Indian J. Anim. Nutr. 2020. 37 (3): 288-291
doi: 10.5958/2231-6744.2020.00046.8

Indian Journal of Animal Nutrition

SHORT COMMUNICATION

Effect of Feeding Graded Levels of Broken Rice on Blood Biochemical Profile of White Pekin Ducks During Second Year of Laying

P.K. Naik[1], D. Kumar, S.K. Panda[2], G.R. Jena[2], B.K. Swain, S.K. Sahoo and S.K. Mishra
ICAR-Central Avian Research Institute, Regional Centre, Bhubaneswar, Odisha-751019, India

ABSTRACT

A study was conducted to find out the effect of feeding graded levels of broken rice (BR) replacing wheat in the diet of White pekin ducks on blood biochemical profile during second year of laying. White pekin laying ducks (75; 82 weeks) were divided into five groups; and diets without (BR-0) and with BR, replacing 25 (BR-25), 50 (BR-50), 75 (BR-75) and 100 (BR-100), percent wheat; were fed for a period of 73 days. The blood glucose (mg/dl) level ranged from 171.23 to 182.07 among the groups; however, it was non-significantly (P>0.05) higher in BR-50 than the other groups. The serum total protein and globulin levels (g/dl) were higher (P<0.05) in BR-50 group than BR-100 group; however, the serum total protein and globulin levels in ducks fed BR were similar with the control. The serum albumen content (3.59-3.65, g/dl) was similar (P>0.05) among the groups. The serum triglycerides content (mg/dl) ranged from 294.10 to 297.70 and was similar (P>0.05) among the groups. There was no effect of BR on the serum cholesterol content (130.81-147.60, mg/dl) of the ducks. The uric acid content (8.07-8.30, mg/dl) was similar among the groups. The Ca (10.17-10.49, mg/dl) and P (3.73-4.08, mg/dl) contents of the serum were also comparable (P>0.05) among the groups. It can be concluded that the complete replacement of wheat by broken rice in the diets of white Pekin laying ducks during second year of egg production had no affect on the blood biochemical profile of White Pekin ducks.

Key words: Blood, Ducks, Rice, Wheat, White Pekin

In India, ducks contribute next to chicken, in total egg and meat production. Therefore, special emphasis is being given on duck farming to meet the egg and meat requirement of the country. There are many advantages of ducks over chickens, in which laying potential in second year is one of them. White Pekin ducks are used both for egg and meat production. In rural areas, farmers prefer to keep ducks in back-yard with supplementation of locally available feed ingredients (Sahoo *et al.,* 2014; Swain *et al.,* 2018). In coastal areas, rice production is predominant and broken rice or *rice kani* is available locally in plenty. As the cost of wheat is increasing exorbitantly, the locally available broken rice is being preferred by the farmers for feeding their ducks. However, very little literature is available on feeding of broken rice to ducks, particularly in second year of laying. Therefore, a study was conducted to find out the effect of feeding graded levels of broken rice replacing wheat on various blood biochemical profile in White Pekin ducks during second year of laying.

Five iso-nitrogenous and iso-caloric diets were prepared without (BR_0) and with the inclusion of broken rice (BR), replacing 25 (BR-25), 50 (BR-50), 75 (BR-75) and 100 (BR-100), percent wheat (Table 1). White Pekin laying ducks (75; 82 weeks) were divided into five groups; each group having three replicates with five ducks per replicate and were offered randomly the above five diets for a period of 73 days. All the birds were reared on deep litter system and were fed the respective diets *ad lib.* during the experimental period. Standard management practices were followed and clean drinking water was made available *ad lib.* throughout the experiment.

During the experiment, about 2.5 ml blood was collected individually from wing vein of three ducks from each replicate. About 0.5 ml blood was stored in NaF "containing vial for blood glucose estimation. The remainder blood was collected in clot activator vials to enable clotting and facilitate serum collection. The

[1] Corresponding author; E-mail: pknaikicar@gmail.com; [2] College of V. S. & A.H., OUAT

Table 1. Physical composition (%) of feeds

Feed ingredient	BR-0	BR-25	BR-50	BR-75	BR-100
Wheat	55	41	27.5	14	0
Broken rice	0	14	27.5	41	55
Soybean meal	25	26	27.5	29	31
Deoiled rice bran	07	06	4.5	3.0	01
Oyster shell	10	10	10	10	10
Di-calcium phosphate	02	02	02	02	02
Calcite	01	01	01	01	01
Trace minerals	0.5	0.5	0.5	0.5	0.5
DL-methionine	0.2	0.2	0.2	0.2	0.2
Lysine	0.1	0.1	0.1	0.1	0.1
Vitamin AD3B2K	0.025	0.025	0.025	0.025	0.025
Vitamin E & Se	0.03	0.03	0.03	0.03	0.03
Vitamin B Complex	0.025	0.025	0.025	0.025	0.025
Toxin binder	0.15	0.15	0.15	0.15	0.15
Choline chloride	0.15	0.15	0.15	0.15	0.15

serum samples were used for analysis of blood sugar, total protein, albumin, globulin, triglycerides, cholesterol, uric acid, calcium and phosphorus by kits manufactured by Coral Clinical Systems (A division of Tulip Diagnostics (P) Ltd., Pantanagar, Uttarakhand, India). The data were statistically analysed for the test of significance (Snedecor and Cochran 1994).

The chemical compositions of the feeds are presented in Table 2. All the diets were iso-nitrogenous (18.33-18.37, %CP) and iso-caloric (2614-2661, ME, kcal/kg). The blood glucose (mg/dl) level ranged from 171.23 to 182.07 among the groups; however, it was non-significantly (P>0.05) higher in BR-50 than the other groups. Earlier workers (Joshi *et al.,* 2015) have also reported similar blood glucose level (172.77-230.97, mg/dl) in ducks. However, lower blood glucose level in ducks has also been reported (90.98-165.09, mg/dl) by many workers (Mahanta *et al.,* 1997; Rath *et al.,* 2016; Sahoo *et al.,* 2014) than the present study. The serum total protein (g/dl) level was higher (P<0.05) in BR-50 group

Table 2. Chemical composition (on % DM basis) of feeds

Parameters	BR-0	BR-25	BR-50	BR-75	BR-100
Dry Matter	96.63	97.37	98.20	97.84	98.70
Organic matter	87.63	87.64	87.81	87.79	87.95.
Crude protein	18.36	18.37	18.36	18.33	18.37
Ether extract	1.45	1.60	1.61	1.57	1.44
Crude fibre	9.75	9.82	9.67	9.72	9.65
Nitrogen free extract	58.07	57.85	58.17	58.17	58.49
Total ash	12.37	12.36	12.19	12.21	12.05
Calculated					
Energy (ME, kcal/kg)	2614	2620	2661	2638	2650
Lysine	1.06	1.07	1.09	1.11	1.14
Methionine	0.46	0.48	0.51	0.54	0.57

Table 3. Effect of feeding graded levels of broken rice on various blood biochemical profile of ducks

Parameters	BR-0	BR-25	BR-50	BR-75	BR-100	SEM
Glucose (mg/dl)	175.96	174.06	182.07	171.23	177.11	1.59
Total protein (g/dl)	6.06^{ab}	5.98^{ab}	6.33^{b}	5.85^{ab}	5.72^{a}	0.07
Albumen (g/dl)	3.65	3.64	3.59	3.61	3.61	0.02
Globulin (g/dl)	2.41^{ab}	2.34^{ab}	2.74^{b}	2.24^{ab}	2.11^{a}	0.08
Triglycerides (mg/dl)	295.40	294.10	296.60	297.70	295.89	2.83
Cholesterol (mg/dl)	130.81	134.04	145.39	147.60	139.16	3.20
Uric acid (mg/dl)	8.07	8.11	8.22	8.30	8.22	0.09
Calcium (mg/dl)	10.24	10.49	10.23	10.17	10.26	0.07
Phosphorus (mg/dl)	4.0	4.08	3.87	3.73	3.83	0.07

^{a,b}Mean bearing different superscript in a row differ significantly (P<0.05)

(6.33) than BR-100 group (5.72); however, the serum total protein level (g/dl) in ducks fed BR (5.72-6.33) was similar with the control (6.06). Earlier studies have reported either similar (Giri *et al.,* 2015), lower (Mahanta *et al.,* 1997; Mohanty *et al.,* 2015; Giri *et al.,* 2015; Rath *et al.,* 2016) higher (Joshi *et al.,* 2015; Sahoo *et al.,* 2014) levels of serum total protein (g/dl) than observed in this experiment. The serum albumen content (3.59-3.65, g/dl) was similar (P>0.05) among the groups. Joshi *et al.* (2015) and Rath *et al.* (2016) recorded serum albumen levels (g/dl) of 1.50-2.16 and 2.06, respectively, which were lower than this study; however, the observation (2.95-4.01 g/dl) of Mahanta *et al.* (1997) in Chara and Chemballi of Assam was close to this study. Similar to the serum total protein (g/dl), the serum globulin level (g/dl) was higher (P<0.05) in BR-50 group (2.74) than BR-100 group (2.11); however, the serum globulin (g/dl) in ducks fed BR (2.11-2.74) was similar with the control (2.41). As compared to this study some previous study reported Low level (Mahanta *et al.,* 1997) while other reported higher level of serum globulin (Joshi *et al.,* 2015) of serum globulin. Serum triglycerides content (mg/dl) ranged from 294.10 to 297.70 and was similar (P>0.05) among the groups, which were also close to the observation (334.21) of Rath *et al.* (2016). There was no effect of BR on the serum cholesterol content (130.81-147.60, mg/dl) of the ducks; which was close to the findings (130.63-160.21) of the earlier workers (Joshi *et al.,* 2015). The uric acid content (8.07-8.30, mg/dl) was similar among the groups and close to the observations (7.70-9.37). The Ca (10.17-10.49, mg/dl) and P (3.73-4.08, mg/dl) contents of the serum were also comparable (P>0.05) among the groups; which were within the range of 7.23-19.90, mg/dl and 3.37-8.68, mg/dl, respectively (Mohanty *et al.,* 2015; Giri *et al.,* 2015).

It can be concluded that the complete replacement of wheat by broken rice in the diets of white Pekin laying ducks during second year of egg production had no affect on the blood biochemical profile of White Pekin ducks.

ACKNOWLEDGEMENT

The authors are thankful to Indian Council of Agricultural Research (ICAR), New Delhi; for providing financial support to conduct the study.

REFERENCES

Giri, S.C., Sahoo, S.K., Sastry, K.V.H. and Bais, R.K. 2015. Effect of dietary protein on reproductive growth of Khaki Campbell ducks. *Indian J. Anim. Sci.* 85: 504-507.

Joshi, S.K., Sahoo, S.K., Babu, L.K. Giri, S.C. and Mondal, D. 2015. Effect of feeding different levels of proteins on the performance in Khaki Campbell ducks during starter stage. *Indian J. Anim. Res*. 49: 70-76.

Mahanta, J.D., Jalaludeen, A. and Ponnuvel, P. 1997. Biochemical characteristics of blood serum of native ducks of Kerala. *Indian J. Anim. Sci*., 67: 693-694.

Mohanty, S.R., Sahoo, S.K., Babu, L.K., Pati, P.K. and Joshi, S.K. 2015. Effect of feeding different levels of proteins on carcass characteristics, nutrient utilization and blood

biochemical parameters on growing Khaki Campbell ducks. *Int. J. Basic and Appl. Agrl. Res.* 13: 77-83.

Rath, R., Mishra, M., Panigrahi, B., Singh, V., Tewari, H. and Tyagi, K. 2016. Effect of dietary choline supplementation on egg quality and serum biochemical profile in White Pekin ducks. *Indian J. Anim. Res., DOI: 10.18805/ijar.9639.*

Sahoo, S.K., Naskar, S.K., Giri, S.C., Padhi, M.K. and Panda, S.K. 2014. Performance of White Pekin ducks on replacement of maize with cassava tuber meals. *Anim. Nutr. Feed Technol.*, 14: 291-300.

Snedecor, G.W. and Cochran, W.G. 1994. *Statistical Methods*. 8th edn. Oxford and IBH Publishing Co. Calcutta, India.

Swain, B.K., Naik, P.K., Sahoo, S.K., Mishra, S.K. and Kumar, D. 2018. Effect of Feeding of Azolla (*Azolla pinnata*) on the Performance of White Pekin Laying Ducks. *Int. Livest. Res.,* 8: 248-253.

Received on 13-09-2020 and accepted on 06-10-2020