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SERUM MACRO-MINERALS VARIATION UPON PREGNANCY IN RABBITS RAISED IN TIARET REGION

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ABSTRACT

The present study was conducted to evaluate blood biochemical profile of local rabbits in Tiaret region and to assess the pregnancy influence on minerals serum of local rabbits raised in semi-arid climate type. Fifty-nine multiparous does was used in this study during 2019. The semi-intensive rhythm of reproduction was used. All pregnant does were at the late stage of pregnancy at the sampling date, blood samples were collected from pregnant and non–pregnant does, serum samples were collected in two seasons: Winter and summer. In this study, biochemical parameters concentrations of pregnant rabbits were significantly higher ($p<0,05$) compared with non-pregnant rabbit. The value of biochemical parameters total protein, albumin, triglyceride, cholesterol, calcium and phosphorus changed significantly. In this study the potassium mean value for all does was 5,35±1,25 mmol/l, a significant ($p<0,05$) difference was recorded between pregnant and non-pregnant does. The mean value in pregnant does was significantly higher ($p<0,05$) with 5,71±1,24 mmol/l against 4,93±1,14 mmol/l in non-pregnant ones. In this study, most parameters were influenced by pregnancy, which causes deterioration in some biochemical parameters. It can be concluded that result might be useful for health and production studies of the locale population and may avoid reproduction problems.

Keywords: Rabbits; serum minerals; seasons; semi-arid climate.

INTRODUCTION

Rabbits can be considered as an ideal meat-producing animal. The rabbit's meat is considered very healthy being low in fat, cholesterol and sodium and rich in protein [1]. It has a short life cycle, a short gestation period, prolific and has a high feed conversion capacity [2]. Under Algerian conditions, rabbit's production is affected by several factors such as the environment and management conditions [3]. Their prolificacy and weight are too low [4]. In the recent years, there has been the introduction of various rabbit breeds in Algerian farms such as the Papillion, New Zealand and Gray breeds, which creates a heterogeneous population on the farms [5].

The mineral level in animal body depends on a large number of factors such as species, breed, age, sex, nutritional and health status, mineral supplementation, seasonal and physiological variations [6]. The responses of animals to environmental stress during different seasons have profound effects on some serum biochemical parameters [7]. Other factors such as nutrition, environment and hormones might cause differences in serum

biochemical values [8]. It was reported that haematological and biochemical parameters are influenced by pregnancy and season [9]. The season significantly affected receptivity [10] which results in a low rate of fertility in the local population. The present study aims to investigate the influence of season and pregnancy on some serum minerals variations in rabbits raised in Tiaret, Algeria.

MATERIALS AND METHODS

The study was carried out at the experimental farm of Ibn Khaldoun university in Tiaret (north western Algeria) in 2019. Fifty-nine multiparous healthy does, from local domestic population of rabbits (*Oryctolagus cuniculus*). Thirty-two pregnant and twenty-seven non-pregnant does weighing between 3-4 kg were used for mating. The animals were housed in single rabbit cages, given *ad libitum* commercial pelleted rabbit food and drinking water. The reproductive status was determined by palpation and confirmed after birth.

Fifty-nine samples were collected from saphenous vein in hepatised vacutainers. Does were wrapped safely in a towel after warming the area over the vessel to promote vasodilation. Samples were brought to the biochemical laboratory within two hours for biochemical parameters analysis. Samples were collected from does and were classed in two groups pregnant and non-pregnant. All samples were analysed with a *COBAS* Integra® 400 Roche, France. The following parameters were determined: Potassium, Sodium, Chlor, total cholesterol, Triglycerides, Total protein, Albumin, Calcium, Phosphorus and magnesium. Mean and standard deviation values were determined for data and a statistical analysis using *SPSS* IMB 20 and the ANOVA1 test was made to determine the influence of the pregnancy and season on the variation of the parameters.

RESULTS AND DISCUSSION

All the results and the effects of pregnancy and season on the different parameters recorded in this work are reported in Table 1 and Table 2. In this study the potassium mean value for all does was 5,35±1,25 mmol/l, a significant ($p<0,05$) difference was recorded between pregnant and non-pregnant does. The mean value in pregnant does was significantly higher ($p<0,05$) with 5,71±1,24 mmol/l against 4,93±1,14 mmol/l in non-pregnant ones.

Table 1. General values of the parameters measured for all does

Parameters	N	Mean	SD	Min	Max
K (m mol/l)	59	5,35	1,25	3,51	10,08
Na (m mol/l)	59	140,07	11,08	61,50	150,90
Cl (m mol/l)	59	102,92	4,96	89,00	115,00
Cholesterol (mg/dl)	59	0,51	0,47	0,12	3,20
Triglyceride (mmol/l)	59	0,83	0,79	0,12	5,94
Proteine (g/l)	59	63,71	8,25	43,00	80,00
Albumine (g/l)	59	39,68	5,34	27,00	53,00
Ca (mg/dl)	59	139,07	16,33	51,00	166,00
P (mg/dl)	59	40,66	8,48	22,00	59,00
Mg (m mol/l)	59	26,70	8,05	16,10	56,90

Sodium and Chlore mean values for all does were respectively 140,07±11,08 mmol/l and 102,92±4,96 mmol/l. For the two parameters no significant difference between non-pregnant and pregnant female was observed in this study. In contrast, the Cholesterol mean value in pregnant does was significantly higher *(p<0,05)* with 0,62±0,59 mg/dl than 0,38±0,23 mg/dl in non-pregnant ones.

In this study, triglycerides mean value for all does was 0,83±0,79 mmol/l, with no difference between non-pregnant and pregnant female. The mean value of triglycerides in pregnant does was 0,77±1,01 mmol/l and about 0,91±0,41 mmol/l in non-pregnant ones.

Proteins area fundamental component of animal tissues, certain hormones and all enzymes. In this work, protein mean value for all does was 63,71±8,25 g/l, a significant *(p<0,05)* difference was recorded between pregnant and non-pregnant does. The mean value in pregnant does was significantly lower *(p<0,05)* with0, 60,41±8,05 g/l than 67,63±6,73 g/l recorded in non-pregnant ones. In this study, albumin mean value for all does was 39,68±5,34 g/l, no important variations in this values between non-pregnant and pregnant rabbits with respectively with 19±5,78 g/l and 25±4,99 g/l.

Calcium is an important mineral in homeostasis in all vertebrate animals. It is the most abundant one in the body. In our work, Calcium mean value for all does was 139,07±16,33 mg/dl. The mean value in pregnant does was significantly lower (p<0,05) with 133,44±18,37 mg/dl against 145,74±10,38 mg/dl in non-pregnant females.

Phosphorus is major component of the skeletal system, in this study, phosphorus mean value for all does was 40,66±8,48 mg/dl, no significant differences between non-pregnant with 40,85±8,09 mg/dl and pregnant with 40,50±8,92 mg/dl rabbits was observed.

In our study Magnesium mean value for all does was 26,70±8,05 mmol/l but no significant difference was recorded among pregnancy.

Table 2. Mean±SD values of serum minerals variation within pregnancy in rabbits

Parameters	Not pregnant (n=27)	Pregnant (n=32)	Total (n=59)
K (m mol/l)	4,93±1,14*	5,71±1,24	5,35±1,25
Na (m mol/l)	142,82±3,48	137,75±14,41	140,07±11,08
Cl (m mol/l)	103,07±5,81	102,78±4,19	102,92±4,96
Cholesterol (mg/dl)	0,38±0,23*	0,62±0,59	0,51±0,47
Triglyceride (mmol/l)	0,91±0,41	0,77±1,01	0,83±0,79
Proteine (g/l)	67,63±6,73*	60,41±8,05	63,71±8,25
Albumine (g/l)	40,19±5,78	39,25±4,99	39,68±5,34
Ca (mg/dl)	145,74±10,38*	133,44±18,37	139,07±16,33
P (mg/dl)	40,85±8,09	40,50±8,92	40,66±8,48
Mg (m mol/l)	25,04±8,00	28,10±7,95	26,70±8,05

**Refers to a significant difference in the same line (p<0, 05)*

The results of our study are in agreement with other research conducted using other animals [11,12]. The most obvious limitation to rabbit production in hot climate area, is the susceptibility of this species to heat stress, which evokes a series of drastic changes in their biological functions that lead to impairment of production and reproduction. The deference of temperature between winter and summer produce some changes in various blood plasma parameters [13,14,15].

CONCLUSION

In this investigation, we concluded that pregnancy and season influence the biochemical parameters in rabbits. The heat stress in hot season negatively reflected on the biochemical parameters, and the better season for reproducing local rabbit in the fresh season. This work furnishs the reference values for comparison in the rabbit's local population raised in the North West Region of Algeria and also in the semi-arid climate type. This informations can guide both breeders and searchers for improved rabbit production.

ETHICAL APPROVAL

Animal Ethic committee approval has been taken to carry out this study.

CONPETIN INTERESTS

Authors have declared that no competing interests exist.

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