

GLUCOSE, TOTAL PROTEINS, URIC ACID AND TRIGLYCERIDES CONCENTRATIONS IN BLOOD OF NATIVE LAYING HENS

Bashir Mahmood Bhatti, Tanzeela Talat and Rozina Sardar
Poultry Research Institute, Punjab, Rawalpindi-46300, Pakistan

ABSTRACT

This study was undertaken to estimate levels of glucose, total proteins, albumins, uric acid and triglycerides in plasma of Desi and Naked Neck laying hens. The experimental birds received ration containing 16 per cent crude protein and were housed in open sheds. The mean values (mg/dL) observed in Desi hens were 226.736 ± 15.20 glucose, 1.624 ± 0.224 albumin, 5.203 ± 1.078 total proteins, 4.633 ± 1.875 uric acid and 529.800 ± 554.74 triglycerides. In Naked neck hens, the mean values were found to be 231.818 ± 31.376 glucose, 1.562 ± 0.287 albumins, 4.533 ± 0.797 total proteins, 4.157 ± 1.336 uric acid and 791.200 ± 320.474 triglycerides. There was no difference ($P < 0.05$) in mean values of blood parameters between both the native laying hens which suggested that in identical genetical mechanism regulated concentrations of blood chemical constituents under study.

Keywords: Estimation of glucose, total proteins, albumin, uric acid, triglycerides, blood, native hens.

INTRODUCTION

Poultry production in Pakistan is developing distinctly as rural poultry farming in villages and intensive poultry farming in cities. According to Livestock Census (1996), there were more than 24 million desi chickens in villages of Punjab. The birds which constituted rural chickens, included *Inter alia* Native (Desi), Assel and Naked Neck birds. There is marked variation in phenotypic, as well as reproductive, characteristics of these birds. The physical and reproductive performance of chickens is dependent on physiological parameters and their interactions (North and Bell, 1990). The physiological blood chemical constituents in respect of chickens of various breeds and strains have been documented such as plasma glucose, plasma albumins and total plasma proteins and blood triglycerides (Krasnodebska and Koncicki, 1999; Paul and Sangeetha, 2000; Afifi and Dowidar, 2000).

This study was undertaken to estimate blood parameters such as glucose, total proteins, albumins, uric acid and triglycerides in Desi and Naked Neck native chickens to appreciate any variation between these two indigenous breeds.

MATERIALS AND METHODS

The experimental birds such as Desi and Naked Neck hens were maintained in Breeding Section of Poultry Research Institute, Rawalpindi. There were 40 birds of both types housed in open sheds. They were

fed experimental ration prepared in Nutrition Division of the Institute right from onset of laying till end of experiment. The ration contained 16 per cent crude protein, 6 per cent crude fibre, 5 per cent fat, 8 per cent moisture, 3.0 per cent calcium and 0.5 per cent phosphorus. The feed and water were available *ad libitum*. Feed was tested for aflatoxin B1 in Feed Testing Laboratory of Institute and was found to contain about 19 ppb (parts per billion) which was within safe levels as per recommendation of FDA (1989). Ten blood samples (25%) in all were collected from each group of 20 Desi and 20 Naked Neck hens for estimation of blood parameters such as plasma glucose, albumins, total proteins, uric acid and triglycerides, using different techniques such as enzymatic kinetic, colorimetric test on basis of Trinder reaction for serum glucose; colorimetric determination of serum albumin using Bromocresole green method at pH 4.2; colorimetric determination of total proteins based on principle of Biuret reaction method; enzymatic color test on basis of Trinder reaction for serum uric acid; and enzymatic colorimetric test for triglycerides. The birds were slaughtered after sampling. The data collected in respect of each blood parameter were subjected to statistical analysis (Steel and Torrie, 1980) to draw inferences.

RESULTS AND DISCUSSION

The findings are given in Table 1. The mean values (mg/dl) of plasma glucose were found to be 226.74 ± 15.20 and 231.82 ± 31.38 in Desi and Naked

Neck hens, respectively. There was no difference between both the strains. The birds have blood glucose levels that are several times higher than in mammals (Jordan and Pattison, 1998).

Table 1: Estimated mean (\pm SD) values (mg/dl) of different chemical constituents of blood in Desi and Naked Neck indigenous hens.

Parameters	Mean values (mg/dl)	
	Desi hen	Naked Neck hen
Glucose	226.74 \pm 15.20	231.82 \pm 31.38
Albumin	1.62 \pm 0.22	1.56 \pm 0.29
Total proteins	5.20 \pm 1.08	4.55 \pm 0.80
Uric acid	4.63 \pm 1.88	4.16 \pm 1.34
Triglycerides	529.80 \pm 554.78	791.20 \pm 320.47

The plasma total proteins and plasma albumins were found to be 5.20 \pm 1.08 and 4.55 \pm 0.80; and 1.62 \pm 0.22 and 1.56 \pm 0.29 in Desi and Naked Neck hens, respectively. Statistically there was no difference in plasma total proteins and plasma albumin values in native birds and are in line with those reported in White Leghorn strains except that there were slightly higher values in commercial leghorn birds which is attributable to different reproductive states. The mean plasma uric acid values were found to be 4.63 \pm 1.88 and 4.16 \pm 1.34 in Desi and Naked Neck hens and there was no difference in both strains. The values as estimated in desi chickens are however, slightly lower than mean values observed in commercial strains (Krasnodebska and Konicki, 1999) which may be due to relatively higher plasma total proteins and albumin concentrations in improved hybrid chickens. The plasma triglycerides values were found to be 529.80 \pm 554.78 and 791.20 \pm 320.47 in Desi and Naked Neck hens, respectively. There was no difference in blood concentration of triglycerides between Desi and Naked Neck hens. The higher plasma triglycerides concentration in improved high laying white leghorn stocks and relatively lower concentrations in Desi chickens is attributable to an increased lipogenic activities of liver stimulated by the endogenous estrogens resulting from selective breeding (North and Bell, 1990). The triglycerides contents in yolk also reflect on lipogenic function of liver (Czekalski *et al.*, 2000) which may be considered in future studies. In the light of present findings, it may be concluded that both Desi and Naked Neck chickens possess identical genetic mechanism for regulation of glucose, total proteins, albumins, uric acid and triglycerides concentrations in blood plasma like identical

mechanism in different commercial broiler strains (Furlan *et al.*, 1999).

ACKNOWLEDGEMENTS

The authors are indebted to Messers Ahmed Nawaz Khan and Malik Khizer Hayat for statistical analysis of experimental data. Mr. Ghulam Abbas for assistance in Laboratory work, and Mr. Tariq Aziz for typing of manuscript.

REFERENCES

- Afifi, O.S. and Y.A. Dowidar, 2000. Age of puberty and sexual maturity in relation to body weight, semen quality and some blood constituents of Daudarawi and Fayoumi chickens under upper Egypt conditions. *Assuit. Vet. Med. J.*, 43: 95-109.
- Czekalski, P., M. Lisowski and M. Bednarczyk, 2000. Influence of the genotype on fatty compound content and table egg quality. *Roczniki Naukowe Zootechniki, Suppl. Z. 5*, 216-220.
- FDA, 1989. Action levels for aflatoxins in animal feed. FDA compliance Policy Guide, Rockville, M.D.
- Furlan, R.L., M. Macari, R.D. Malheiros, V.M.B. Moraes and E.B. Malheiros, 1999. Effect of age and strain on haematology and blood biochemical parameters in broiler chickens. *Revista Brasileira de Ciencia Avicola*, 1(2): 117-122.
- Jordan, F.T.W. and B.M. Pattison, 1998. Nutritional Disorders. In: *Poultry Diseases*, 4th Edition, W.B. Saunders, Company, Ltd. U.K.
- Krasnodebska, D.A. and A. Konicki, 1999. Physiological values of selected serum biochemical indices in chickens. *Polich. J. Vet. Sci.*, 2(2): 49-57.
- Livestock Census, 1996. Agricultural Census Organization, Statistics Division, Government of Pakistan, Islamabad.
- North, M.O., and D.D. Bell, 1990. Commercial Chicken Production Manual, 4th Ed. Avi Publishing Company, Inc., Westport, Connecticut.
- Paul, F. and R. Sangeetha, 2000. Influence of growth stages and gender on serum glucose, albumins, globulin and total proteins in RIR chickens. *Indian J. Poult. Sci.*, 35(1): 45-46.
- Steel, R.G.D. and J.H. Torrie, 1980. Principles and Procedures of Statistics. McGraw Hill Book Co., New York.