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Regional Vitamin A and B carotene Deficiency in Small Ruminant (Sheep) in Basra Governorate

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Abstract

The present study was carried out to evaluate the levels of vitamin A and B- carotene in sheep from different regions in Basra province /south of Iraq by used ELISA kit. Samples of serum were collected from (90) heads of sheep, in different ages and sexes. According to the results, the first group 9(10%) was clinically healthy, revealed the highest levels of vitamin A and B-carotene (4.1±0.3) nmol/l, (28.6±7.2) µg/ml respectively. The second group 81(90%) characterized by clinical signs of vitamin A deficiency with significantly lower ($p<0.05$) levels vitamin A and B- carotene in comparison with the first group as following (1.4±0.3) nmol/l, (16.03±1.5) µg/ml respectively. According to the regions(north, south, east and west of Basra governorate) ,the higher level of vitamin A and B-carotene were recorded in Al-zubair (2.0±0.2) nmol/l,(24.6±3.9)µg/ml respectively. While levels of vitamin A and B-carotene in the remaining regions were ranging between (1.2 ±0.2-1.5±0 .2) nmol/l, (10.9±3.1-17.3±3.9) µg/ml subsequently as well as we recorded the foodstuff on which the animal depends(Green, Dry, Mixed).The examination of 81 deficient animals for vitamin A, the clinical findings were showed: Blindness, abortion, nervous signs and diarrhea, in addition to the vital signs(temperature of the body. Pulse and respiratory rate) which hadn't been affected by the deficiency of vitamin A nor B-carotene.ThereforesheepinBasrasufferingfromvitaminAdeficiencyduetoreducegreenforage,terrible management in addition sheep had low conversion rate of B-carotene to vitamin A.

Keywords: Deficiency/ Region/ Vitamin A / B- carotene

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1- Introduction

Vitamin A is a one of unsaturated nutritional organic compounds, that include retinol, retinal, retinoic acid, and numerous provitamin A carotenoid, among which beta-carotene is the most essential. Dark green leafy vegetables, yellow fruits, orange roots (mainly carrots) and the oils of palms are the main natural sources of vitamin A [20]. This is among leaves only those that are dark green are really good sources, because their carotenoid pleased in chloroplasts is around proportional to the concentration of chlorophyll which they were associated for photosynthesis. Vitamin A get special consideration in animals by several workers in the world [25]. Vitamin A has numerous functions: it is necessary for growth and development, for the maintenance of the immune system and perfect vision [22]. Vitamin A is essential for the regeneration of the visual purple necessary for dim light vision, for normal bone growth and for maintenance of normal epithelial tissues [24]. Deprivation of the vitamin produces effects largely attributable to interruption of these functions. However, there is a differenceintissueandorganresponseinthedifferentspeciesandparticularclinicalsignsmay occur at different stages of development of the disease. large doses of vitamin A increased the anti-oxygenic potential of the tissues, and it was suggested that retinol might be considered as a potential antioxidant similar to tocopherol in animal nutrition [13].

Animals store vitamin A in the liver, when they graze on green grasses they convert carotene (grasses) to vitamin A inside the wall of small intestine [10]. However, many cases of vitamin A deficiency have been reported in sheep getting ration considered to be adequate or high in vitamin A activity, such incidence for use of barley, longer storage and heat treatments for drying and processing feeds. Similar effect related to higher nitrate content of forages, especially when grown under adverse weather conditions, as well as nitrogen fertilizer application [3].

The role of vitamin A is maintenance of epi the ill tissue and visual purple, also normal development of bones, teeth and nerves tissue (Schmitt, et. al. 1993). In general sheep had low efficiency in converting carotene to vitamin A, and B-carotene is considered to have 400-500 IU of vitamin A value for sheep [11]. Therefore, sheep in Basra suffering from vitamin A deficiency due to reduce green forage, or may be due to terrible management in addition sheep had low conversion rate of B- carotene to vitamin A.

Methods

We used ELISA Kite that contain: Sheep Vitamin A (VA) ELISA Kit Sheep B- carotene oxygen o base 2(BCO2) ELISA Kit, (Standard ELISA reader, Precision pipettes and disposable pipette tips, Distilled water, Disposable tubes, Absorbent paper.

Results

All suspected 81 sheep were found deficient for vitamin A and B- carotene compart with the

controls group (Table1).

Table 1- The examine sheep serum by ELISA for vitamin A and B carotene level.

Sheep group	No.	Vitamin A(nmol/l)	B-carotene ng/ml
		Mean±SE	Mean±SE
Deficient	81	1.4±0.3	16.03±1.5
Control	9	4.1±0.3*	28.6±7.2*
Total	90		

There are significant different

According to the region of Basra result show: -

Values of vitamin A in serum of sheep from center of Basra, Al-Qurna, AL-zubair, Shatealarab and Abu-Alkassib regions of Basra were ((1.2±0.2; 1.2±.0.2; 2.0±0.2;1.3±0.2 and 1.5±0.2)) (nmol/l) respectively. The values of vitamin A in Shatealarab region were significantly lower ($p<0.05$) than other regions. While The values of vitamin A in Al-zubair region were significantly higher($p<0.05$) than other regions. (Table 2).

Table 2-The level of vitamin A and B-carotene in local sheep according to the regions in Basra.

Region	No. of animals	Vitamin A (nmol/l)	B-carotene ng/ml
Center of Basra	20	1.2 ± 0.2	16.5±3.0
Al-Qurna	13	1.2± 0.2	17.3±3.9
Shatealarab	13	1.3± 0.2	10.9±3.1
Al-zubair	21	2.0 ± 0.2*	24.6±3.9*
Abu-lkassib	13	1.5 ±0 .2	15.1±3.9
Control	9	4.1±0.3*	28.6±7.2*

Values are mean and standard error of mean .*The mean difference is significant.

B-carotene: Values of B-carotene in serum of sheep from center of Basra, Al-Qurna, Shatealarab, Al-zubair and Abu-lkassib regions of Basra were (116.5±3.0; 17.3±.3.9;

10.9±3.1;24.6±3.9; and15.1±3.9)ng/ml respectively. The values of B-carotene in Shatealarab was (10.9±3.1)ng/ml region were significantly lower ($p<0.05$) than other regions. While the values of B-carotene in Al-zubair was (24.6±3.9) ng/ml region were significantly higher($p<0.05$) than other regions. (Table2). Vital signs

Temperature: The mean of body temperature of control and deficient groups was(39.4±0.5and39.3±1.4) Cº. Respectively, With no significant variation between the groups(Table3).

Respiratory rates: The mean of respiratory rates of deficient vitamin A group was (34.0±0.5)/Min, which was higher than control group was (30.6±1.4)/ min, but in not significant important.

Pulse rates: The mean of pulse rate of control and deficient groups was (84.8±1.4 and 84.3±0.5)/Min.respectively. With no significant variation was recorded between groups. (Table 3).

Table 3- Vital signs of sheep with hypovitaminosis A.

Groups	No.	Temperature Cº	Respiratory rate /Min.	Pulse rate /Min.
Deficient	8	39.3±0.1	34.0±0.3	84.3±0.5
Control	9	39.3±0.04	30.6±1.1	84.8±1.4
Total			90	

Values are mean and standard error of mean. there are no significant different

Value of vitamin A in different nutrition

There are no significant at the $p<.05$level in the different nutrition, but lower value was occur in the mixed nutrition was(1.3±0.1)nmol/l. While the higher value of vitamin A in the green nutrition that was (1.8± 0.1) nmol/l. (Table 4).

Table 4- level of vitamin A in the different nutrition.

Nutrition	No. of animal	Vitamin A (nmol/l)

Green	38	1.5 ± 0.2
Dry	16	1.3 ± 0.1
Mixed	27	1.8 ± 0.2

Values are mean and standard error of mean. *The mean difference is no significant

Discussion

Vitamin A deficiency consider as an important clinical disease affected domesticated animal specially small ruminant such as sheep, therefore consideration for control and fast treatment of those cases should be advance [1,18,8]. The present study represent the examination of serum from 90 samples heads of sheep in different regions of Basra province, suspected to have deficiency in vitamin A and B- carotene, that by use specific vitamin A ELISA kit and B-carotene ELISA kit respectively.[6] From 90 sheep there were 9 heads showed higher levels of vitamin A and B-carotene (4.1±0.3 nmol/L and 28.6±7.2 ng/ml) respectively, those sheep clinically were in normal limits, as showed in table (1), so this group was represented as control[15,18].

From 90 sheep there were 81 heads with low serum levels of vitamin A and B-carotene (1.4± 0.3 nmol/L and 16.03± 1.5 ng/ml) respectively, all those sheep were having clinical findings, and considering the deficient group, as explained by, they mentioned a clinical evident of vitamin A deficient sheep would appear several clinical findings in association with low levels of vitamin A and B carotene in their serum. More than sheep were recorded had low conversion rate of B carotene to vitamin A. That sported by [18,21]. According to the regions the levels of vitamin A and B-carotene from lower to higher were; Center of Basra, Al Qurna, Shatealarab, Abulkassib and Al-zubair as in table (2), such arrange was exposed Al-zubair sheep with levels of vitamin A and B-carotene of (2.0± 0.2 nmol/L and 24.6± 3.9 ng/ml) respectively, which perhaps related to the managements in addition to most owners tend to graze there sheep flocks in a wide grazing area covered by short green grasses [2]. The green forages can control hypovitaminosis A in sheep, their leaves assume as good source for this vitamin [1]. Otherwise the deficiency of vitamin A in the body might due to the antagonism of other elements, those can interact with absorption of the vitamin A, by competition on the receptors in the jejunum [9]. Additionally, the drop in levels of vitamin A may be as an outcome to the infestation of gastrointestinal parasites, those can have impaired the absorption of vitamin A [5]. In otherwise [14] founded that environmental variation of high moisture, atmospheric pressure and the increase in the whole animal effort negatively, and affect the level of concentration of vitamin A in the blood serum among different region. Elsewhere an opinion of [19] says that little interest of owners predominantly affects the general status of the herd, in which nutritional matter including the vitamins, was not on the summit of the management schedule, for that reason multiples deficiencies come out persistently [4].

Vital signs such as temperature and pulse rate were exposed with no significant differ, but the respiratory rate showed slight elevation also with no significant difference, in a truth that vitamin A deficiency leads to an imbalance in the production of red blood cells [9], and at that moment leading to increase respiratory rate to supply the body with oxygen [18]. The level of vitamin A in deferent nutrition including; Green, dry, and mixed. There were deferent in rate level but the difference is not significant, so the higher rate appeared in the mixing nutrition, where the sheep out in the morning its depended on grassing as well as dependence on concentrated feeding when it returns to the farm [16,12]. the dry nutrition had little or may be not green fibers that consider the sores of precursor vitamin A [7]. The high proportion of hypovitaminosis A in local sheep in Basra were related to less green food, bad management in addition sheep had low conversion rate of B-carotene to vitamin A.

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