

## ARTICLE / INVESTIGACIÓN

# Role of ascorbic acid and appetite stimulants on a few blood serum biochemical characteristics in pregnant Iraqi ewes under heat stress

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**Abstract:** This study evaluated the effect of VêO® premium (2 or 4)g and ascorbic acid on pregnant ewes on some minerals. Twenty Iraqi ewes are aged 2-4 years in the Fallujah, Al-Anbar Government regions from August 5th, 2019, to February 9th, 2020. The ewes were divided randomly into four groups. It was fed naturally and on one diet, and the (G1) was given VêO® premium 4 g, (G2) was given VêO® premium 2 g, (G3) was given ascorbic acid 40 mg, and (G4) was treated as the control group. Blood samples were taken monthly via the external jugular vein before and during pregnancy. The serum samples were liquated in tubes and immediately stored at -20 °C until assay for analysis of calcium, phosphorus, potassium, sodium and magnesium. The results showed the effect of VêO® Premium and ascorbic acid on calcium concentration in G2 before pregnancy. Phosphorous concentration was significantly higher ( $P \leq 0.05$ ) in the (G1, G2, and G4) before pregnancy, but no significant difference in potassium between the groups before and during pregnancy. Sodium concentration was significantly higher ( $P \leq 0.05$ ) in the (G1, G2, G3, and G4) before pregnancy. Magnesium concentration was significantly higher ( $P \leq 0.05$ ) in the (G2) during pregnancy and (G3) before pregnancy. It was concluded from the current study that the addition of VêO® premium (2 or 4)g and ascorbic acid (40 mg) to the feed increased some minerals before and during pregnancy in Iraqi ewes.

**Key words:** VêO® premium, ascorbic acid, minerals, pregnancy, Iraqi ewes.

## Introduction

Reproduction is closely related to nutrition through the level of energy and protein, especially at the beginning of puberty. There are many nutrients and minerals whose deficiency leads to reduced reproduction<sup>1,2,3,7</sup>.

Several studies have shown the benefit of adding nutritional supplements to animal diets on fertility and that their deficiency leads to a reduction in enzyme activity affecting energy; protein metabolism; synthesis of hormones; integrity of rapidly dividing cells within the reproductive system; the activity of rumen microflora, and the role of micronutrients as depression antioxidants<sup>16</sup>.

Minerals are found in components and metabolites of the follicular fluid that exhibit physiologic functions and chemical constituents of semen from farm animals<sup>7,8</sup>. These minerals also may have specific roles and requirements in reproductive tissues. The conditions of a mineral in reproductive tissue and cell type may change with the physiological state of the tissue during reproductive cycling and pregnancy<sup>10</sup>.

Therefore, the current study aimed to evaluate the effect of VêO® premium and ascorbic acid on Iraqi ewes in pregnancy on some minerals.

## Materials and methods

The experimental work was carried out in Fallujah, Al-Anbar Government regions from August 5th, 2019, to February 9th, 2020. 20 Iraqi ewes aged 2-4 years were divided randomly into four groups. It was fed naturally and on one diet, and the (G1) was given VêO® premium 4 g, (G2) was given VêO® premium 2 g, (G3) was given ascorbic acid 40 mg, and the (G4) was treated as a control group. VêO® premium supplementation components: Orange sweet, calcium carbonate, silicon dioxide, Vit. E and wheat flour (Produced by the Phodé, French). The sponges were withdrawn 14 days after they were placed, and the male was inserted for five days. Blood samples were taken monthly via the external jugular vein before and during pregnancy. The blood sample was centrifuged at (3000 RPM for 10 minutes), and the serum samples obtained were liquated in tubes and immediately stored at -20 °C until assay. Using commercially available kits, we used the serum samples to determine the concentrations of calcium, phosphorus, potassium, sodium and magnesium. A spectrophotometric analyzer was used for the mineral analytes (APLI. The kit was provided by SPINREACT, S.A./S.A.U. Ctra. Santa Coloma, SPAIN).

Analysis of variance (GLM; SPSS program/ version 25) was used to determine the effects of groups (control, VêO® premium and ascorbic acid) and mineral concentration.

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Comparison of means was carried out by the Least Significant Differences test (LSD) according to (23). Differences were considered to be significant at ( $p < 0.05$ ).

## Results

### Calcium and Phosphorous

The effect of VêO® premium and ascorbic acid on Iraqi ewes in pregnancy on calcium and Phosphorous are presented in Table (1). G2 before pregnancy was significant ( $P \leq 0.05$ ) in calcium concentration than during pregnancy, and no significant difference in the other groups. Phosphorous concentration was significantly higher ( $P \leq 0.05$ ) in the (G1, G2 and G4) before pregnancy. There was no significant difference before and during pregnancy (G3).

### Potassium, Sodium and Magnesium

The effect of VêO® premium and ascorbic acid on Iraqi ewes in pregnancy on Potassium, Sodium and Magnesium are presented in Table (2). There was no significant difference in potassium before and during pregnancy. Sodium concentration increased significantly ( $P \leq 0.05$ ) in the (G1, G2, G3, and G4) before pregnancy. Magnesium concentration was significantly higher ( $P \leq 0.05$ ) in the (G2) during pregnancy and (G3) before pregnancy. But no significant differences in (G1 and G4). Potassium and sodium are also necessary for maintaining normal energy metabolism and reproductive physiology to reduce complications of excess sodium intake on blood pressure and keep blood pressure levels, though excess consumption of potassium can cause a problem<sup>5,14</sup>.

Minerals	Groups	Periods	
		Before pregnancy	During pregnancy
Calcium (mmol/l)	G1	9.37 ± 0.49	9.12 ± 0.175
	G2	9.275 ± 0.58 a	8.975 ± 0.255 b
	G3	9.12 ± 0.19	9.28 ± 0.18
	G4	8.82 ± 0.23	8.995 ± 0.35
Phosphorus (mmol/l)	G1	4.28 ± 0.4 a	3.94 ± 0.52 b
	G2	5.26 ± 1.22 a	4.035 ± 0.185 b
	G3	4.3 ± 0.665	4.38 ± 0.175
	G4	5.09 ± 0.885 a	3.88 ± 0.11 b

Different superscript letters denote statistical differences in rows ( $P < 0.05$ )

**Table 1.** Effect of VêO® premium and ascorbic acid to Iraqi ewes in pregnancy on Calcium and Phosphorus.

Minerals	Groups	Periods	
		Before pregnancy	During pregnancy
Potassium (mmol/l)	G1	4.28 ± 0.185	4.475 ± 0.22
	G2	4.185 ± 0.125	4.43 ± 0.165
	G3	4.015 ± 0.07	4.135 ± 0.155
	G4	4.345 ± 0.165	4.11 ± 0.105
Sodium (mmol/l)	G1	140.01 ± 3.28 a	138.125 ± 2.21 b
	G2	135.195 ± 3.085 a	134.67 ± 2.87 b
	G3	137.875 ± 4.735 a	136.125 ± 2.055 b
	G4	140.15 ± 3.9 a	135.463 ± 2.335 b
Magnesium (mmol/l)	G1	2.66 ± 0.24	2.56 ± 0.135
	G2	2.29 ± 0.12 b	2.52 ± 0.095 a
	G3	2.79 ± 0.11 a	2.54 ± 0.1 b
	G4	2.525 ± 0.19	2.64 ± 0.08

Different superscript letters denote statistical differences in rows ( $P < 0.05$ )

**Table 2.** Effect of VêO® premium and ascorbic acid to Iraqi ewes in pregnancy on Potassium, Sodium and Magnesium.

## Discussion

Calcium carbonate improves bone strength because of the bone calcium granules supply<sup>22</sup>. Calcium absorption and metabolism are regulated by calcitriol, which is the presence of ascorbic acid. It increases calcium absorption in early pregnancy to structure the skeleton of the fetus<sup>15,19</sup>. Calcium affects reproduction in animals through a decrease in milk production and fertility. It has also been found that low calcium affects uterine reflux, which leads to fertility problems in females<sup>21</sup>. Calcium ion works to suppress the immunity of the female reproductive system to regulate the movement of sperm for fertilization and implantation of the embryo in the uterus by stimulating estrogen hormone secretion<sup>12,18</sup>.

Pregnant females need phosphorus to sustain and sustainable of pregnancy<sup>22</sup>. The decreased concentration of phosphorus in the stages of pregnancy is due to the stresses occurring in these stages<sup>13</sup>. A decreased phosphorous level in the feed leads to decreased fertility and ovarian activity, irregular estrous cycles, higher occurrence of cystic ovaries, delayed sexual maturity and reduced conception rates<sup>4</sup>.

It may be the cause of low phosphorus during the stages of pregnancy in the current experience of its absence within VêO® premium components.

Some studies have shown that increasing potassium and sodium levels in an animal's diet can delay puberty and ovulation, impair corpus luteum development and increase the incidence of anestrous in heifers<sup>4,21</sup>. Gestational magnesium deficiency may cause hematological and teratogenic damage and low birth weight<sup>9,14</sup>. Magnesium deficiency affects ruminants because of its low in food and high potassium in green pastures, which inhibits magnesium absorption in the rumen. This deficiency affects the survival and growth of the fetus and the high rate of fetal malformations<sup>24</sup>. The study showed that the magnesium level was not affected during pregnancy in ewes.

## Conclusions

Our study demonstrated that the addition of VêO® premium 2 g or 4 g to the diet improves some minerals before and during pregnancy in Iraqi ewes.

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