

Some Biochemical Values in the Young and Adult Sudanese Geese *Anser anser*

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Abstract: Plasma biochemical values were determined in 14 healthy adult (52-75 week old) and 14 healthy young (8-10 weeks old) local Sudanese geese. The young birds had significantly greater aspartate amino transferase (AST) and Alanine Lmino Transferase (ALT) values than the adult birds. The alkaline phosphatase (ALP), inorganic phosphate, bicarbonate (HCO_3^-), sodium (Na), potassium (K) and chloride (Cl) levels in the young bird were not significantly different from those of the adult duck. The total protein, albumin, globulin, uric acid and creatinine values were also similar in the young and adult birds.

Key words: Geese, biochemical values, electrolytes

INTRODUCTION

True Geese belong to the sub family Anserinae. They are coloured in blacks, whites, grey, and brown. The sexes are very similar in appearance. Two species of geese have been domesticated. The Grey lag and the Swan goose. The Grey lag was probably the first; it appears in 4.000 year old Egyptian Frescoes. By now a larger number of strains have been bred for meat, eggs and ornamental purpose.

Geese are introduced to Sudan from Egypt. They are bred for ornamental purposes. They are reared in livestock farms using the extensive management system. Plasma biochemical data of birds in our hot climate are limited to fowl. There is no available report on the blood chemistry values for the local Sudanese geese. In this study we aimed to investigate some plasma biochemical values of geese in Sudan to establish data on them presenting the effect of age on plasma biochemical values.

MATERIALS AND METHODS

The birds were purchased from a local market in Kuku, Khartoum North, Sudan. They were kept as parents stock and housed in deep litter pens at the College of Veterinary Medicine and Animal Production Teaching and Research Farm. During this period, water and grower's mash were provided *ad libitum*.

Twenty-eight healthy local Sudanese geese were hatched in the hatcheries of the College of Veterinary Medicine and Animal Production, Sudan University of Science and

Technology and had been used for this study. Of these, 14 were 8-10 week old unsexed young geese (Fig. 1) and 14 were 52-75 week old adults of both sexes (Fig. 2).

The geese were kept in deep litter pens with concrete floor, connected with iron sheet roof. The pens extended East- West and constructed from iron pasts with wire netting. The pen was divided in to equal 2 pens (the length of house 6 m, height 2.7 m and the width 3 m). Food and water were provided *ad libitum*. Geese were divided into two groups for the study, based on age

Blood samples were collected from the jugular vein of individual birds into bottles containing disodium salts of ethylene diamine teraacetic acid (EDTA, 2 mg mL⁻¹ of blood) (BDH Chemicals Limited, Poole, England) and centrifuged at 3,000 for 10 minutes to obtain plasma. Sodium (Na) and potassium (K) concentrations of the plasma were determined by standard flame photometry, inorganic phosphate by the method of Gomori^[1], chloride by the method of Schales and Schales^[2] and bicarbonate and calcium according to Toro and Ackermann^[3].

Biochemical methods: Plasma samples were analyzed for aspartate transaminase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), creatinine level and uric acid concentration by using commercial kits (Linear Chemicals, Barcelona, Spain). Total protein and albumin were determined by using commercial kits (Linear Chemicals, Barcelona, Spain). Globulin was obtained by subtracting the albumin from the total protein.



Fig. 1: Young Sudanese Geese (8-10 week)



Fig. 2: Adult Sudanese Geese (52-75 week)

Statistical analysis: Statistical significance was assessed by Student's t-test.

RESULTS

Table 1 compares the plasma enzyme and electrolyte levels in young and adult Sudanese geese. The young birds had significantly higher AST ($p < 0.01$) and ALT ($p < 0.001$) than the adult Sudanese geese. Plasma Na, K, Cl, HCO₃, Ca, inorganic phosphate and ALP were similar in the young and adult Sudanese geese.

Table 2 shows the effect of age on the plasma protein and metabolite levels in the Sudanese geese. There were no significant differences between the young and adults in the total protein, albumin, globulin, uric acid and creatinine values.

DISCUSSION

The present study showed that there were no significant differences in the plasma electrolytes; Na, K,

Table 1: Plasma enzyme and electrolyte levels (mean \pm SD) in young and adult Sudanese local geese

Parameters	Young geese	Adult geese
ALP (i.u L ⁻¹)	74.40 \pm 11.68	81.00 \pm 12.48
AST (i.u L ⁻¹)	33.20 \pm 3.29	27.13 \pm 4.66*
ALT (i.u L ⁻¹)	28.10 \pm 3.25	18.71 \pm 4.21**
Na (mmol L ⁻¹)	135.70 \pm 7.41	139.20 \pm 5.46
K (mmol L ⁻¹)	5.93 \pm 2.00	5.82 \pm 1.25
Cl (mmol L ⁻¹)	103.70 \pm 3.00	106.53 \pm 1.56
HCO ₃ (mmol L ⁻¹)	22.40 \pm 2.12	23.05 \pm 1.33
Ca (mg dL ⁻¹)	7.73 \pm 0.11	8.16 \pm 0.12
Inorganic Phosphate (mg dL ⁻¹)	3.31 \pm 0.62	2.12 \pm 0.29

Value significantly different from young duck at * $p < 0.01$ ** $p < 0.001$

Table 2: Plasma protein and metabolite levels (Mean \pm SD) in young and adult Sudanese geese

Parameters	Young geese	Adult geese
Total protein (g dL ⁻¹)	4.95 \pm 0.36	4.91 \pm 0.29
Albumin (g dL ⁻¹)	2.85 \pm 0.17	2.81 \pm 0.21
Globulin (g dL ⁻¹)	2.10 \pm 0.22	2.09 \pm 0.11
Uric acid (g dL ⁻¹)	4.04 \pm 0.19	4.12 \pm 0.12
Creatinine (mg dL ⁻¹)	1.10 \pm 0.46	1.14 \pm 0.44

Cl, HCO₃, Ca and inorganic phosphate levels. The same result reported by Olayemi, *et al.*^[4] in young and adult Nigerian duck (*Anas platyrhynchos*). However, in geese it was reported that the plasma Ca value remained unchanged and Cl value increased while inorganic phosphate levels decreased with age Hunt *et al.*^[5]. Work^[6] reported that adult Hawaiian dark-rumped petrels (*Pterodroma phaeopygia*) and wedge-tailed shearwaters (*Puffinus pacificus*) had lower Ca and inorganic phosphate values than the young. He also observed that adult frigate birds (*Fregata minor*) had greater Ca and inorganic phosphate values than the young birds.

Young Sudanese geese had significantly higher plasma AST and ALT levels than adult birds. The AST in the adult Sudanese geese was lower, while the ALT was higher than in adult guinea fowls as reported by Ayeni^[7]. There were no significant differences between the young and adult Sudanese geese in total protein, albumin, globulin, uric acid and creatinine values. Olayemi, *et al.*^[4] reported the same results in young and adult Nigerian duck (*Anas platyrhynchos*). Brandt^[8] recorded that the total protein value decreased with age in the domestic fowls and in Japanese quail^[9].

Work^[6] reported increases in total protein, albumin and globulin values with age in peleciform birds. Wolf *et al.*^[10] found that in brown pelicans (*Pelecanus occidentalis*) globulins and total protein values increased with age but albumin decreased

The mean Ca, inorganic phosphate and Cl values in adult Sudanese geese are the same as values reported in Nigerian ducks Olayemi, *et al.*^[4]. The values of Ca, inorganic phosphate and Cl values in adult Sudanese geese are lower than the values reported by Soliman *et al.*^[11] in adult Egyptian ducks. Also, the Na

and Cl values in Sudanese geese are lower, but the K value is higher than those found by Balasch *et al*^[12] in Galliformes.

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