Determination Of Some Serum Elements With Some Comparative Hemato-Biochemical In Male Fattening Buffalo Calves In Different Centers In Menufia Governorate

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ABSTRACT

The current study was carried out to evaluate the levels of some elements and their effects on buffalo calves. Sixty fattening male buffalo calves from six localities of Menufia Governorate (Quesna, Shibin Elkoum, El-Sadat, El-Shohadaa, Talla and Berket El Sabh) were obtained for determination of some micro and macro elements associated with hemato-biochemical studies.

Based on the present results, it could be concluded that serum lead was increased in Quesna center (0.260 ppm) that considered being above the permissible value (0.250ppm) also associated with hepatic dysfunction, so it recommended administrating calcium gluconate and alkaline diet for demobilizing plasma lead to bone. The serum Iron was increased in El-Sadat, Quesna, Berket El-Sabh and Shibin El-Koum centers which ranged between 2.42 ppm to 3.100 ppm which is above the accepted Iron level of the Egyptian buffaloes (1.821 to 2.166 ppm), so that the drinking water should be evaluated for Iron –pollution to avoid Iron –toxicity. The serum manganese in all centers ranged between 0.030 ppm to 0.320 ppm which is the normal of level Egyptian buffaloes (0.488ppm), so manganese salts administeration should be recommended for all localities to avoid Mn- deficiency. The serum Nickel value levels of studied animals ranged between 1.69 to 4.18 ppm which is under the toxic limit (10 ppm), copper, calcium, phosphorus, sodium and potassium) were within the normal serum values for buffaloes.

INTRODUCTION

The heavy metals are the Iron (Fe) and other metals denser than it as Manganese (Mn), Copper (Cu) , Cobalt (Co) and Zinc(Zn), which are essential, harmful or toxic, the toxic metals depend their action mainly on the species of animal and the concentration of metal, such as Lead (Pb), mercury (Hg) and Cadminm (Cd) *(1)*, the difference between the micro(trace)or macro-elements is depending on the relative amounts needed in feed for performing normal body metabolism *(2)*.

The lead containing paints used for painting the buildings or fences, lead storage batteries, insecticide and forage contaminated with exhaust from automobiles along heavily, traveled high routes , one or more are possible cause for lead poisoning *(3,4)*. Other sources of lead poising for farm animals may be due to lead solder in plumbing pipers, lead dust, lead chromate and lead glazed ceramic *(5)*.

Problems of deficiencies or toxicities of trace elements were currently well known, due to that trace minerals deficiencies may cause serious economic losses and mortalities to livestock and pet animals as selenium toxicity and Zn and Cu –deficiencies in sheep and dog respectability *(6)*. There were direct relationships between the accumulated heavy metals in the tissues and their concentrations in polluted drinking water in the area *(7)*. The dietary sodium (Na) deficiency is an important factor for the pathogenesis of hypomagnesaemic tetany in sheep *(8)*. Zn is a constituent of numerous metalo-enzymes and insulin hormone it is required for normal protein, carbohydrate and nucleic acid metabolisms. The, required elements animals are I, Fe, Cu, Zn, Mn, Se, Fr, Mo and Si *(2)*.

The current study was conducted for recognizing the sites of mineral excess and deficiency in serum of the fattening buffaloe calves in different centers of Menufia Governorate and the associated haemato-biochemical changes and treatment for preventing mineral excess or deficiency in affected animals of the area.

MATERIAL AND METHODS

Animals

Sixty of apparently healthy (free from external and internal parasites) fattening male buffaloes (18-24 month age) were obtained from six localities (centers) of Menufia Governorate (10- animals / center).

Sampling

Two blood samples were taken from each animal, 1st sample for hematological study according to Schalm *(9)* and 2nd to obtain clear serum for estimation of serum protein electrophoresis *(10),* determination of some serum trace elements (lead, zinc, cupper,nickel and manganese)using atomic absortion spectrophotome-try *(11),* sodium, *(12)* potassium *(13)* calcium *(14)* and phosphorus *(15).* Total protein *(16),* total bilirubin *(17),* total cholesterol *(18),* triglyceride *(19),* urea *(20),* uric acid *(21)* and creatinine *(22)* the activities of ALT and AST enzymes *(23)* were also measured.

Statistical Analysis Obtained data were analyzed using (ANOVA) F-test *(24).*

RESULTS

The results of different serum elements are showen in tables (1 - 4)

Lead (Pb)

The highest serum lead concentrations in fattening male buffaloes was detected in Quesna fallowed by Shibin Elkoum then El-Sadat with no significant variation between them, the lower Pb- level was detected in animals of Tala, Berket El-Sabh and El-Sadat (0.06 ppm) with no significant variation between these centers (Table,1).

Iron (Fe)

Higher serum Iron level in fattening male buffaloes were detected in El-Sadat (3.10 ppm) then Berket El-Sabh (3.05 ppm), the lower Fe-level were detected in animals of El-Shohadaa center (1.55 ppm) and Tala center (1.58 ppm).

Zinc (Zn)

The higher serum Zinc concentrations in fattening male buffaloes are detected in El-Shohadaa center (2.40 ppm), then Berket El-Sabh center (1.29 ppm) with significant variations but the lower Zn-concentrations are showed by Tala center (0.83 ppm), and El-Sadat center (1.05ppm) without significant variations.

Copper (Cu)

The higher serum Cupper level in fattening male buffaloes are detected in El-Shohadaa (0.56 ppm), then Shibin Elkoum and Quesna (0.48 ppm) without significant variations between means, but the lower Cu- level could be detected in Tala (0.38ppm), and Berket El-Sabh (0.39 ppm).

Nickel (Ni)

The higher serum Nickel concentrations were detected in Shibin Elkoum center, then Berket El-Sabh center (3.55 ppm) without significant variations, but the lower Ni-concentrations could be detected in El-Shohadaa center (1.69 ppm).

Manganese (Mn): The higher serum Manganese concentrations in Shibin Elkoum center (0.32 ppm), then Quesna center (0.29 ppm) then El-Sadat center (0.82 ppm), the lower Mn-concentrations could be detected in Tala center (0.03 ppm).

Potassium (K)

The higher serum K- level were detected in Quesna (7.30 mmol/l), but the lower K-concentrations could be detected in El-Sadat (5.60 mmol/l), the K- level in other centers ranged between 6.10 to 6.40 mmol/l in other centers which were non- significant varied.

Sodium (Na)

Serum Na- level ranged between 132 MEq/l (El-Shohadaa) to 145 ppm (El-Sadat), all Na-concentrations in the different Menofia centers were non- significantly varied.

Phosphorus (P)

The higher P- levels were detected in Quesna (5.92 mg/dl) and Berket El-Sabh (6.40 mg/dl), but the lower P- level could be detected in El-Sadat (5.70 mg/dl) then Tala (5.80 mg/dl).

Calcium (Ca)

Higher serum ca-level was recorded in Tala (10.90 mg/dl), but lower Ca- level could be detected in Berket El-Sabh (10.10 mg/dl) (Table1).

Table 1. The concentrations of macro- and micro –elements in the serum of the male fattening buffaloes in different localities in Menufia Governorate

Element: / Centers	(pb) (ppm)	(Ni) (ppm)	(Fe) (ppm)	(Zn) (ppm)	(Cu) (ppm)	(Mg) (ppm)	(K) (mmol/l)	(Na) (MEq/l)	(P) (mg/dl)	(Ca) (mg/dl)
Shibin Elkoum	0.14 ab ± 0.00	4.18 a ± 0.59	2.42b ± 0.13	1.18 b ± 0.01	0.48ab ± 0.01	0.32a ± 0.02	6.20 b ± 0.14	136.00a ± 5.44	5.00 c ± 0.28	10.30 c ± 0.14
Quesna	0.26 a ± 0.17	2.71 c ± 0.01	0.70ab ± 0.01	1.25 b ± 0.02	0.48 ab ± 0.06	0.29ab ± 0.02	7.30 a ± 0.11	144.0 a ± 6.60	5.92 a ± 0.21	10.21 b ± 0.18
El-Shahadaa	0.11ab ± 0.00	1.69d ± 0.01	1.55 c ± 0.02	2.40 a ± 0.21	0.56 a ± 0.01	0.19 ab ± 0.01	6.40 b ± 0.20	132.0 a ± 4.05	6.20 c ± 0.23	12.10 d ± 0.14
El-Sadat	0.06 ab ± 0.00	2.77 bc ± 0.02	3.10 a ± 0.01	1.05bc ± 0.15	0.46 bc ± 0.01	0.82 ab ± 0.19	5.60 c ± 0.21	145.0 a ± 5.00	5.70 c ± 0.17	10.60 c ± 0.10
Tala	0.04 b ± 0.00	2.80 bc ± 0.20	1.58 c ± 0.01	0.83 c ± 0.02	0.38 c ± 0.01	0.03 b ± 0.00	6.10 bc ± 0.25	135 a ± 5.6	5.80 c ± 0.14	10.90 d ± 0.23
Berket El-Sabh	05 ab ± 0.00	3.55ab ± 0.01	3.05 a ± 0.43	1.29 b ± 0.15	0.39 c ± 0.01	0.20ab ± 0.01	6.30 b ± 0.21	138 a ± 5.14	6.46 b ± 0.20	10.10 f ± 0.14

N.B. the different litters columns denote significant variations between means (at P≤ 0.05)

Serum protein Electrophoresis

Table, 2 higher serum albumin levels in Shibin Elkoum, Quesna then El-Shohadaa, the lower serum albumin could be detected in the other 3 centers which ranged between 4.19 mg/dl (Berket El-Sabh) to 4.06 mg/dl (El-Sadat).

Alpha (α) Globulins

Higher serum α-globulins in 3- Monefia centers which ranged between 1.61 mg/dl (El-El-Shohadaa) to 1.60 mg/dl (Shibin Elkoum), but the lower α- fractions detected in other 3 centers which ranged between 1.58 mg/dl (Berket El-Sabh) to 1.39 mg/dl (El-Sadat).

Beta (β) Globulins

The higher serum β-globulins could be recorded in El-Sadat center (1.87 mg/dl), but the lower β- fractions could be detected in Quensa center (1.41mg/dl).

Gamma (γ) Globulins

The higher serum γ-fractions in Monefia centers which could be detected in 3-centers that ranged between 1.86 mg/dl (El-Sadat) to 1.89 mg/dl (Shibin Elkoum), but the lower γ-fractions could detected in the other centers 1.80 mg/dl (Quensa). (Table 2).

Table 2. Serum protein fractions of the male fattening buffaloes (as determined by serum protein electrophoresis)in different localities in Monufia Governorate

Parameter: / Centers	T.Bilirubin (mg/dl)	Cholesterol (mg/dl)	Triglyceride (mg/dl)	Urea (mg/dl)	Uric acid (mg/dl)	Creatinin (mg/dl)	ALT (U/L)	AST (U/L)
Shibin Elkoum	0.400 b ± 0.010	64.20 cd ± 3.41	126.20 a± 3.16	33.60 a ± 1.58	2.20 a ± 0.10	1.55 a± 0.11	10 a ± 0.7	30 cd± 1.7
Quesna	0.290 c ± 0.020	64.30 cd± 1.70	101.50bc± 3.40	36.40 a ± 1.58	2.30 a ± 0.11	1.70 a ± 0.07	8.00 b ± 0.57	27 c ± 1.00
El-Shahadaa	0.430 b± 0.010	74. 00 c ± 2.28	122.00 a ± 2.82	34.70 a± 2.55	2.50 a ± 0.14	1.17 b± 0.07	8.00 b± 0.65	28 c ± 2.3
El-Sadat	0.540 a ± 0.020	160.00 a ± 5.00	104.00bc± 3.53	37.20 a ± 1.84	2.40 a ± 0.20	1.55 a ± 0.10	7.00 b ± 0.35	40 ab± 1.84
Tala	0.330 a ± 0.020	58.30 d ± 3.41	96.30 c ± 3.40	36.30 a± 2.47	2.30 a± 0.18	1.68 a± 0.07	11.00a± 0.65	35 bc± 1.84
Berket El-Sabh	0.310 c ± 0.020	103.00 b± 3.86	109.80 b± 3.83	36.10 a ± 2.61	2.50 a± 0.10	1.80 a± 0.07	7.00 b± 0.5	41 a± 1.41

N.B. the different litters columns denote significant variations between means (at P≤ 0.05)

Serum Biochemical constituents

1. Total protein

Animals in Sadat center showed the higher significant total serum protein than that of the other centers showed non- significant variation in serum total protein.

2. Total Bilirubin

The higher serum total bilirubin could be detected in El-Sadat, El-Shohadaa and Shibin Elkoum centers, but the lower bilirubin in Quensa and Berket El-Sabh centers.

3. Serum cholesterol

The higher serum cholesterol could be detected in El-Sadat, and Berket El-Sabh centers, but the lower values could be detected in Tala, Shibin Elkoum and Quensa centers.

4.Triglycerides

The higher values of triglycerides in Shibin Elkoum and El-Shohadaa centers, but the lower triglycerides could be detected in Tala and El-Sadat centers.

5.Serum urea and uric acid

There were insignificant change of serum urea and uric acid between the centers of Menufia Governorate

6.Serum creatinine

The serum creatinine values in all centers which ranged between 1.55 mg/dl to 1.80 mg/dl except in El-Shohadaa centers which showed the lower value (1.17 mg/dl).

7. Serum Alanine amino transferase (ALT) enzyme activity

Tala and Shibin El-Koum centers showed higher ALT, but the lower enzyme activities showed by El-Sadat and Berket El-Sabh centers.

8. Aspartic amino transferase (AST) enzyme activity:

Higher AST showed in El-Sadat and Berket El-Sabh centers, and the lower values could be showed by Quesna, El-Shohadaa and Shibin El-Koum centers.

Hematological study

1.Haemoglobin (Hb)

Concentration: The higher Hb-concentrations was detected in Shibin El-Koum, Berket El-Sabh and Tala centers where Hb mean values ranged between 12.9 to 12.5 mg /dl, the lower Hb- concentrations could be deteced in El-Sadat center (10 mg/ dl).

2.Red Blood counts (RBCs)

The mean RBCs counts ranged between 5.3 $x10^6$ (El-Shohadaa center) to 6.42 $x10^6$ millions/cumm (Tala center).

3.White Blood counts (WBCs)

WBCs mean counts in Monufia province centers which ranged between 7x103 (El-Sadat) to $11.6x10^3$ thousands/cumm (El-Shohadaa).

3.Platelets counts

Blood platelets counts were $284x10^3$(Quesna center) to $400x10^3$ thousands/cumm (Shibin El-Koum center).

Table 3. Serum protein fractions of the male fattening buffaloes (as determined by serum protein Immuno-electrophoresis)in different localities in Monufia

Parameters / Centers	T.protein (mg/dl)	Albumin (mg/dl)	Globulin fractions(mg/dl)			T.globulin (mg/dl)
			α	β	γ	
Shibin Elkoum	9.48 b± 0.14	4.55 b± 0.14	1.60 ab ± 0.06	1.50 c ± 0.14	1.89 bc ± 0.05	5.01 b± 0.17
Quesna	9.16 b ± 0.0.14	4.35 b± 0.21	1.60 a± 0.06	1.41 d± 0.02	1.80 d± 0.03	4.81 b± 0.19
El-Shahadaa	9.45 b± 0.10	4.60 b± 0.20	1.61 a± 0.03	1.68c± 0.08	1.86 cd± 0.06	4.85 b± 0.23
El-Sadat	9.18 a± 0.10	5.06 a± 0.17	1.39 ab ± 0.04	1.87 a± 0.03	1.86 a± 0.03	5.12 a± 0.27
Tala	10.40 b± 0.20	5.33 b± 0.23	1.59 bc ± 0.07	1.60 b± 0.06	1.88 cd± 0.02	5.07 b± 0.20
Berket ElSabh	9.36 b ± 0.27	4.19 b ± 0.22	0.58 c± 0.04	1.71 b± 0.03	1.88 b± 0.04	5.17 b ± 0.19

Table 4. Some Haematalogical parameters of the male fattening buffaloes in different localities in Monufia Governorate

Parameters / Centers	Platelets (x106)	WBCs (x103)	RBCs (m /cumm) (x106)	Hb content (mg/dl)
Shibin Elkoum	12.90 a ± 0.20	4.30 a ± 0.10	10.40 b ± 0.71	400.00 a ± 18.44
Quesna	11.20 b± 0. 21	3.7c b ± 0.07	7.20 d ± 0.14	284.00 b ± 12.51
El-Shahadaa	11.40 b ± 0.16	3.80 b ± 0.13	11.60 a ± 0.25	381.00 a ± 14.14
El-Sadat	10.00 c ± 0.25	3.30 c ± 0.10	7.00 d ± 0.30	290.00 b ± 14.92
Tala	12.50 a ± 0.16	4.42 a ± 0.17	9.60 bc ± 0.30	288.00 b ± 11.40
Berket ElSabh	12.84 a ± 0.16	4.30 a ± 0.21	9.20± 0.27 c	305.00 b ± 9.22

DISCUSSION

The current study was concerned with the evaluation of the elevated or reduced levels of the different micro and macro-elements in the male fattening buffaloes from the different localities (centers of Monufia- Governorate and the subsequent effects of the possible chronic deficiencies or excess of such elements, such effects may reflected on changes on clinical, hemato-biochemical parameters in animals, then a comparative study of such effects on animals in different 6- centers of the governorate in order to recognizing the sites of excess or deficiency for future dealing with such problems.

Concerning serum lead level in the studied animals. Its level significantly increased in Quesna center (0.260ppm), Shibin El-koum (0.14ppm) and El-Shohadaa center (0.110ppm) compared to the other centers where Pb-levels ranged between 0.00ppm to 0.050ppm. The Pb-toxicity induced CNS-abnormal-ities, increased reticulocytes with basophilic stippling with substantial and functional renal damage that associated with presence of renal tubular inclusion bodies *(25)*.

There were no apparent clinical signs of chronic lead toxicity in the animals of different centers under study, that leading us to suspecting that the Pb-levels in animals in most centers were under the toxic levels (0.250ppm) *(26)*, but Pb-level in Quesna center (0.260 ppm) showed marginal or higher than acceptable Pb-level (0.250ppm), so that in Quesna serum level should be considered as toxic level. In most cases the centers which showed in their animals a higher serum Pb-level than the other centers, animals showed lowered RBCs count and Hb content as detected in animals of Quesna and El-Shohadaa centers, but El-Sadat center (which showed the lowest RBCs count and Hb concentration) may be attributed such decrease to other factors than due to the elevated serum-Pb. The slight anemia induced by Pb-toxicity may be due to the fact that 90% of the Pb in the blood is found in Hb and cell membrane of RBCs *(27)*. As the lead toxicity induce substantial and functional renal damage *(25)* and also, there was no significant change in the serum urea and creatinine levels in animals of all centers, this indicated that such lead levels could not affecting the kidney, but the higher Pb-level in animals of Quesna and Sibin El-Koum centers could affecting the hepatic function through the elevation of ALT-enzyme activity *(28)*, also in most cases, the animals of Sibin El-Koum and El-Shohadaa centers showed higher serum total bilirubin than that of the other centers which showed also higher Pb-levels than other centers, in contrast the AST-enzyme activity not fallowed the increase of Pb-levels in the current study. The ALT-enzyme activity was increased essentially with liver disease, but AST-enzyme activity was increased with myocardial and skeletal muscle necrosis essentially and with hepatic disease secondly *(29)*. The non-significant elevation of serum albumin and

AST-enzyme activity in Pb-elevated serum levels in animals of mentioned centers indicated that the liver is only slightly damaged (due to increased Pb-levels).Hypoalbuminemia may be induced by disturbance in its hepatic biosynthesis and/or due to its renal secretion with urine as a results of substantial renal damage *(30).*

The iron was in the serum of animals of El-Sadat (3.100ppm), Berket El-Sabh (3.05ppm) and Quesna (2.70ppm) compared to the other centers where the serum Fe- levels were ranged between (1.55ppm to 2.42ppm) such level is over the normal values (1.821 to2.166ppm). The Fe-toxicity induces diarrhea, reduced growth and feed conversion. The iron is an essential nutrient that it is associated with haemoglobin, myoglobin, ferritin and Fe- containing enzymes. An interaction may occur between Fe and Zinc (Zn) owing to mutual competition for absorption sites, as the high dietary Zn can cause anaemia due to interference with Fe-turnover *(31, 32)* and this reverse relationships between Fe and Zn could be detected in the present study, as Fe level in El-Sadat center is 3.10ppm, Zn level is 1.05ppm and when Fe-level in animals of El-Shahadaa center was 1.55ppm , the level of Zn is 2.44ppm and so on in most remaining localities.

The Zn is a constituent of numerous metallic enzymes and insulin hormone, it is required for normal protein, carbohydrates and nucleic acids metabolisms, its deficiency induces retardation of bone formation and growth *(10).* The Zn-level in serum of studied animals was increased in El-Shohadaa (2.40ppm) and Berket El-Sabh (1.29ppm) than that of animals of other centers which ranged between 0.83ppm (Tala) to1.25 ppm (Quesna). These Zn- levels seem to be above the normal Zn- level of Egyptian buffaloes calves 7 month age (0.579ppm) *(33),* no clinical signs of Zn-toxicity was detected in studied animals and no Zn-deficiency could be predicted in animals of the studied centers as the normal Zn- levels in steers of New Guinea ranged between 0.91 to 1.70ppm *(34).*

Serum Nickel was increased in animals of Shibin E-Koum (4.18ppm) and Berket El-Sabh (3.55 ppm) compared to the other localities. The Ni may induce toxicity in calves as reduction of food palatability and consequently reduction of feed intake and growth performance *(35)* the obtained Ni- levels in the studies animals of different center seem to be under toxic Ni- level (10 ppm) *(32).*

The serum Manganese element showed to be decreased in serum of studied animals of Tala (0.03ppm) compared to the other centers, where Mn-levels ranged between 0.19 ppm (El-Shohadaa) to 0.32ppm (Shibin E-Koum). The serum Mn- levels detected in the studied buffaloes (0.488 ppm) as recorded *(33).* The excessive dietary calcium or phosphorus reduce Mn-absorption *(10)* and this severe relationship between serum Mn and either serum Ca or P could be detected through the present study (in most cases), that when the Mn decreased in serum of animals of Tala center (0.03 ppm), the calcium and phosphorus increased in the same center (10.90 and 5.80 mg/dl respectively), and when the Mn increases in animals of Shibin El-Koum center (0.32 ppm), the calcium and phosphorus decreased in the same locality (10.90 and 5.80 mg/dl respectively). While Mn decreased than that of the normal value previously reported in buffaloes, the calcium and phosphorus seem to be similar to that reported *(36).*

Serum Copper of male fattening buffaloes of Tala and Berket El-Sabh (0.380 and 0.390 ppm respectively) seem to be decreased than that of the other centers, where their serum Cu-levels ranged between 0.460ppm (El-Sadat) to 0.560ppm (El-Shohadaa), the overall mean of Cu-levels detected in the current study seem to be approximately similar to that previously detected in Egyptian buffaloes *(37)* who recorded serum Cu-level as 0.481ppm. In ruminants the deficiencies of selenium, zinc or iron or toxicities of lead or molybdenum may enhance Cu-deficiency *(38).*

The serum zinc levels of studied male fattening buffaloes were increased in El-Shohadaa, El-Sadat, Shibin El-koum and Berket El-Sabh centers. Also, in most cases the gamma (γ) globulin fractions seem to be increased in the serum of animals of the same centers, such direct relationship could be understood through the fact that Zn induced increasing in gamma (γ) globulins as recorded *(10).*

The Sodium was non-significantly changed in the serum of studied animals of all localities, while potassium (K) increased in animals of Quesna center (7.30 mmol /l) compared to the animals of other localities. The Sodium in the serum of studied buffaloes ranged between 132MEq/l to 144 MEq/l and the K ranged between 5.60 mmol/l to 7.30 mmol/l. Similar results was obtained to the Iranian buffaloes where their serum Na is 134.5 MEq/l and the K is 5.34 mmol/l *(39)*, so that we believe that the changes between K in the serum of the studied buffaloes seem to be around the normal range. A critically osmotically active substance of the blood plasma is sodium and that of the intracellular contents is potassium ions, potassium provides for a stable osmotic pressure of the intracellular fluid, acetylcholine synthesis, generation of rest and action potentials, sodium maintain a stable osmotic pressure of the extracellular fluid, regenerate acid-base balance and generate membrane and action potentials *(40)*.

Based on the current study, it could be concluded that the male fattening buffaloes in Quesna center with higher serum lead (0.260ppm) than the accepted serum lead level (0.250ppm), so it could be recommended the administration of calcium gluconate and alkaline diet for demobilizing plasma lead into bone to be precipitated in according to *(41, 42)*. Also, the serum iron in Berket El-Sabh, El-Sadat, Quesna and Shibin El-Koum centers (2.42ppm to 3.100ppm) were over the previously reported accepted level in serum of Egyptian buffaloes (1.821ppm to 2.166ppm), so that the iron of drinking water should be evaluated to prevent polluted drinking water with iron in these localities. Also, the serum manganese levels in all centers which ranged from 0.03ppm to 0.320 ppm seem to be under the normal previously recorded in Egyptian buffaloes (0.488ppm), so it could be recommended the frequent administration of Mn-salts to avoid chronic Mn-deficiency in fattening male buffaloes. Nickel serum value (1.69 to 4.18 ppm) was showed to be under the permissible toxic level (10ppm). The serum elements (cupper, calcium, phosphorus, sodium and potassium) showed to be within the previously recorded normal serum values in buffaloes.

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الملخص العربى

تقدير بعض العناصر مع بعض الدراسات والهيماتوبيوكيميائية المقارنة في ذكور عجول تسمين الجاموس بالمراكز المختلفة لمحافظة المنوفية

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المعادن الثقيلة وبعض العناصر اللازمة للجسم سواء كانت عناصر صغيرة او كبيره كلها قد توجد في أنسجة الحيوانات وفي مصل الدم، وهذه العناصر إما عناصر سامة أو عناصر ضرورية لأداء وظائف الجسم وبعض العناصر الأخرى ليس لها دور معروف. والدراسة الحالية تم إجراؤها لتقييم تأثير مستوياتها المختلفة على الجسم ، ولهذا الغرض استخدم عدد ستون من عجول الجاموس الذكور السليمة والخالية من الطفيليات الخارجية والداخلية وقد استخدمت من ستة مراكز مختلفة من محافظة المنوفية وذلك لتقدير مستوى العناصر المختلفة وتأثيرات تلك العناصر على بعض المعالم البيوكيميائية والهيماتولوجية والمناعية، وبناء على نتائج هذه الدراسة فقد أمكن استنتاج إن مستوى عنصر الرصاص قد زاد في مركز قويسينا (٠,٢٦٠ جزء بالمليون) والذي اعتبر فوق المستوى المسموح(٠,٢٥٠ جزء بالمليون) ولذلك فأنه يوصى بإعطاء جلوكونات الكالسيوم مع الغذاء القاعدي لسحب الرصاص من الدم لترسيبه في العظام، وقد وجد أيضا إن مستوى عنصر الحديد في المصل يتراوح بين ٢,٤٢جزء بالمليون إلى ٣,١ جزء بالمليون في مراكز السادات وقويسنا وبركة السبع و شبين الكوم وهذا المستوى أعلى من المستوى المقبول للجاموس المصري(١,٨٢١ إلى ٢,١٦٦ جزء بالمليون) ولهذا فانه يجب تقدير عنصر الحديد في مياه الشرب المقدمة للحيوانات في هذه المناطق لتفادي التلوث بالحديد بها بعد معرفة مصدر التلوث، وقد وجد أن مستوى عنصر المنجنيز في مصل عجول الجاموس في المراكز المختلفة للمحافظة تتراوح مابين ٠,٠٣ إلى ٠,٣٢ جزء بالمليون وهذا المستوى يعتبر اقل من المستوى العادي المسجل بمصل الجاموس المصري ٠,٤٥ جزء بالمليون ، ولهذا يوصى بإعطاء أملاح المنجنيز لتعويض النقص المحتمل في حيوانات المناطق المختلفة وكذلك وجد إن مستوى عنصر النيكل في مصل الحيوانات تحت الدراسة قد تراوح مابين ١,٦٩ إلى ١٨, ٠ جزء بالمليون وان هذه المستويات وجد إنها اقل من المستوى السام لعنصر النيكل بالجسم (١٠ جزء بالمليون) ، وكذلك فانه قد وجد إن عناصر النحاس والكالسيوم والفسفور والصوديوم والبوتاسيوم ذات مستويات حول المستويات العادية السابقة تسجليها في الجاموس المصري