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EFFECT OF AGE ON SOMEN QUALITY AND SOME MINIRALS, AND TESTOSTERONE HORMONE IN AWASSI RAMS

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Abstract. *The study was conducted in the laboratories of the Musayyib Technical College in cooperation with a private field for sheep breeding in Al-Mahaweel District / Babylon Governorate from September to November 2020, to study the effect of age on semen quality and some minerals, and testosterone hormone, thanks. of Awassi rams, 12 Awassi rams were used and divided into three categories. Age, the first: 1-3 years, the second: 3-5 years, and the third: over 5 years old. Blood was drawn, serum was separated, and its biochemical and hormonal components were analyzed. The results of the study showed a highly significant (p≤0.01)) for the age group greater than 5 years in zinc ion (Zn) concentration compared to other age groups. There was a significant superiority (p≤0.01) for the age group 3-5 years in calcium* (Ca) *concentration and testosterone level over the other age groups. A highly significant (P≤0.01) was observed for the age group 1-3 years in the concentration of iron ions (Fe) compared with other age groups. The results of the study also showed a positive, direct and highly significant correlation of (Ca) with the testosterone hormone, and a negative, inverse and highly significant correlation coefficient between* (Zn) *and iron. with testosterone.*

Keywords: *Semen, Awassi rams, Minerals, Testosterone hormone*

1. INTRODUCTION

Sheep are economic animals and represent an important part of the economy of many countries of the world as they are inexpensive to raise. The introduction of reproductive techniques to assist in the reproduction and improvement of sheep and to overcome fertility problems is one of the important factors in improving the reproductive performance of sheep. [1] The chemical elements play a crucial role in reproduction in rams, as the imbalance in the chemical elements may lead to an imbalance in sperm formation, decreased sexual desire, and consequently poor male fertility [2]. The difference in semen quality is qualitative and quantitative according to age and condition health and sexual activity of animals. With a focus on the biochemical materials, natural environmental factors, and various animal activities, also, it was found that chemical nutrients have an indirect but decisive effect on the vitality of sperm in males [3]. An imbalance in the sperm chemistry may lead to an imbalance in sperm formation, and distort the external shape of sperm, and decrease sexual desire, and consequently poor fertility in males. This

happened due to the importance of chemical nutrients. As the process of sperm formation continues automatically and qualitatively under the control of hormonal regulation, and when the concentration of follicle-stimulating hormone (FSH) decreases, hormonal control works to prepare the body with high concentrations of testosterone. [4]. Therefore, the aim of this study was to determine the effect of age on semen quality and some minerals, and testosterone hormone for Awssai rams.

2. MATERIALS AND METHODS

2-1 Animals and the location of the experiment

The study was conducted in the laboratories of the Musayyib Technical College in cooperation with a special field for sheep breeding in Al-Mahaweel district from September to November 2020. Twelve (12) Awssai rams were used in the study, which were divided into three groups according to age, each group includes 4 rams as shown below:

- First group: age 1-3 years
- Second group: age 3-5 years
- Third group: age over five 5 years old

2-2 Samples blood collection

Blood samples were collected from the jugular vein using a 10 ml medical syringe after cutting the wool and sterilizing the intake site and placing the blood samples into sterile tubes. Place the tubes in a centrifuge at 3000 rpm for 10 minutes, after which blood serum is withdrawn through a sterile pipette and placed in 5 ml tubes and kept the temperature below 5 °C.

2-3 Estimation of blood serum ions

A kit (Human, Germany) was used to evaluate the level of ions in the blood sera of Awssai rams [5].

2-4 Measurement of Testosterone in blood sera of Awssai rams

Kits of (Monobind, USA) were used to evaluate the levels of hormones in the blood sera of Awssai rams[6].

2-5 Statistical Analysis

Statistical Analysis System –(SAS) 2012 was used for data analysis to study the effect of different age groups on the studied traits according to a completely randomized design-CRD, and the significant differences between the means were compared with the multiple probability test [7].
Mathematical model of design
$Yij = \mu + Ai + eij$
Since:
Yij: View value j of transaction i.
μ: the general average of the trait studied.
Ai: the effect of age group i (1-3, 3-5, older than 5 years).
eij: the normally distributed random error with a mean of zero and a variance of σ2e.

3. RESULTS AND DISCUSSION

3-1 The advance, mass movements, and deformities of the sperm .

The results in Table. (1) of the current study showed that the individual motility of experimental rams was not significantly affected by different age groups, as its values were recorded at 70.71, 70.87 and 70.91% [8] It was found that the rate of mass motility is higher than what we found in our current study 1.21 + 91.92%, and the reason may be due to the difference in nutrition, it was mentioned [9] that the high energy concentration in the diet affected the concentration of sperm in the semen due to the accumulation of fat in the scrotum, which affects the thermoregulatory mechanism of the testicles and affects the ability of the seminal tube to produce sperm, reducing the mass movement percentage Kinetic.

As for the mass motility, the results of the current study indicated a significant superiority (P≤0.01) in the old ages, which recorded a value of 67.54%, compared with the middle ages and younger ages 66.95% and 66.79% respectively, and this agreed with [10] which mentioned that the mass motility is the lowest in the young ages and the highest rate of movement is in the old ages. While [11] results is disagree with our obtained results, and found that the mass movement is higher in young ages, The reason for the mismatch may be to the type of animal used in Experience. For deformities, there is a significant superiority (P≤0.01) in the young and old ages, (2.29% and 2.54%), compared with the middle ages (1.71%), and these results are in agreement with [8].

Table 1: Effect of age on advance and mass movement and *deformities of the sperm.*

age group (year)	average ± standard error		
	deformities (%)	Mass motility (%)	advance movement (%)
1-3 year	2.29 ±0.15 a	66.79 ±0.18 b	70.71 ±0.76
3-5 year	1.71 ±0.19 b	66.95 ±0.96 b	70.87 ±0.26
greater than year5	2.54 ±0.23 a	67.54 ±0.10 a	70.91 ±0.27
Significant level	**	**	NS
The averages with different letters within the same column are different significantly between them. ** (P≤0.01), NS: Not significant.			

3-2 The concentration of the studied minerals in the blood serum.

The results of the statistical analysis of (Zn) in Table (2) showed a significant superiority (P≤0.01) in favor of the large age group (17.1 µmol/L) compared with the young and middle ages 15.47 µmol/L and 11.48 µmol/L respectively. (Zn) ion has an effect on mass motility at older age, and this is consistent with [13] findings, which showed that (Zn) participates in regulating sperm motility through its association with adenosine triphosphate and regulating motility and energy expended. Also the importance of (Zn) was in its effect on decreasing rates of primary malformations, and this agreed with [14] who found that rams who have low levels of (Zn) in the blood serum are more susceptible to sperm abnormalities.

Additionally, The results showed that (Ca) was significantly increased (P≤0.01) in the middle age group (3-5 years), which reached 10.37 µg/dL compared with the young and old ages, which reached 8.78

µg/dL and 9.64 µg/dL respectively. The superiority of (Ca) in the middle age group led to a decrease in the percentage of malformations, and increase in the vitality and concentration of the sperm and these results are in agreement with what was mentioned by [15,and 16].

Furthermore, (Fe) ions, showed a highly significant (P≤0.01) of the young age group (1-3 years), which amounted to 93.03 µg/dL compared to the middle and older age groups, (76.77 µg/dL and 86.09 µg/dL) respectively. This superiority of (Fe) led to a decrease in the initial deformations of the sperm. These results agree with both [17] and [18] which they mentioned that the (Fe) content within the seminal plasma is important for maintaining the movement and vitality of the sperm, and it was found that it helps the sperm to maintain its functions.

Table 2: Effect of the age on the concentration of minerals in the blood serum

age group (year)	average ± standard error		
	Iron (µg/dL)	Zinc (µmol/L)	Calcium (µg/dL)
1-3 years	93.03 ±6.34 a	15.47 ±0.12 b	8.78 ±0.11 c
3-5 years	76.77 ±4.21 b	11.48 ±0.10 c	10.37 ±015.a
greater than 5 years	86.09 ±4.02 ab	17.01 ±0.07 a	9.64 ±0.18 b
significant level	**	**	**
The averages carrying different letters within the same column differ significantly among themselves. * (P≤0.05),** (P≤0.01).			

3-3 Testosterone hormone level.

The results in Table (3) that there is a high significant superiority (P≤0.01) in the testosterone hormone for the middle-aged age group, which amounted to 1.84 pg/L compared with the young and older ages 1.152 pg/L and 1.101 pg/L respectively. These results were agreed with many previous studies [19,and 20] and the reason may be due to the lack of Leydig cells in young and large animals [21]. The level of the testosterone hormone in the circulatory system of rams varies according to the breed, age, nutrition, season, and manifestations of estrus in ewes.

Table 3: Effect of age on testosterone hormone level

age group (year)	average ± standard error
	testosterone hormone (pg/ml)
1-3 year	1.152 ±0.11 b
3-5 year	1.84 ±0.21 a
greater than 5 year	1.101 ±0.13 b

morale level	**
Averages carrying different letters within the same column differ significantly between each other ** (P≤0.01)	

3-4 The correlation between the concentration of minerals and testosterone hormone in the blood serum.

The results in Table (4) indicated that there is a positive correlation for each of (Ca) (r = +0.32) and (Zn) (r = +0.40). In general, these results are in agreement with [22]. [23] found a positive correlation between (Zn) levels and testosterone hormone levels. It is well known that (Zn) ion plays an important role in maintaining germ cells and testicular growth, and helps in the maturation of sperm, as a well as it is important for testosterone hormone synthesis [24]. Deficiency of (Zn) ion would affect the growth and development of seminiferous tubules. Another study found that rams with normal levels of testosterone have higher levels of (Zn) compared to rams with low testosterone [25].
It was also noted that there was a significant negative correlation (P≤0.01) of (Fe) (r = -0.38) with testosterone concentration [25] and it may be attributed to sickle cell patients and this affects the level of testosterone [26].

Table 4: Correlation between some minerals concentration and testosterone hormone level in the blood serum

Minerals	correlation coefficient(r) testosterone hormone
Calcium	0.32 **
Zinc	0.40 **
Iron	-0.38 **
** (P≤0.01), NS: Not significant	

4. CONCLUSIONS

The group of 3-5-year-old rams suproior in most of the studied traits, a highly significant direct correlation of (Zn) with testosterone, the studied minerals in the blood serum affect the characteristics of the sperm, the highest proportions of important minerals are in the middle age group (3-5 years).

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