



Research Article

ELECTROLYTE AND MAJOR DIAGNOSTIC ENZYME PROFILE OF ADULT MALE TURKEY DOMESTICATED IN MIZORAM, INDIA

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Abstract: Turkey (*Meleagris gallopavo*) contributes significantly to the economy of the nation. Turkey husbandry is gaining momentum as a new agricultural activity for the commercial production of meat in India. Blood biochemical profile such as glucose, calcium, total protein, AST, ALT, urea, chloride levels are of diagnostic value for various disease conditions and having particular reference to liver disorders, kidney diseases, diarrhea, dehydration etc. The observed plasma electrolyte and diagnostic enzyme profile were calcium-12.38±0.99 mg/dl, inorganic phosphorus-8.05±1.39 mg/dl, magnesium-3.28±0.17 mg/dl, sodium-136.50±35.98 mEq/l, potassium-3.10±0.64 mEq/l, chloride-100.50±30.64 mEq/l, ALT-1.00±0.00 U/l, AST-351.50±118.14 U/l, alkaline phosphatase-125.25±38.39 U/l.

Keywords: Turkey, Electrolyte, Diagnostic enzyme profile, Mizoram

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Introduction

Haemato-biochemical profile is of paramount importance for diagnostic and managerial purposes [1]. Biochemical analytes such as glucose, calcium, total protein, aspartate aminotransferase (AST), alanine aminotransferase (ALT), urea, chloride levels are of diagnostic value for various disease conditions and having particular reference to liver disorders, kidney diseases, diarrhea, dehydration etc. [2]. Enzyme activity can be useful in selecting males to improve fertility and hatchability of females in chicken [1]. Knowledge of mineral concentration in the body fluid or blood plasma is usually used as a diagnostic tool for assessing variety of disorders. Potassium and glutathione are important component in metabolic activities in mammalian species since the potassium ion is essential in regulating osmotic balance between cells and the extracellular fluid. The deficiency of these parameters could affect negatively health and efficiency of the animals. Sodium and chloride are critical in the electrolyte balance [3-5]. Turkey is one of the neglected avian species from research point of view although they form almost 2% of the total poultry population [6]. It is a prized avian species reared all over the world for their tasty and high quality meat besides its link with celebrations of "Christmas" and "Thanksgiving celebrations" in the western world [7]. The turkey meat in India is a rich source of animal protein with low fat percentage [8,9,10]. However, the health of the bird should be properly checked before it is slaughtered for meat production. Serum enzymes and electrolyte profile play role as diagnostic aids. The diagnostic enzyme and electrolyte profile of turkey reared under agro-climatic conditions of hilly region is not available. Hence, there is a need to establish an appropriate baseline data of this breed for realistic evaluation of health and managerial aspects. Accordingly, present study was planned to the normal level of diagnostic enzyme and electrolyte of the turkey under Agro-climatic conditions of Mizoram.

Materials and Methods

The research was carried out in Department of Veterinary Physiology & Biochemistry, College of Veterinary Sciences & A.H., Central Agricultural University, Selesih, Aizawl, Mizoram. The blood samples were collected from adult female turkeys (*Meleagris gallopavo*) reared at Poultry Farm, A. H. & Veterinary Department, Government of Mizoram, Selesih, Aizawl. The blood samples (approximately 3 ml) were collected aseptically from wing vein using pre-sterilized polypropylene disposable syringe and transferred to heparinized non-vacuum tubes. The plasma from the blood sample was separated by centrifugation at 2500 rpm for 5 min in a refrigerated centrifuge machine (Hermle-Z326K). The electrolyte and diagnostic enzyme profile was determined in the separated plasma samples in fully automated Dry clinical analyzer (FujiFilm 4000i). The results were then analyzed statistically using suitable statistical method as per Snedecor and Cochran [11].

Results and Discussion

The electrolytes are very important in homeostasis, nerve impulse transmission, muscle contraction, ovarian steroidogenesis and the process of ovulation [4,5]. The observed plasma electrolyte and diagnostic enzyme profile of the adult male turkey reared under agro-climatic conditions of Mizoram is given in table-1. The plasma calcium level observed was 12.38±0.99 mg/dl and the level ranges between 11.50 and 13.80 mg/dl. This observed value is comparatively higher than the values reported in literature. Gattani, et al. [1] reported serum calcium level of 7.82±0.28 mg/dl during winter and 8.04±0.20 mg/dl for the adult male turkeys reared under arid tropical environment while Isidahomen, et al.[12] reported a value of 8.44±0.07 mg/dl for the adult female turkeys reared in Southern Nigeria.

Table-1 Plasma Electrolyte and diagnostic enzyme Profile of Adult Male Turkey

SN	Parameters	Average	Range
1	Calcium (mg/dl)	12.38±0.99	11.5-13.80
2	Inorganic Phosphate (mg/dl)	8.05±1.39	6.4-9.8
3	Magnesium (mg/dl)	3.28±0.17	3.1-3.5
4	Sodium (mEq/l)	136.50±35.98	101-168
5	Potassium (mEq/l)	3.10±0.64	2.2-3.7
6	Chloride (mEq/l)	100.50±30.64	72-127
7	GPT (U/l)	1.00±0.00	1.0
8	GOT (U/l)	351.50±118.14	216-452
9	ALP (U/l)	125.25±38.39	94-175

The inorganic phosphorus observed in the present investigation was 8.05±1.39 mg/dl and the value ranges from 6.40 – 9.80 mg/dl. Similar to calcium level observed, the observed inorganic phosphorus is also higher than the values reported in literature [1,12]. The value observed for the adult male turkeys reared under arid tropical environment was 5.31±0.33 mg/dl during winter and 4.82±0.28 mg/dl during summer [1] while the value observed for the adult female turkeys reared in Southern Nigeria was 4.27±0.22 mg/dl [12]. The magnesium level estimated was 3.28±0.17 mg/dl and the level ranges between 3.10 - 3.50 mg/dl. The sodium, potassium and chloride level observed were 136.50±35.98 mEq/l, 3.10±0.64 mEq/l and 100.50±30.64 mEq/l respectively and the level ranges between 101.00 and 168.00 mEq/l for sodium, 2.20 and 3.70 mEq/l for potassium and 72.00 and 127.00 mEq/l for chloride. The observed sodium and potassium level in the present investigation is almost comparable with the values reported for the adult female turkeys reared at Southern Nigeria [12]. Similarly, enzymes are also an important component of laboratory diagnostic process. The Serum Glutamate Pyruvate Transaminase (ALT) level observed was 1.00±0.00 (U/l). The low value estimated ALT is also reported by other workers (is negligible, this may be correct as other investigators also reported a very low level of ALT in serum. Gattani, *et al.*[1] reported a level of 14.45±1.86 IU/L during winter and 32.07±1.86 IU/L during summer for the adult female turkeys reared at Southern Nigeria while Agina, *et al.*[13] reported a level of 11.00±2.12 IU/l for the domestic turkeys in Nsukka, Enugu state, Nigeria. The Serum Glutamate Oxaloacetate Transaminase (AST) observed was 351.50±118.14 (U/l) and the level ranges between 216.00 and 452.00. This observed level is almost comparable with the level reported for the adult male turkeys reared under arid tropical environment. Gattani, *et al.* [1] reported a value of 309.22±7.95 IU/L during winter and 348.35 IU/L during summer. However, Agina, *et al.* [13] reported a value of 73.99±5.40 IU/L for domestic turkeys in Nsukka, Enugu state, Nigeria. The Alkaline Phosphatase level was 125.25±38.39 (U/l) and ranges from 94.00 to 175.00 U/l. This observed value is more or less comparable with the reported value. Agina, *et al.*[13] reported a value of 165.19±15.77 IU/L for the domestic turkeys in Nsukka, Enugu state, Nigeria.

Conclusion: The study thus reports the physiological values of electrolytes and some clinically important enzymes, which may be used as reference values for future investigations.

Application of Research: Data generated will be of use to monitor the health as well as disease diagnosis of the turkeys.

Abbreviations:

mEq/l :	milliequivalen per litre
u/l :	unit per litre
IU/L :	international unit per litre
GPT :	Glutamate Pyruvate Transaminase
GOT :	Glutamate Oxaloacetate Transaminase
ALP :	Alkaline Phosphatase
rpm :	Revolutions per minute
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References

- [1] Gattani A., Pathak A., Kumar A., Mishra V. and Bhatia J.S.(2016) *Veterinary World*, 9(5), 530-534.
- [2] Akporhualho P.O. (2011) *International journal of Poultry Science*, 10(4),287-289.
- [3] Elgart H. (2004) *American Association of Critical-Care Nurses*, 15(4), 607-621.
- [4] Peracchia C. (1978) *Nature*, 271, 669–671.
- [5] Carnegie J.A., Tsang B.K. (1984) *Biology of reproduction*, 30, 515-522.
- [6] Sonawane, N.D., Patodkar, V.R., Sardar V.M., Kadam, A.S., Jadhav S.N. and Lonkar, V.D. (2017) *Indian Research Journal Extension Education*, 62-66.
- [7] Anna Anandh M., Richard Jagatheesan P.N., Senthil Kumar P., Paramasivam A. and Rajaranjan G. (2012) *Veterinary World*, 5(4),226-229.
- [8] Thronton E.K., Emery K.F., Steadman D.W., Speller C., Matheny R. and Yang D. (2012) *PLoS ONE*, 7(8), c42630.
- [9] Hamza H.M., Al-Mayali Hind A. and Kadhim A. (2015) *International Journal of Current Microbiology and Applied Sciences*, 4(10), 669-677.
- [10] Marchewka J., Watanabe T.T.N., Ferrante V. and Estevez I. (2013) *Poultry Science*, 92(6),1467-1473.
- [11] Snedecor G.O. and Cochran W.G. (1994) *Statistical methods*. Oxford and IBH Publ. Co., Janpath, New Delhi.
- [12] Isidahomen C.E., Njidda A.A. and Amaza I.B. (2013) *International Journal of Agriculture and Biosciences*, 2(5), 297-301.
- [13] Agina O.A., Ezema W.S. and Nwishiye C. N. (2015) *Animal Research International*, 12(1), 2120-2129.