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Effect of Iraqi Apricot Seed Extract on Some Physiological Parameters in Male Rats

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Abstract

Amygdalin specifically represents the apricot (*Prunus armeniaca*) seed in the Rosacea family of plants. Except for cyanogenic glycoside, the seeds include a variety of substances, including trace minerals, vitamins, carbohydrates, organic acids, esters, phenols, and terpenoids. It is well known that bioregulators have the ability to control the activity of certain hormones and enzymes. The current study examined the effect of Iraqi apricot seed extract on physiological parameters in male rats, including blood parameters, hormone parameters, and antioxidant parameters, as well as histological studies of the spleen and testes. The study comprised four groups, each consisting of six animals. The animals in the control group received distilled water as their treatment. G1 received an extract (10 mg b.w.), G2 received an extract (20 mg b.w.), and G3 received an extract (40 mg b.w) orally every day for 30 days. The results showed a significant increase in WBC and blood platelets ($P \leq 0.05$), as well as T3 and T4. When compared with the control, TSH shows a significant decrease ($P \leq 0.01$) in the three groups. While FSH, LH, and testosterone hormone showed a significant decrease ($P \leq 0.01$) in the G1 and G2 groups, MPO, MDA, GPX, SOD, vitamin C, and E showed a significant decrease ($P \leq 0.01$) when compared with the control group. Finally, the histological examination showed that the spleen and testis in all groups showed a normal appearance after 30 days.

Keywords: Iraqi apricot, seed extract, hormones, antioxidant, spleen and testes.

1. Introduction

Bio-regulators [1] refer to the most widely distributed plant and biologically active plant ingredients that offer health benefits and serve as medicinal agents. The Babylonians and Assyrians inherited the Sumerian civilization, which has a long history of herbal medicine in our country dating back to its time [2]. Recently, medicinal plants and herbs have become indispensable sources for treating diseases, making them a new element in the preparation of medicines [3-5].

The apricot is a fruit high in potassium, iron, and vitamin C. It also contains vitamin A. Apricots improve vision. A recent scientific study reveals that the human body transforms "carotenoid" compounds in dry apricots into vitamin A, which the eye needs to eliminate harmful compounds. These compounds also activate liver functions, lower blood cholesterol levels, and protect the heart and arteries from diseases. According to the study, apricot fruits may be the most effective therapies for preventing women from developing skin conditions and acne because they are high in vitamin A, which has an anti-wrinkle effect [6] The apricot (*Prunus armeniaca* L.) is a vital economic plant. Carotenoids and flavonoids found in apricots are believed to have antioxidant properties [7]. Amygdalin, a biomolecule present in apricot seeds, has gained a lot of attention due to its alleged anti-cancer properties [8]. About 5000 years ago, researchers discovered the advantages of bitter seed derivatives in the treatment of skin cancers. The richest sources of these compounds are bitter almonds, often known as vitamin B17 or laetrile [9]. Amygdalin is an aromatic, cyanogenic compound belonging to the sub-class of carbohydrates and carbohydrate conjugates. The structure of amygdalin comprises two units of glucose, one unit of hydrocyanic acid, and one unit of benzaldehyde [10]. The chemical formula is $C_{20}H_{27}NO_{11}$. It has a molecular weight of 457.432 g/mol [11**]**.

2. Materials and methods

2.1. Collecting and Preparation of apricot seed

The study collected samples from the Kadhimiya area in Baghdad and the city of Samarra in the ninth month following the fruit ripening period in 2021. After transferring the samples to the laboratory, we cleaned them of impurities, washed them, and allowed them to dry naturally. We then removed the outer wooden cover, ground the grains using an electric grinder, and stored them in tightly sealed bags. Store the samples in the refrigerator or freezer until they are needed for extraction preparation.

2.2. Preparation for extraction

2.2.1. Ethanolic extract 80%

After grinding, we extracted the apricot seed powder with 80% ethyl alcohol and filtered it using filter paper. A rotary evaporator vacuum device subsequently concentrated the total filtrate. Therefore, we place the extract in sterilized glass dishes at a temperature of 37 °C for 3 days to dry all the residual alcohol, and store a clean, sterile bottle in the refrigerator at 3 °C [12].

2.2.2. Preparation of required dosage

We used 80% apricot seed extract at concentrations of 10, 20, and 40 mg/kg B.W. orally for 30 days in male rats, while the control group received distilled water. The rats used in this study weighed between 200 and 250 grams.

2.3. Experimental animals

The Iraqi Center for Cancer Research and Medical Genetics Research at Al-Mustansiriya University provided 24 Swiss male rats weighing between 190 and 200 gm for this study. The animals were housed in Al-Mustansiriya University's Research Center. The researchers housed the animals in metal cages, covered them with metal mesh, and covered the floor with sawdust. After cleaning the animals under a temperature (25 °C), ventilation, and natural lighting, the animals were divided into 4 groups:

-Control: A group involved six adult male rats. Animals in this group were administered distilled water and served as controls.

-G1: Involved 6 adult male rats, This group was given Iraqi apricot seed extract, administered orally daily with a concentration (10 mg\Kg) by mouth daily for 30 days.

-G2 Involved 6 adult male rats, This group was given Iraqi apricot seed extract, administered orally daily with a concentration (20 mg\Kg) by mouth daily for 30 days.
-G3 = Involved 6 adult male rats, This group was given Iraqi apricot seed extract, administered orally daily with a concentration (40 mg\Kg) by mouth daily for 30 days.
Following the 30-day period, we drew blood from all animals for biochemical analysis, sacrificed all animals, and collected the spleen and testis for histological study.

2.4. Blood Sampling

At the end of the experiment, we used the heart puncture technique to draw the blood. We divided the drawn blood into 1 cc and stored it in a heparin tube for a complete blood picture. We then placed the remaining blood in a gel and clot activator tube and centrifuged it for 15 minutes. We placed the serum in a sterile Eppendorf tube and maintained it at a temperature of -20 ℃ for biochemical analysis. Then, we sacrificed all the animals to collect samples of the spleen and testes for a histopathological study.

2.5. The Parameters

We estimated the blood parameters, the hormones T3, T4, TSH,LH,FSH, and Testosterone [13], the antioxidants myeloperoxidase [14], malonaldehyde [15], glutathione peroxidase [16], superoxide dismutase [17], vitamin C [18], E [19], and glutathione [20], using ELISA kits from Cusabio, USA.

2.6. Statistical Analysis

The Statistical Analysis System (SAS, 2018) program was used to detect the effect of different factors on study parameters. In this study, we significantly compared the means using the least significant difference (LSD) test (Analysis of Variation, ANOVA) [22].

2.7. Histological study

The histological study had the following purpose, as stated in [23]:
1-Fixition, 2-cutting, 3-dehydration, 4-clearing, 5-blocking, 6-sectioning, 7- Staining, 8-Mounting, 9- Examination.

3. Results

3.1. Blood parameters

3.1.1. Total white blood cell count (x 10^9 /L)

Table 1 shows that after 30 days, there was a significant increase ($P \leq 0.05$) in white blood cells in the G1 group when they were treated with apricot seed extract at a concentration of 10 mg/kg compared to the control group (4.62 ±2.06). There was also a non-significant increase in white blood cells in the G2, G3, and G4 groups when they were compared to the control group (4.62 ±2.06).

3.1.2. Platelets (PLT) Count (10^9 /L)

Table 1 shows that groups G1, G2, and G3 had more blood platelets than the control group (505.20 ±127.25), with values of 844.8 ±93.53, 6601.60 ±36.39, and 7785.60 ±75.66, respectively ($P \leq 0.05$). Results showed that there were non-significant differences in RBC, Hb, hematocrit, MCH, and MCHC in the treated groups as compared with the control.

Table 1. Effect of apricot seed extract (10, 20, 40 mg\kg) on blood picture.

Group	WBC (10^9 /L)	PLT(10^9 /L)	RBC(10^{12}/L)	HG (g/dl)	HCT (%)	MCH (Pg/cell)	MCHC (g/dl)
Control	5 .40 ±0.54 c	601.80 ±67.48 b	6.48 ±0.23	11.84 ±0.37	37.08 ±1.07	18.28 ±0.10	31.86 ±0.24
G1=10 mg\kg	11.76 ±2.50 a	844.80 ±93.53 a	6.81 ±0.53	13.06 ±0.61	37.42 ±2.73	19.56 ±1.59	35.42 ±2.47
G2= 20 mg\kg	7.22 ±1.20 b	601.60 ±36.39 b	6.76 ±0.09	11.98 ±0.22	37.40 ±0.39	17.72 ±0.28	32.04 ±0.27
G3=40 mg\kg	7.30 ±1.30 b	785.60 ±75.66 ab	7.30 ±0.40	13.16 ±0.71	40.22 ±1.76	18.04 ±0.24	32.68 ±0.35
LSD value	4.337 **	213.85 *	1.071 NS	1.559 NS	5.170 NS	2.452 NS	3.785 NS
P-value	0.0024 significantly **	0.050 significantly *	0.452	0.189	0.551	0.430	0.205

3.2. Hormones Parameters

3.2.1. Triiodotherionin (T3) (m IU/ml) concentration

Table 2 showed that there were no significant differences in hormone T3 in the G1 (1.81 ±0.15) when compared with control (1.30 ±0.08), and there was a significant increase (P≤0.01) in the G2 and G3 (2.54 ±0.31) (4.09 ±0.2) ,when compared with control (1.30 ±0.08).

3.2.2. Titraiodothyronin (T4) concentration (m IU/ml)

Table 2 showed that there was a significant increase (P≤0.01) for thyroxine hormone in the G1, G2, and G3 (18.39 ±3.64), (26.62 ±6.11), and (54.98 ±8.37), respectively, when compared with the control (8.12 ±1.73).

3.2.3. Thyroid stimulating hormone concentration

There was a significant drop (P≤0.01) in thyroid stimulating hormone (TSH) levels in all three groups compared to the control group (5.62 ±1.47). The levels were 3.27 ±0.29, 22.57 ±0.25, and 2.13 ±0.36 (**Table 2)**.

Table 2. Table 2:Effect of apricot seed extract (10, 20, 40 mg\kg) on TSH (m IU/ml), T3 (m IU/ml) and T4 (m IU/ml), Hormones level.

Group	Mean ± SE		
	T3(mIU/l)	T4(mIU/l)	TSH(mIU/l)
Control	1.30 ±0.08 c	8.12 ±1.73 c	5.62 ±1.47 a
G1=10 mg\kg	1.81 ±0.15 c	18.39 ±3.64 bc	3.27 ±0.29 b
G2= 20 mg\kg	2.54 ±0.31 b	26.62 ±6.11 b	2.57 ±0.25 b
G3=40 mg\kg	4.09 ±0.28 a	54.98 ±8.37 a	2.13 ±0.36 b
LSD value	0.690 **	16.685 **	2.343 *
P-value	0.0001	0.0001	0.0275

Means having with the different letters in same column differed significantly. * (P≤0.05), ** (P≤0.01).

3.2.4. Follicle stimulating hormone (ng/ml) concentration

Table 3 shows that the levels of follicle-stimulating hormone are significantly lower (P≤0.01) in the G1(11.76 ±2.50) and G2(10.30 ±0.66) groups compared to the control (26.08 ±2.28). However, there is no significant difference between the G3(27.04 ±3.38) group and the control (26.08 ±2.28).

3.2.5. Luteinizing hormone (interstitial cell stimulating hormone) mIU/ml concentration

The results in the **Table 3** show that there is a significant decrease *(P≤0.05) in the concentration of luteinizing hormone in the G1 (3.75 ±0.57) and G2 (6.58 ±0.62), respectively, when compared with the control (8.93 ±1.50), and there is no significant difference in the G3

(9.86 ±2.86) when compared with the control (8.93 ±1.50).

3.2.6. Testosterone hormone (ng\dL)

The results in the **Table 3** show that there is a high significant decrease (P≤0.01) in the G1 (2.49 ± 0.10), G2 (3.86 ± 0.52), and G3 (4.67 ± 0.58), respectively, when compared with the control (6.72 ± 0.64).

Table 3. Effect of apricot seed extract (10, 20, 40 mg\kg) on FSH (ng/ml), LH (mIU/ml) and Testosterone (ng\dL) hormones.

Group	Mean ± SE		
	FSH(ng/ml))	ICSH (mIU/ml)	Testosterone (ng/dL)
Control	26.08 ±2.28 a	8.93 ±1.50 a	6.72 ±0.64 a
G1=10 mg\kg	11.76 ±2.50 b	3.75 ±0.57 b	2.49 ±0.10 c
G2= 20 mg\kg	10.30 ±0.66 b	6.58 ±0.62 ab	3.86 ±0.52 bc
G3=40 mg\kg	27.04 ±3.38 a	9.86 ±2.86 a	4.67 ±0.58 b
LSD value	7.251 **	5.009 *	1.526 **
P-value	0.0001	0.0453	0.0002

Means having with the different letters in same column differed significantly. ** (P≤0.01) ,* (P≤0.05) .

3.3. Antioxidant parameters

3.3.1. Myeloperoxidase

The myeloperoxidase levels were significantly lower in groups G1 (2.19 ±0.14), G2 (2.67 ±0.18), and G3 (4.41 ±0.27) compared to the control group (88.20 ±1.06) (P≤0.01) **(Table 4).**

3.3.2. Malonaldehyde

A significant rise (P≤0.01) in the concentration of malonaldehyde was seen in the G1 group (4.16 ±0.33) compared to the control. There was no significant difference between the other groups (2.17 ±0.21) and the control (2.26 ±0.04) **(Table 4).**.

3.3.3. Glutathione peroxidase, catalase, superoxide dismutase

Results showed a significant decrease (P≤0.01) in the value of glutathione peroxidase, catalase, and superoxide dismutase in the three groups compared with the control **(Table 4)**.

3.3.4. Vitamin E, and C

Results showed a significant decrease (P≤0.01) in the value of vitamin C and E in the first and second groups compared with the control, and there is no significant difference in the three groups compared with the control **(Table 4).**

Table 4. Comparison between difference groups in oxidants and vitamins parameters.

Group	Mean ± SE							
	MPO mmol\L	MDA mmol\L	GPX IU\L	CAT IU\L	SOD IU\L	Vit. C mg\kg	Vit. E mg\kg	GSH mmol\L
Control	8.20±1.06a	2.26±0.04b	13.12±2.44a	25.95±4.85a	281.87±70.36a	29.23±3.75a	13.22±1.71a	36.49±7.38a
G1	2.19±0.14 c	4.16±0.33a	2.70±0.28b	7.38±0.27b	60.75±1.79b	11.31±0.89b	5.16±0.34b	10.74±0.84a
G2	2.67±0.18c	2.17±0.21b	4.15±0.12b	10.06±0.63b	77.52±4.69b	14.65±0.64b	6.86±0.47b	16.17±0.55a
G3	4.41±0.27b	2.29±0.12b	5.56±0.51b	13.16±1.63b	129.64±13.29b	24.16 ±1.51 a	13.43±1.04a	38.65±18.01a
LSD value	1.682 **	0.621 **	3.774 **	7.744 **	107.6 **	6.29 **	3.128**	29.21 NS
P-value	0.0001	0.0001	0.0001	0.0006	0.0019	0.0001	0.0001	0.140

Means having with the different letters in same column differed significantly. ** (P≤0.01)

3.4. Histological Examination

Histological, Layers of tissue known as the tunica cover the testicle. We refer to the outer layer as the tunica vaginalis and the inner layer as the tunica albuginea. The testicle divides into parts known as lobules. Each lobule contains tubes called seminiferous tubules. The tubules are responsible for spermatogenesis. Between the seminiferous tubules are cells called interstitial cells, or Leydek cells, which secrete the hormone testosterone (**Figures 1, 2**).

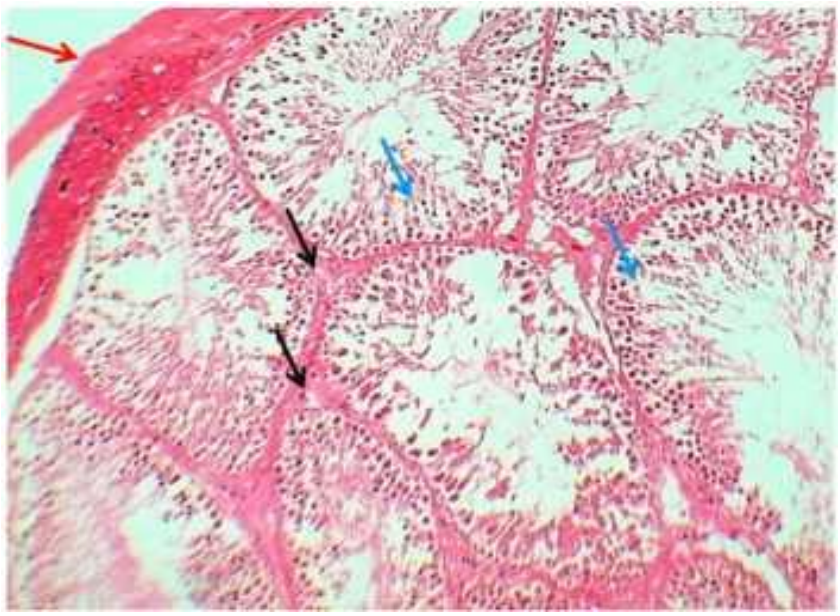

Figure 1. Section of testis (Control 30 days) shows: Normal appearance of germinal epithelium (Blue arrow), interstitial cells (Black arrows tunica albuginea (red arrow). H&E stain.(100x) albuginea (red arrow). H&E stain (100x).

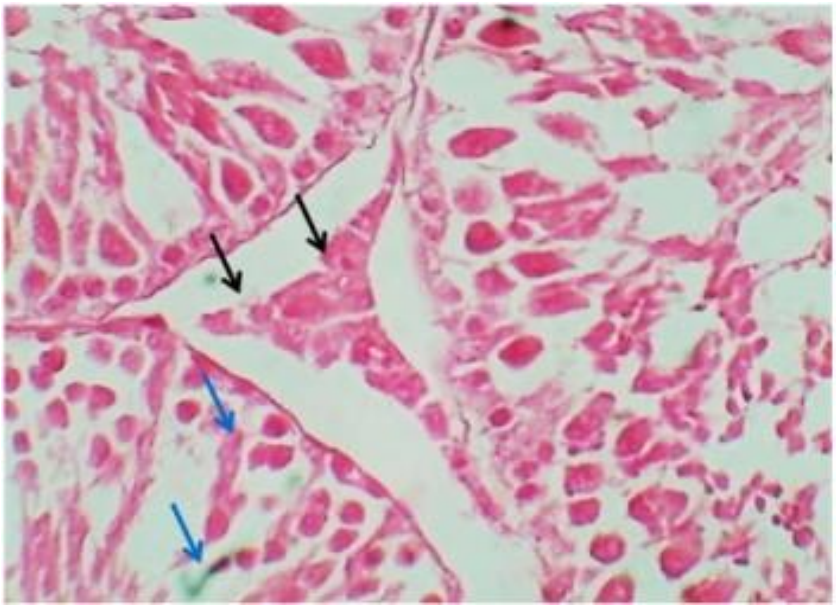

Figure 2. Section of seminiferous tubule (Control 30 days) shows: Normal appearance of germinal epithelium (Blue arrow), interstitial cells (Black arrows). H&E stain.(400x).

The spleen consists of two types of tissue called white pulp and red pulp. The white pulp is lymphatic tissue consisting mainly of lymphocytes around arteries. The red pulp consists of venous sinuses filled with blood and cords of lymphatic cells, such as lymphocytes and

macrophages. The splenic artery brings blood into the spleen, which filters it through the sinuses before it exits through the splenic vein (**Figures 3, 4**).

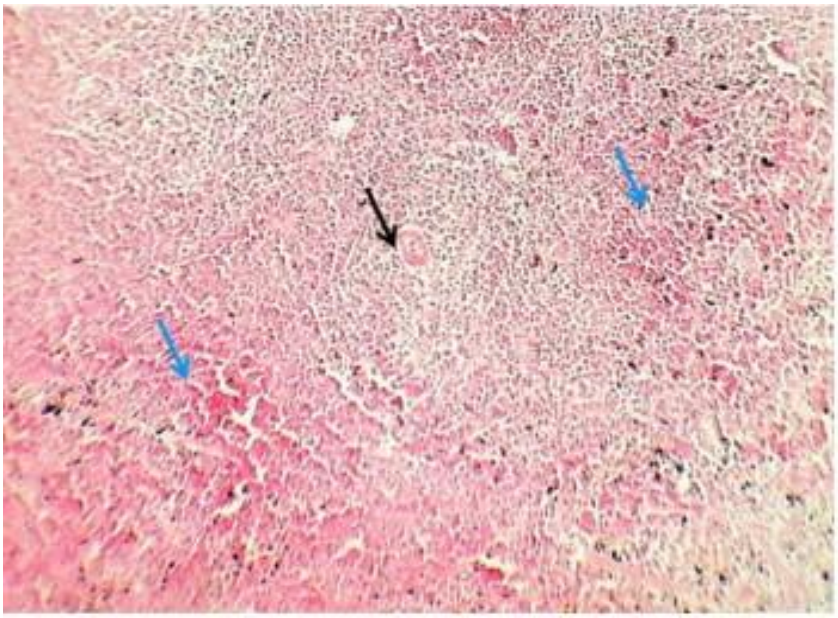

Figure 3. Section of spleen (Control 30 days) shows: Normal appearance of central arteriole of lymphoid follicle of white pulp (Black arrow) & splenic sinusoid of red pulp (Blue arrows). H&E stain.100x.

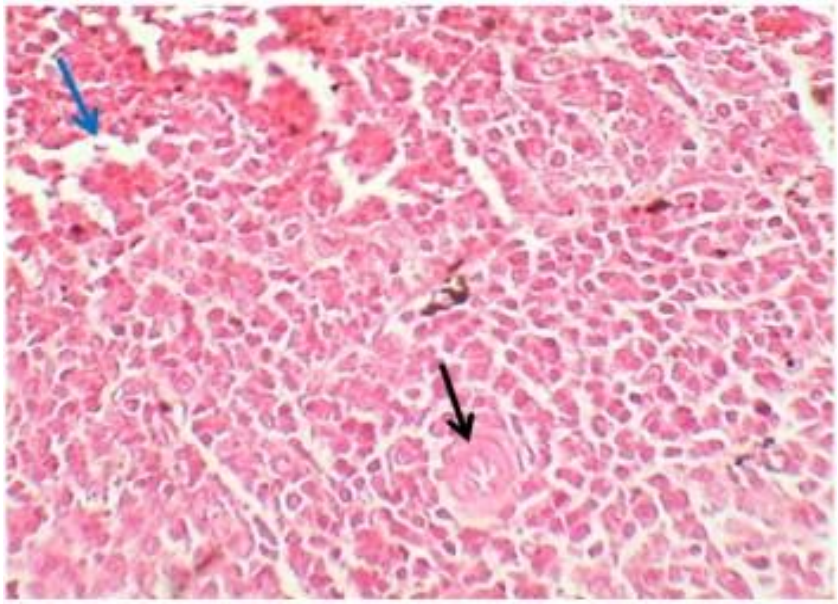

Figure 4. Section of spleen (Control 30 days) shows: Normal appearance of central arteriole of lymphoid follicle of white pulp (Black arrow) & splenic sinusoid of red pulp (Blue arrows). H&E stain.400x.

The testes and spleen tissue of rats that received G1=10 mg/kg apricot seed extract after 30 days. In comparison with sections of the control group, the sections of the ovary were similar to those in the control group (**Figures 5-8**).

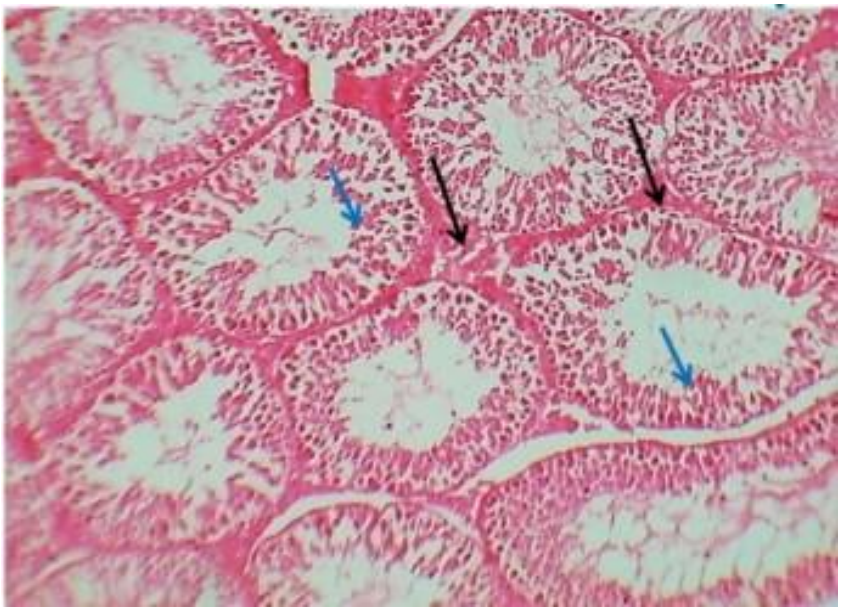

Figure 5. Section of testis (G1-10mg\kg for 30 days) shows: Normal appearance of germinal epithelium (Blue arrow) & interstitial cells (Black arrows). H&E stain.100x.

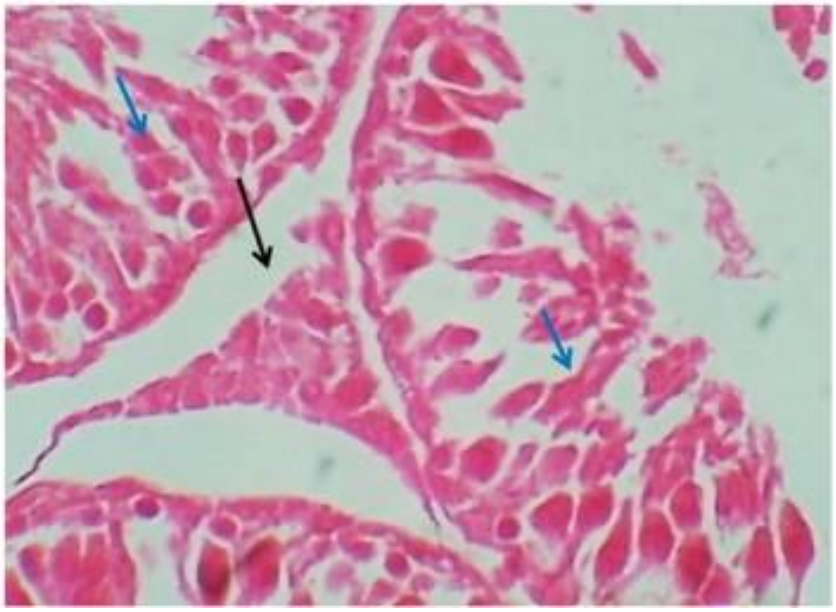

Figure 6. Section of seminiferous tubule (G1-10mg\kg for 30 days) shows: Normal appearance of germinal epithelium (Blue arrow), interstitial cells (Black arrows). H&E stain.400x.

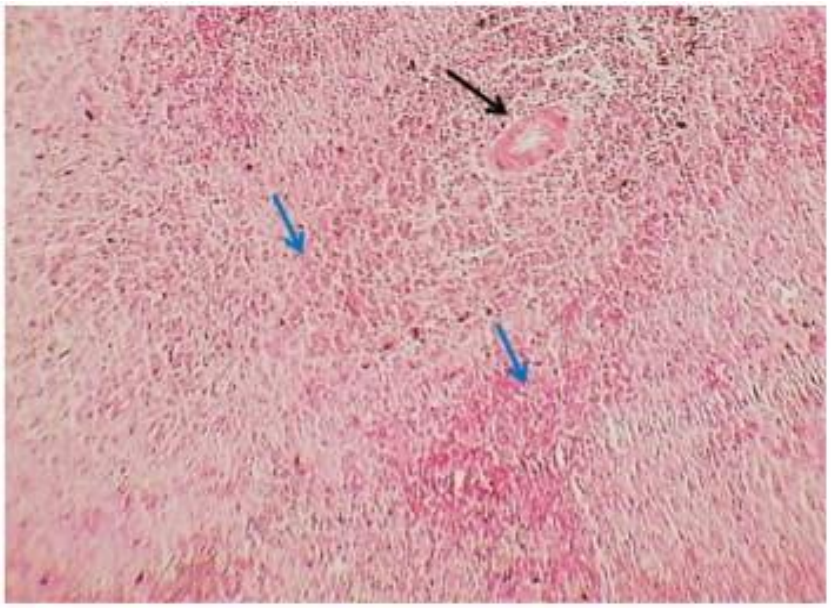

Figure 7. Section of spleen (G1-10mg\kg for 30 days) shows: Normal appearance of central arteriole of lymphoid follicle of white pulp (Black arrow) & splenic sinusoid of red pulp (Blue arrows). H&E stain.100x.

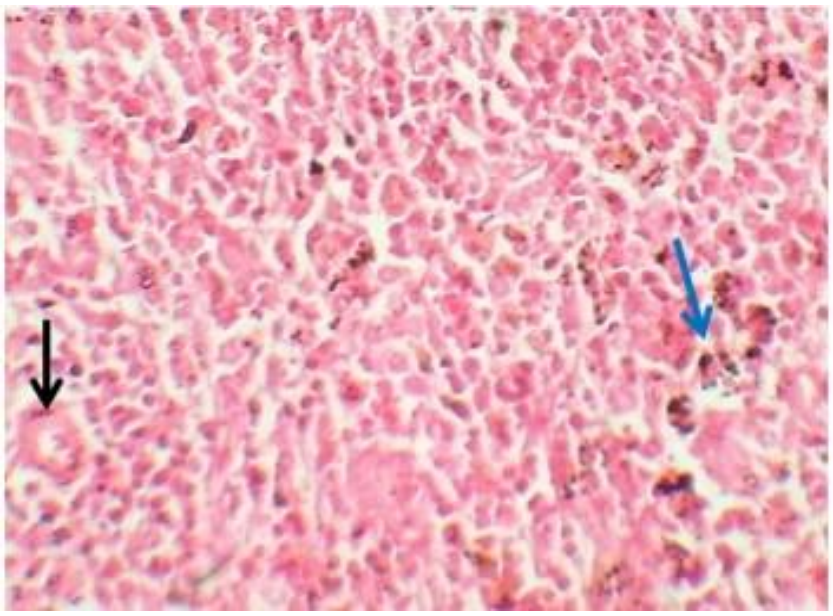

Figure 8. Section of spleen (G1-10mg\kg for 30 days) shows: Normal appearance of central arteriole of lymphoid follicle of white pulp (Black arrow) & splenic sinusoid of red pulp with hemosiderin laden macrophages (Blue arrows). H&E stain.400x.

The rats that received G2 = 20 mg/kg apricot seed extract after 30 days had similar testes and spleen tissue. In comparison to the sections of the control group, the sections of the testes and spleen were similar (**Figures 9-12**).

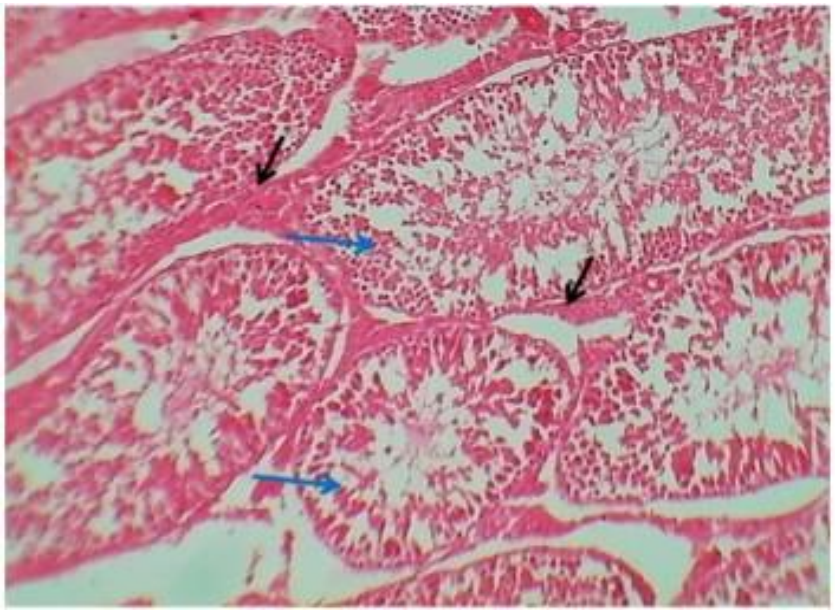

Figure 9. Section of testis (G2-20mg\kg for 30 days) shows: Normal appearance of germinal epithelium (Blue arrow) & interstitial cells (Black arrows). H&E stain.100x.

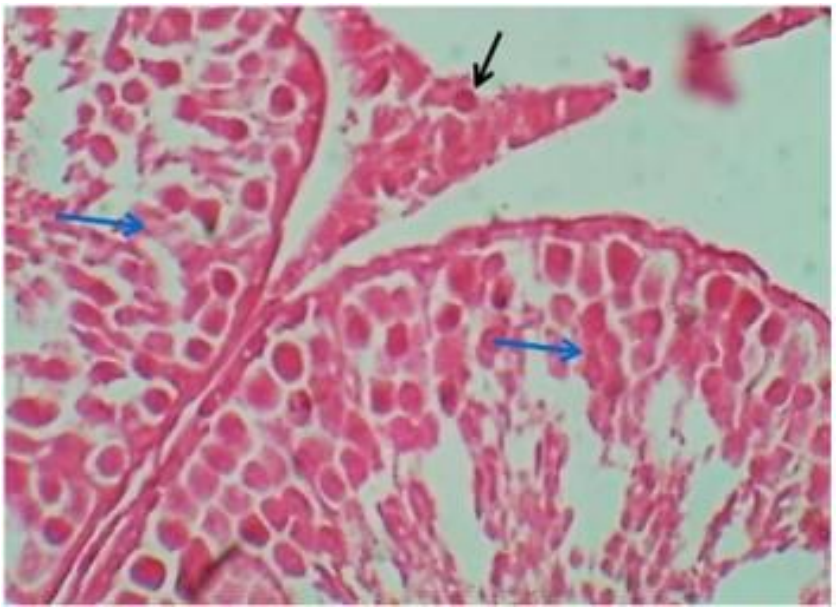

Figure 10. Section of seminiferous tubule (G2-20mg\kg for 30 days) shows: Normal appearance of germinal epithelium (Blue arrow), interstitial cells (Black arrows). H&E stain.400x.

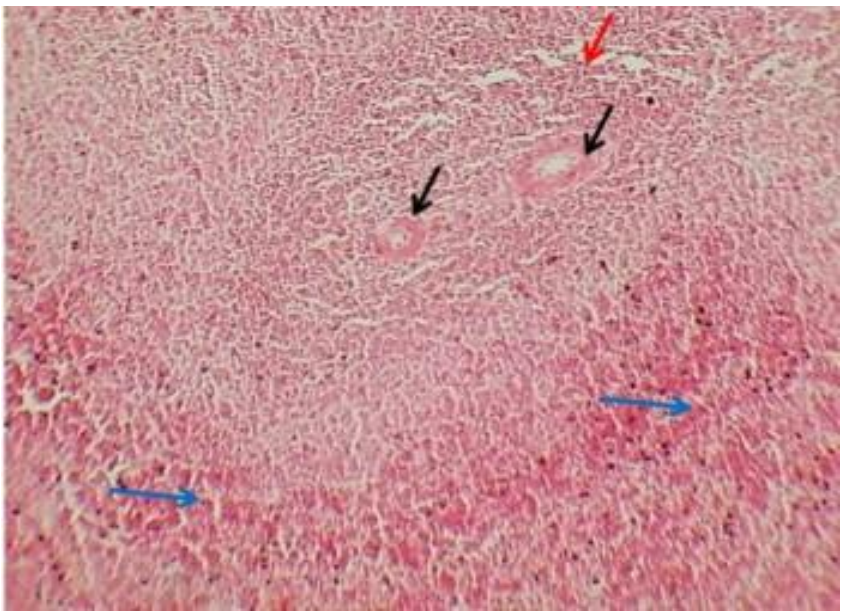

Figure 11. Section of spleen (G2-20mg\kg for 30 days) shows: Normal appearance of central arterioles of lymphoid follicle of white pulp (Black arrow) with germinal central (Red arrow) & splenic sinusoid of red pulp (Blue arrows). H&E stain.100x.

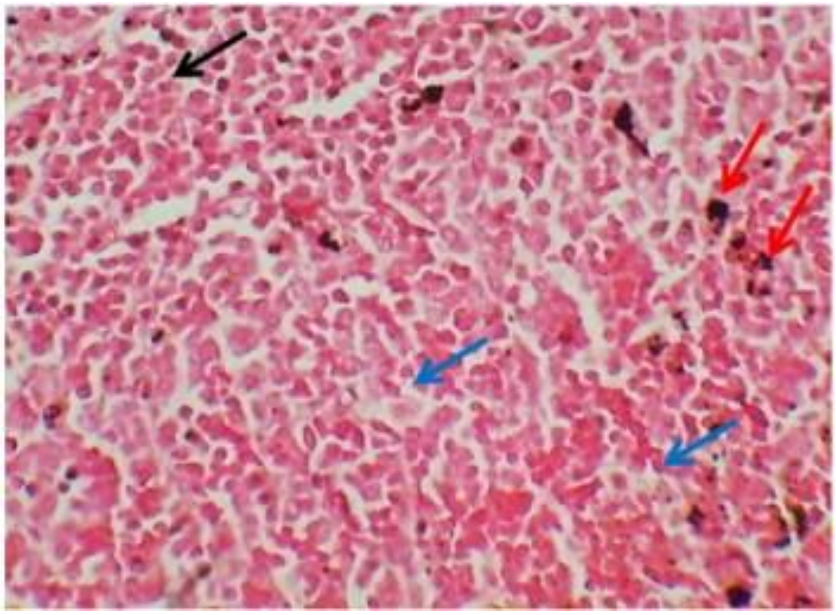

Figure 12. Section of spleen (G2-20mg\kg for 30 days) shows: Normal appearance of lymphocytes of lymphoid follicle of white pulp (Black arrow), splenic sinusoid of red pulp (Blue arrows) with hemosiderin laden macrophages (Red arrows). H&E stain.400x.

Rats that received G3=40 mg/kg apricot seed extract after 30 days had similar testes and spleen tissue. In comparison to the sections of the control group, the sections of the testes and spleen were similar (**Figures 13-16**).

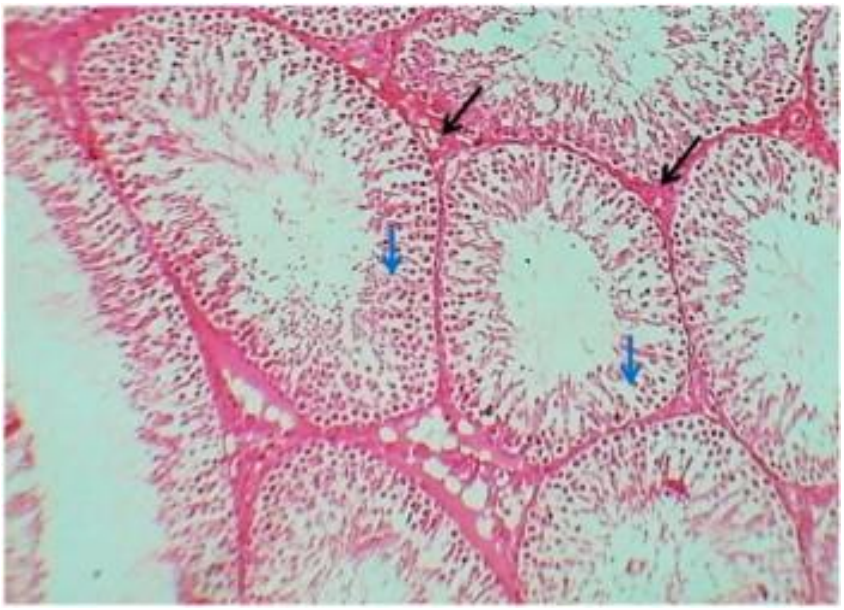

Figure 13. Section of testis (G3-40mg\kg for 30 days) shows: Normal appearance of germinal epithelium (Blue arrow) & interstitial cells (Black arrows). H&E stain.100x.

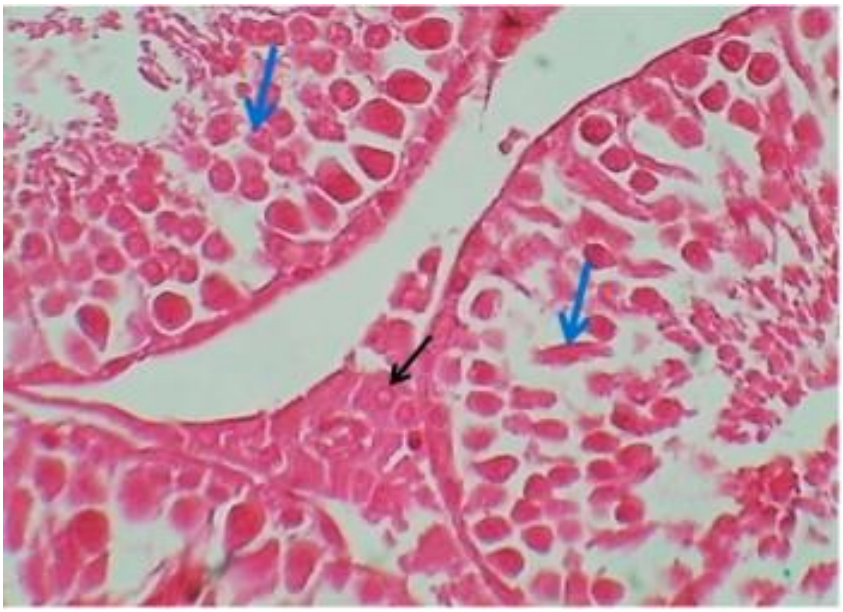

Figure 14. Section of seminiferous tubule (G3-40mg\kg for 30 days) shows: Normal appearance of germinal epithelium (Blue arrow), interstitial cells (Black arrows). H&E stain.400x.

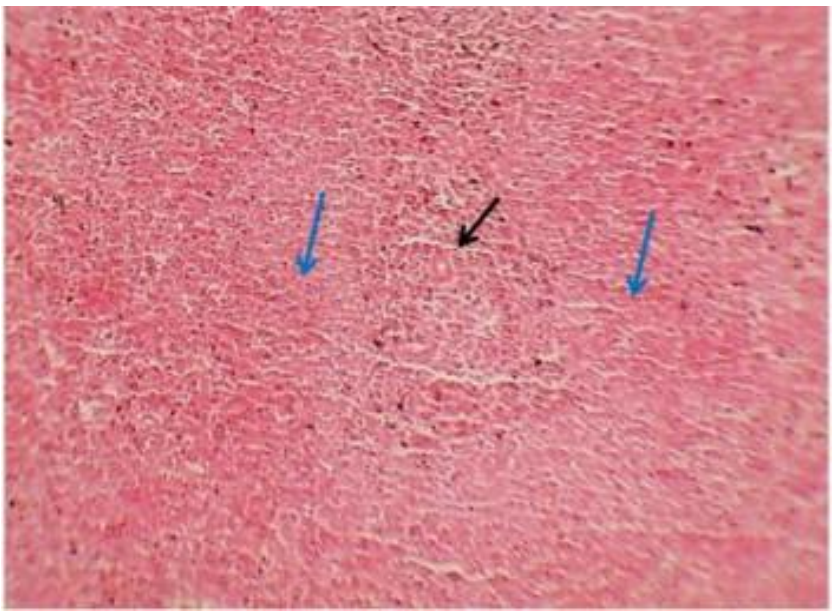

Figure 15. Section of spleen (G3-40mg\kg for 30 days) shows: Normal appearance of central arterioles of lymphoid follicle of white pulp (Black arrow) & splenic sinusoid of red pulp (Blue arrows). H&E stain.100x.

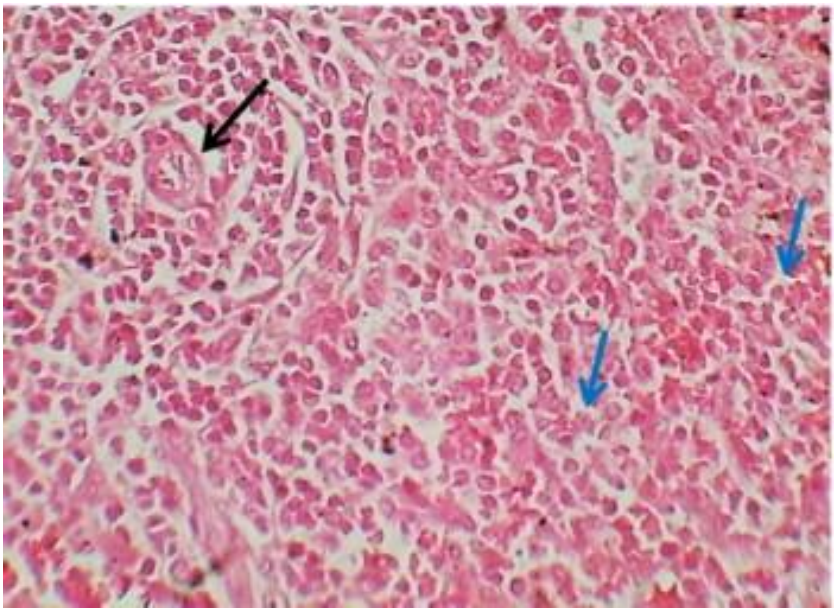

Figure 16. Section of spleen (G3-40mg\kg for 30 days) shows: Normal appearance of lymphocytes of lymphoid follicle of white pulp (Black arrow), splenic sinusoid of red pulp (Blue arrows). H&E stain.400x

4. Discussion

The current results show an increase in white blood cells and platelets, which may be due to oxidative stress caused by apricot almond extract [24]. The researcher [25] conducted another study on 5 groups of rabbits, giving them apricot seeds in three different doses, and found a significant increase in white blood cells, but no significant difference in the values of PCV, MCV, MCH, and MCHC.

Additionally, the researcher [26], who examined the effects of apricot seed extract on four groups of mice over 30-day period, found a significant increase in neutrophils, white blood cells, and platelets. However, there was no significant difference in other blood indicators such as RBC, HG, PCV, MCV, MCH, and MCHC, which aligns with the findings of the study.

The results in **Table 2** showed that the apricot seed extract increased T3 and T4 hormones, as well as a decrease in TSH. The explanation for this is that the thyroid gland is under the

influence of the hormone TRH, which is secreted from the hypothalamus, this hormone works to stimulate the secretion of TSH hormone from the anterior lobe of the pituitary gland, and TSH hormone stimulates the thyroid gland to secrete hormones such as T3 and T4. Excess T3 and T4 hormones lead to a decrease in TRH secretion, which in turn triggers a decrease in TSH. This phenomenon, known as negative feedback, aligns with our study [27].

The researcher Halenar found that intramuscular amygdalin did not affect the levels of thyroid hormones in another study he conducted on female rabbits to determine if amygdalin affects hormones [28]

Previous researchers investigated the effect of natural substances on the reproductive system [29-31], investigated the effect of amygdalin on the female reproductive system, and described the effect of natural substances containing cyanide on sperm motility. This study examined the impact of apricot seed extract on hormones in male rats, as well as its influence on testicular tissue. The findings reveal a reduction in the concentration of follicle-stimulating hormone and luteinizing hormone in animals treated with apricot seed extract, when compared to the control group. The hypothalamus gland secretes the gonadotropin-releasing hormone (GnRH), which stimulates the anterior lobe of the pituitary gland to secrete the hormones FSH and LH. [32,33]. Oxidative stress impacts the release of the gonadotropin-releasing hormone (GnRH) [34]. The decrease in luteinizing hormone, which stimulates the release of testosterone, results in a decrease in testosterone concentration. This is consistent with our results [27]. Researchers [35] also found that apricot seeds given orally to rabbits have the ability to disturb the level of the FSH hormone.

The current study examined the extract's impact on antioxidant indicators in male rats, revealing a rise in malonaldehyde enzyme levels. It is considered an indicator of lipid peroxidation in the body; this is evidence that the extract works to increase lipid peroxidation. The results also showed a decrease in the enzyme myeloperoxidase, which is an enzyme expressed by a gene found in neutrophilic white blood cells. Inflammation in the body causes a lack of myeloperoxidase, which explains the increase in white blood cells due to the extract's cyanide content. This result agrees with [24]. The results also showed a decrease in the enzymes superoxide dismutase and glutathione peroxidase, which are two enzymes that work to reduce free radicals and prevent lipid peroxidation. The concentration of vitamins A and C also decreased. This could be due to the extract's anti-cancer properties [36], which eliminate all free radicals in the body to prevent cell damage. Amygdalin hydrolyzes into glucose and mandelonitrile, an unstable molecule that decomposes into HCN and benzaldehyde [37]. Excessive production of benzaldehyde raises the levels of reactive oxygen species (ROS) in cells [38].

However, [39] concluded that the increase in free radicals in the body could be useful for stimulating the immune system by raising white blood cells and eliminating the pathogen. Perhaps this is the mechanism by which the extract eliminates pathogens.

That these indicators may have gone down because the extract contains amygdalin, a chemical that makes the body make more free radicals. This creates an oxidative imbalance, which in turn causes cells to die on their own. This extract mechanism eliminates cancer and improves the immune system [40]. **Figures 1** and **2** illustrated the histopathological figures of the control negative groups of the testis, revealing a normal tunica albuginea (capsule), seminiferous tubules, germinal epithelium, and normal interstitial cells. There were no abnormalities in the spleens of the control negative groups. The splenic capsule, lymphoid follicles of the white pulp, splenic cords, or sinusoids of the red pulp looked normal (**Figures 3, 4**). The histopathological of the rats

that received Iraqi apricot seed extract at doses of 10, 20, and 40 mg kg, respectively **(Figures 1-3)**, for 30 days, were all similar to those of the control negative group (**Figures 5-16**).

5. Conclusions

Iraqi apricot seed extract has negative effects on thyroid hormone, as it causes an increase in the levels of T3 and T4 hormones ,extract plays a role in oxidative stress and antioxidants, as evidenced by an increase in MDA and a decrease in MPO, GPX, Vit C, E, SOD CAT as well as the extract led to a decrease in the concentrations of the fertility hormones FSH, LH, and testosterone and increased WBC and PLT without affecting RBC, Hb, HCT, MCV, MCH, or MCHC. |But has no effect on testes or spleen tissue.

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Conflict of Interest

There is no conflict of interest.

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Ethical Consideration:

The Ethics Board of the College of Science for Women, University of Baghdad, approved the study, all research participants agreed, and the work proceeded.

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