagus racemosus) root* supplementation in the feed of crossbred layers increased egg production, egg weight and age at sexual maturity. Further, the experiment was conducted to assess the effect of Shatavari root powder supplementation on the production performance of laying Japanese quail.

2. Material and Methods
A total of hundred Japanese quail layers of eight weeks of age were allocated randomly to four

dietary treatment groups of 25 birds each and housed in laying cages under similar managemental conditions. A practical basal diet was formulated based on common feedstuffs such as maize, soybean meal and rice bran meal to meet the nutrient requirements of Japanese quail layers, which was adequate in all the nutrients. The root powder of Shatavari was added at 1% level (Ts1), 1.5% (Ts2), 2.0% level (Ts3), whereas the Ts0 was the control group. Weighed quantity of each diet was offered as mash *ad libitum* daily in the morning to laying quails reared in cages for a period of 15 weeks (8-23 weeks of age). Feed consumption and egg production was recorded daily. The chemical composition of Shatavari root powder was found to be OM (93.56), CP (7.05), EE (0.82), CF (20.35), Ash (6.39) and NFE (65.54) per cent and ME was 3944 Kcal/kg. Initial and final body weights of the laying quails were recorded. Feed efficiency ratio both for feed intake/kg egg mass and net feed efficiency and the change in body weight were calculated according to standard procedures. For egg quality studies, ten eggs from each dietary groups laid on 15th week per treatment were taken for egg quality parameters with respect to shape index, albumen index, yolk index, shell weight and shell thickness. The shape index was determined by measuring the length and width of the eggs using an vernier caliper. Eggshell was broken and the albumen and yolk height was measured with a Spherometer, whereas, the length and width of albumen and yolk were measured using a vernier caliper. The albumen index and yolk index were determined as per the method (Heiman and Corver 1936) [7]. The shell thickness was measured at three points of the shell using a screw gauge and averaged. The eggshell weight was taken after drying the shell and was expressed as a percentage of egg weight. Data were tested for statistical significance using Duncan multiple range test (DMRT) (Duncan, 1955) [4].

3. Results and Discussion

The Results on production performance of laying quails on hen day egg production, egg weight, egg mass, feed intake, feed conversion ratio and change in body weight as influenced by Shatavari supplementation are presented in Table 1. Results indicated significantly ($P< 0.05$) higher per cent hen day egg production in group Ts2 containing 1.5 percent Shatavari groups, but the groups Ts1 & Ts3 in diet did not differ significantly from each other in Ts2 than Ts1 and Ts0 diets, but the groups fed Ts1 and Ts3 diet did not differ significantly from each other. Egg weight was also higher in Shatavari supplemented group (Ts2) than Ts1 & Ts3 group. Cumulative feed intake (g/b) for the 8-23 weeks feeding period was significantly ($P< 0.05$) higher in the Ts0 group than other groups. FCR (feed intake/egg mass) and net FCR were significantly ($P< 0.05$) poorer in Ts0 group than other supplemented group. The change in body weight (Final-initial body weight) remained statistically higher in all the treated groups. Similar observations were reported by (Kerketta, 2012) [10] who studied the effect of feeding root powder of Shatavari on growth rate, feed consumption and FCR on Guinea fowl. These results are also in agreement with the results of (Jothie, 2014) [9]. Ibrahim *et al*. (2018) [8] Reported slightly higher average egg production, higher average egg weight on supplementation of Olive Pulp up to 60g/kg in the feed of layers. NRC, (1994) [12] has recommended a slightly lower (60 mg/kg diet) dietary Mn level for laying quails. The trace mineral requirement of birds are known to be affected by breed, variety, type of productivity, age, sex, physiological condition, overall nutritional adequacy of the diet, climatic conditions besides other factors. The egg quality traits of laying quails as influenced by graded levels of Shatavari are presented in Table 2. The egg quality parameters *viz*. shape index, albumen index and yolk index were not found to differ significantly among different supplemental levels of Shatavari. The eggs shell thickness was significantly ($P< 0.05$) higher in group Ts2 than the control group. However, the birds consuming Shatavari diets having 1.0, 1.5 and 2.0 percent, shell thickness did not differ significantly from each other. Shell weight on per cent egg weight basis was significant ($P< 0.05$) higher in group Ts2 than other treated levels of *Asparagus racemosus*. The present results are in agreement with (Bhardwaj and Gangwar, 2011) [3] reported shape index, albumen index, yolk index of eggs has not been found to be affected significantly due to Satawar root powder supplementation; however there was the increase in shape index with the increased level of Satawar supplementation. Okon *et al*. (2020) [13] revealed that mean egg weight, egg length, egg width, shell weight and shell thickness were 10.195 g, 32.199 mm, 22.536mm, 1.280mm and 0.228 mm respectively. Saly *et al*. 1985 [15] recommended 30-60 mg Mn/kg in the diet of laying hens for optimum egg quality traits. Sukla *et al.* (1993) [16] also observed significantly ($P < 0.05$) higher eggshell weight in diets having higher Mn levels than lower levels.

Table 1: Effect of Shatavari supplementation on production performance of laying Japanese quails (8-23 weeks of age)

Dietary Treatments of *Asparagus racemosus* (%)	Hen day egg production (%)	Egg weight (g)	Egg mass (g)	Cumulative feed consumption (g)	FCR (feed consumption /kg mass)	Net FCR	Change in body weight (g)
Ts0	75.54 ±1.53^{ab}	12.38 ±0.21^{ab}	976.22 ±26.27^{ab}	3170.29 ±34.12^{a}	3.24 ±0.07^{a}	3.18 ±0.06^{a}	28.75 ±2.49^{ns}
Ts1	76.85 ±2.41^{abc}	12.19 ±0.16^{a}	981.63 ±32.52^{ab}	3190.25 ±39.27^{a}	3.25 ± 0.16^{a}	3.19 ±0.16^{a}	34.28 ±3.67^{c}
Ts2	82.37 ±1.52^{c}	12.80 ±0.15^{b}	1103.13 ±21.03^{c}	3552.39 ±8.06^{c}	3.22 ±0.09^{a}	3.16 ±0.08^{b}	33.65 ±4.73^{a}
Ts3	77.44 ±2.17^{abc}	12.65 ±0.17^{ab}	1051.21 ±32.07^{bc}	3316.12 ±30.15^{b}	3.15 ±0.11^{a}	3.14 ±0.12^{c}	29.45 ±2.92^{b}
Overall averages	78.05 ±1.94^{a}	12.50 ±0.21^{ab}	1028.05 ±28.33^{a}	3307.26 ±28.11^{c}	3.21 ±0.11^{b}	3.17 ±0.17^{b}	31.53 ± 0.52^{a}

*The values having at least one common superscript does not differ significantly ($P< 0.05$) in a column

Table 2: Egg quality parameters of Japanese quail on the inclusion of Asparagus racemosus in the diet

Dietary Treatments of *Asparagus racemosus* (%)	Shape index	Albumin index	Yolk index	Shell thickness (mm)	Shell weight (% egg weight)
Ts0	76.89 ± 0.49^{a}	0.112 ±0.003^{a}	0.461 ±0.005^{a}	0.218 ±0.003^{a}	9.36 ±0.14^{a}
Ts1	78.95 ± 0.51^{c}	0.114 ±0.002^{ab}	0.488 ±0.006^{c}	0.217 ±0.001^{a}	9.45 ±0.33^{a}
Ts2	77.81 ±0.67^{bc}	0.115 ±0.002^{ab}	0.469 ±0.003^{ab}	0.225 ±0.002^{b}	10.23 ±0.28^{b}
Ts3	76.92 ±0.43^{ab}	0.125 ±0.004^{c}	0.475 ± 0.006^{bc}	0.222 ±0.003^{ab}	9.62 ±0.08^{a}

*The values having at least one common superscript does not differ significantly ($P< 0.05$) in a column

4. Conclusion

The results of the present study on production performance of laying quails indicated that supplementation of Shatavari (*Asparagus racemosus*) in common feedstuffs is sufficient to support the optimum egg production performance of Japanese quails under humid and sub-humid regions and there is no need to supplement the diet with additional calcium and manganese as it is coming naturally in diet from Shatavari (*Asparagus racemosus*).

5. Acknowledgement

The authors have deep regards towards the Major advisor Dr. J. L. Choudhary and Dr. Lokesh Gupta, Head, Department of Animal Production, Rajasthan College of Agriculture, Udaipur for providing all the necessary facilities for conducting this experiment.

6. Conflicts of Interest: All authors have no conflict of interest regarding this study.

7. Reference

1. Ahmad Javed, Kumar Ashok, Shukla SK, Singh SK. Effect of Satavar Root (*Asparagus racemosus*) supplementation on the performance of crossbred layers. M.VSc. Thesis (Poultry science), G.B.P.U.A. & T., Pantnagar. 2008.
2. Babat US. Investigations of nutritive value of *Asparagus racemosus* - an Analytical Approach. Chapter II. Chemistry Department, University of Pune, Pune. 1969, 2006.
3. Bhardwaj RK, Gangwar SK. Effect of dietary supplementation of *Withania somnifera* on egg production and egg quality parameters in Japanese Quails. International Journal of Advanced Research. 2011;1:32-34.
4. Duncan DB. Biometrics. 1955;11:1-42.
5. Garde GK, Sarth V. Marathi Translation of Vagbhat's Astangahridya. Uttarstana, Aryabhushana Mudranalaya. 1970, 40-48.
6. Hasan N, Ahmad N, Zohrameena S, Khalid M, Akhtar J. Asparagus racemosus: For medicinal uses & pharmacological actions. International Journal of Advanced Research. 2016;4(3):259-267.
7. Heiman V, Corver JS. Fundamentals and testing of egg quality. Poult. Sci. 1936;15:991-994.
8. Ibrahim NS, Sabic EM, Abu-Taleb AM. Effect of inclusion irradiated olive pulp in laying quail diets on biological performance. Journal of Radiation Research and Applied Sciences. 2018;11(4):340-346.
9. Jothie KA. Effect of *Asparagus racemosus* (Shatavari) root powder on the Reproductive performance of Japanese quails (*Coturnix coturnix japonica*), M.V.Sc. Thesis submitted to Tamil Nadu Veterinary and Animal Science University, Chennai-51. 2014.
10. Kerketta N. Evaluation of growth performance and carcass characteristic of pearl and lavender variety of guinea fowl with special reference to supplementation of shatavari. Ph.D. Thesis submitted to Chhattisgarh Kamdhenu Vishwa Vidhyalay, Durg (C.G.). 2012.
11. Kumari S, Gupta A. Nutritional composition of dehydrated Ashwagandha, Shatavari, and ginger root powder. International Journal of Home Science. 2016;2(3):68-70.
12. NRC. Nutrients Requirements of Poultry. 9th Edn. National Research Council, National Academy Press, Washington, D.C. 1994.
13. Okon B, I bom LA, Dauda A, Ebegbuulem VN. Egg quality traits, phenotypic correlations, egg and yolk weights prediction using external and internal egg quality traits of Japanese quails reared in Calabar, Nigeria. Intenational Journal of Molecular Biology. 2020;5(1):21-26.
14. Rani P. Effect of shatavari root powder on sensory and nutritional composition of biscuits. Journal of Pharmacognosy and Phytochemistry. 2019;8(5):523-526.
15. Saly J, Fried K, Jantosovic J, Kusev J, Benhatchi M. Optimum level of manganese on performance of laying hens. Folia Veterinaria. 1985;29(1-2):91-99.
16. Shukla PK, Shrivastava AK, Singh RP, Bedi SPS. Comparision of added and normal levels of manganese level on the egg quality traits of layers Indian Journal of Poultry Sciences. 1993;28:116-119.