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EFFECT OF ERUCA SATIVA SEEDS POWDER AS FEED SUPPLEMENTATION ON SOME PHYSIOLOGICAL TRAITS OF MALE LAMBS

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Abstract: This study was carried out at the University of Kufa to determine the activation of Eruca sativa (jar jeer) seeds powder on some hormones and blood parameters of Awassi lambs. The fifteen Awassi lambs aged 4-4.5 years an average weighed of (33.04) Kg were fed traditional ration and randomly divided into three groups. The first group was fed a standard ration without additions as the control group, the second and third groups were fed a regular diet with 40 or 80 gm/kg of body weight of eruca sativa seeds powder, and the lambs were fed with Eruca sativa seeds showed a significant decrease of anti-mullerian hormone, a substantial increase of testosterone hormone. There was a considerable increase in ALP alkaline phosphatase in lamb fed on a diet with E.sativa seed powder as compared with control, there were no significant differences in levels of AST, or ALT enzymes in the second and third treatments.

Keywords: Awassi Lambs, Eruca Sativa, Seed Powder, Hormones and Blood Parameters.

1. Introduction

Eruca sativa prophylactic activity and antioxidant activity against oxidative stress diminished free radicals and raise the level of antioxidant molecules [1]. it is locally known jarjeer that contain vitamin c, carotenoids, flavonoids such as luteolin, appin and glucosinolates the precursors of sulfaraphene and isothiocyanates [2]. Eruca sativa have volatile oils like apiola, -B- phellandrene and myristicin. Glucosinolates possess several biological activities including antioxidant action, anti-carcinogenic, anti-fungal, and anti-bacterial [3]. Eruca sativa seeds used also to increase sexual activity to both gender by increase fertility and production of sperm [4]. Eating its leaves or seeds increases the fertility rate and concentration of sperms in male, reduce miscarriages, and regulate menstruation [5]. Research studies indicate that E. sativa rich in: proteins, oil, vitamins (vitamin E, C and carotenoid), mineral, and secondary metabolize product such as glucosinolates and Flavonoids, saponine and alkaloids which have a beneficial effects on human and animal health [6]. The aim of this study was to determine the effects of Eruca sativa seeds as feed supplementation to Awassi male lambs on the activity of liver enzymes (ALT, AST and ALP) and hormones (testosterone and Anti-mullerian) hormone.

2. Materials and Methods

Fifteen male was lambs were used of 4-4.5 month age, were elected from field of agriculture college /kufa university in Najaf ,and divided into three groups (5 lambs to each group), were fed for two weeks as introductory feeding ,then the groups were fed normal nutrient especially (control group) with adding Eruca sativa seed powder of the second group with (40 g/kg of feed) while ,third group were fed with (80 g/kg) ,the lambs were fed for four months ,the feed were introduced two times daily at 8 o'clock a.m and at five o'clock p.m ,calculated the amount of feed intake weekly and all the animals were under the veterinary care all the time of experiment.

Preparation of the basal diet: The awes were fed basal diet daily as 2% of body weight, it was prepared by mix the basal diet with Eruca sativa powder, the seed powder was mixed with small basal diet then increased gradually, to be mixed as well. The composition is given in Table (1).

Table 1. Composition of basal diet ingredients used to feed ewes.

Ingredients %	Blackberry 1	Blackberry 2	Blackberry 3
Crushed barely	35	35	35
Wheat bran	49	45	41
Corn	8	8	8
Soybean meal	5	5	5
Watercress seed powder	-	4	8
Limestone	1.5	1.5	1.5
Salt	1.5	1.5	1.5

Blood samples: The 10 ml of blood was collected from jugular vein of the animal at the end of experiment, the blood was centrifuged at 3000 rpm /15 minutes and then stored at -20C untie for chemical analysis which included testosterone [7]. Statistical analysis: Data was analyzed by using SAS system [8].

3. Results and Discussion

Anti-mullrian and testosterone hormones level: Serum level of anti-mullerian hormone significantly increase in the treatment groups that fed with Eruca sativa (1.22 and 2.13) Ng/ ml, as compared with control (0.89). while, serum level of testosterone hormone showed significant increase, in the group that fed Eruca sativa seed at (80 mg/ kg) (2.04Ng/ml), while in concentration (40 mg/kg), was (2.38 Ng/ml) as compared with control (1.33Ng/ml).

Table 2. levels of hormones (AMH, testosterone) in three treatments.

Testosterone	AMH	Hormones / Treatments
1.33 ±0.26 B	0.17 ±2.13 A**	Control G=0
2.04 ± 0.09 A*	1.22 ± 0.28 A**	Second treatment G=40
2.38 ±0.22 A*	0.89 ± 0.01 B	Third treatment G=80
*	**	Significant

Mean ±stander error

-the different letters in the column indicated significant differences in three treatments.

Liver enzymes levels: The serum of liver enzyme (ALP) in table (2) appeared significant increase ($p<0.05$) in the treatment groups that fed with eruca sativa, and it was (1.15 ±32.28 ,2.24±33.42) as compared with control (1.57± 26.84) as showed in figure (1), while, figures (2, 3) serum level of liver enzymes (ALT, AST) observed no significant differences ($p<0.05$) in lambs that fed with eruca sativa seed as compared with control.

As shown in results that serum levels of anti-mullerian hormone decrease significantly in treatment groups, there are relationship between testosterone hormone and anti-mullerian hormone, testosterone hormone has ability to decrease levels of anti-mullerian hormone especially in sertoly cells [9]. It act as regulator to AMH hormone, testosterone before superovulation caused changes the expression and concentration of AMH, suggesting that testosterone hormone have a role in regulation of ovarian reverse [7].

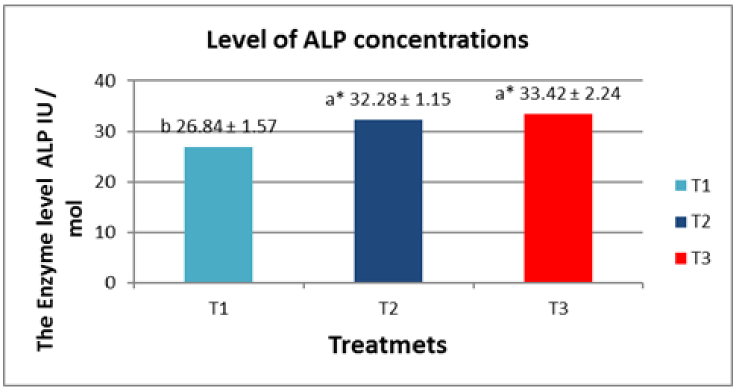

Figure 1. The effect of different levels of Eruca sativa mill Seeds powder on the alkaline phosphatase (ALP) levels.

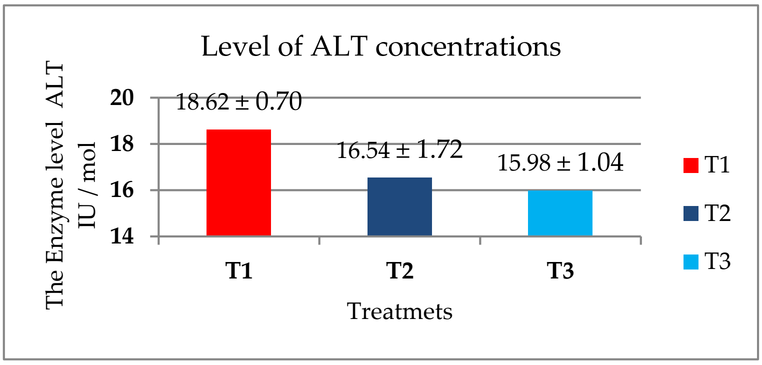

Figure 2. The effect of different levels of Eruca sativa mill Seeds powder on the Alanine transaminase (ALT) levels.

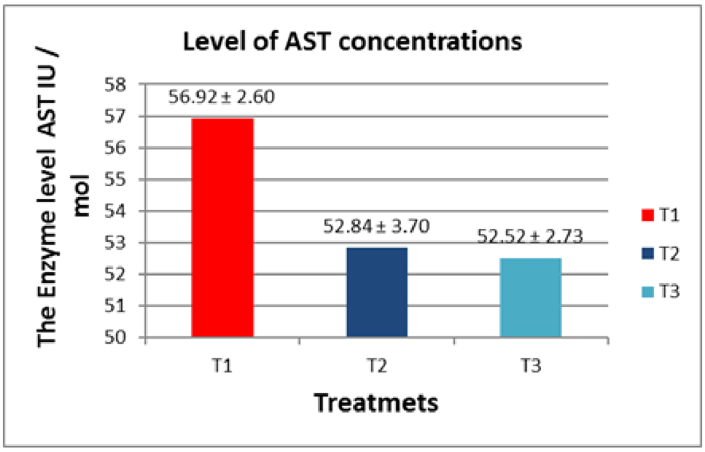

Figure 3. The effect of different levels of Eruca sativa mill Seeds powder on the Aspartate transaminase (AST) levels.

In table (2) there are significant increases in testosterone hormone in the serum of ewes fed with Eruca sativa seed, the result is accomplished with the study of [10], which observed that ginger has pharmacological effects and has the ability to activate sperms because it contains materials have an important role in the growth of sperms, these materials are (flavonoids, glycosides). Also, Eruca sativa seeds contain la arge amount of manganese which stimulates the production LH hormone that insincere assent of testosterone hormone [11].

The results showed that the serum level of ewes which fed eruca sativa seed was increased significantly in liver enzymes especially (ALP), these results agreement with [12] who mentioned that added eruca sativa seeds in diet of lambs promote (ALP) activities and increase skeleton growth which some of ALP formed from muscle bones [13]) or due to that, watercress seeds contain vitamin C and there is relationship between the activity of ALP and ascorbic acid which have activity in bone metabolism [12]. At the same time the levels of (ALT, AST) appeared no changes and non-significant, as mentioned.

4. Conclusion

In conclusion, testosterone hormone significantly increased while anti-mullerian hormone significantly decreased. Alkaline phosphatase levels in lamb fed a diet containing E. sativa seed powder increased significantly compared to control, although levels of AST or ALT enzymes did not differ significantly between the second or third treatments.

Supplementary Materials:

No Supplementary Materials.

Author Contributions:

A. M. Ajeel; methodology, writing—original draft preparation, L. A. Mehdi; writing—review and editing, L. A. Mehdi; paraphrasing. All authors have read and agreed to the published version of the manuscript.

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The authors declare no conflict of interest.

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