



ROLE OF TAURINE IN MALE REPRODUCTIVE SYSTEM PERFORMANCE IN ADULT MALE RATS EXPOSED TO OXIDATIVE STRESS BY HYDROGEN PEROXIDE

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ABSTRACT

The experiment has been conducted to study the role of taurine of the concentration (0.5 & 1%) in the performance of the male reproductive system of rats that are exposed to oxidative stress by hydrogen peroxide for six weeks. 32 albino adult male rats aged (12-14) weeks and weighing (252.3 +/- 27.08 gram), divided into four groups: Control Group:- this group is given natural water. Group (2): treated with (H₂O₂, 0.5%) in drinking water. Group (3): treated with (H₂O₂, 0.5%) by taurine (0.5%) in drinking water. Group (4): treated with (H₂O₂, 0.5%) by taurine (1%) in drinking water. The results reveal that this exposure with (0.5 % H₂O₂) has led to an significant decrease in the body weight and the ano – genital distance, the percentage weight of the testicles, head and tail of epididymis, prostate gland, seminal vesicles, the percentage of live sperms, the number of Legdig and Sertoli cells, as well as the significant increase in the percentage of abnormal sperms and an significant decrease in the diameter of seminiferous tubules. Treatment with taurine (0.5 & 1%) has led to an significant improvement in the body weight, ano-genital distance, the percentage of the testicles weight, head and tail of epididymis, prostate gland, seminal vesicles, the percentage of live sperms, the number of Legdig and Sertoli cells, as well as the significant decrease in the percentage of abnormal sperms and an significant increase in the diameter of seminiferous tubules in comparison with the treatment group by hydrogen peroxide. Treatment with taurine (1%) has led to an significant improvement of the sperm count and the percentage weight of the head and tail of the epididymis as well as the number of Legdig and Sertoli cells compared with the control group and the group of taurine (0.5%).

Keywords: ano–genital, epididymis, prostate gland , rats, taurine.

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INTRODUCTION

Taurine – (2- aminoethane sulphonic acid) is of the B-amino acids and is one of the semi-essential amino acids. Sulfur is one of its ingredients and exists in the body in a free manner and it is included in many simple peptides, however it does not participate in the formation of proteins and bio-activities (Raiha *et al.*, 1975).

In 1827, the taurine was first recognized as one of the ingredients of the gallbladder. The nutritional importance of taurine for humans was determined in 1975 (Raiha *et al.*, 1975), taurine is one of the organic compounds that are of low molecular weight and exists in humans and many animals (Huxtable 1992) because it is one of the amino-acids that are semi-basic, it exists abundantly in many tissues, namely in animals. Milk, meat, eggs, poultry, and fish are good sources of

taurine whilst taurine does not exist in plants (Balch and Balch 1997; Balch and James 2000), as well as it is formed in many other tissues such as the central nervous system, liver, kidney, as well as in the retina and the mammary gland (Oertal *et al.*, 1981; Pasantes-Morales *et al.*, 1976).

As for the male reproductive system, taurine is located in Legdig cells and some of the interstitial cells of the testes and the epithelial cells of the canals in rats (Lobo *et al.*, 2000). Also (Holmes *et al.*, 1992; Hinton 1990) indicate the existence of taurine among the free main amino acids of the sperm cells and the semen fluid, As well as, (Li *et al.*, 2006) has indicated that the taurine is synthesis in the organs of the male reproductive system.

Taurine plays various physiological activities as capacitating agent (Alvarez and Storey 1983), antioxidant (Meizel *et al.*, 1980; Meizel 1985),

membrane-stabilizer factor (Mrsny and Meizel 1985), and sperm movement factor (Botman *et al.*, 1990). Taurine activates the secretion of the testosterone hormone inside and outside the body (Yang *et al.*, 2010). Also (Jacobsen and Smith 1968) states its importance in organizing the contraction and the diastole of the heart. Whereas Huxtable and Spbring (1983); Bousquest *et al.*, (1981) mention its role in decreasing high blood pressure, as well as Satoh and Sperelakis (1998) has shown that taurine affects, in a direct and indirect way, the organizing of calcium ion via controlling the calcium and sodium canals as well as its role in the magnesium and potassium canals, by so doing it helps creating nerve impulses and preserves osmotic pressure of the cells especially the retina in which taurine is existed with high concentrations (Militante and Lombardini 2002).

It is mentioned by Skopnik *et al.*, (1991) that treatment with taurine leads to high concentrations of vitamin (E) in the blood. Taurine works on increasing the absorption of vitamin (E) in the intestines. It has also been noticed that taurine is antioxidant when mixed with various types of (tocopherols) changing them from the non-dissolved form into the dissolved one thus protecting vitamins from destruction by the various active types of oxygen (Petrosian and Haroutounian 2000).

The concentrations of vitamin (C) in the blood and the brain increase when treated by taurine (Petrosian and Haroutounian 2000; Mochizuki and Yokogoshi 2000). A direct relation has been found by (Mahalakshmi *et al.*, 2003) between the levels of selenium and taurine in the blood and Piao *et al.*, (1990) has noticed an increase in the excretion of taurine and glutathione via the kidneys in rats which feed on selenium short food.

So far, the role of taurine is still unclear in the male reproductive system, so this study aims at knowing the role of taurine to decrease or stop oxidative stress by hydrogen peroxide in the performance of the male reproductive system in adult rats.

MATERIALS AND METHODS

The study has been conducted at the animal house of the college of Veterinary Medicine/ Mosul University.

1. Animals

Thirty-two (32) albino adult male rats aged (12-14) weeks and weighing (252.3 +/- 27.08 gram) were used The animals of the study have been bred in plastic cages with stainless steel lids with dimensions

of (20x30x20) in animal breeding room which is compatible with the general conditions of breeding of illumination by (12 hours) and temperature of (23.5+/- 4.2) and adequate ventilation and water and foods are at lipitum.

2. Experimental Design

The animals of the experiments (32 rats) have been equally distributed on the four groups of the experiment as follows:

- a) Group One (control group): the group has been given drinking water during the whole experiment which lasted six weeks.
- b) Group Two (hydrogen peroxide group , Laboratory reagents India): the animals of the experiments have been treated with hydrogen peroxide with drinking water of the concentration (0.5%) for six weeks.
- c) Group Three (hydrogen peroxide group0.5% +taurine treated 0.5% (BDH Laboratory reagents chemicals Ltd, poole, England) 0.5%. The animals of the experiment are treated with hydrogen peroxide with the concentration (0.5%) as well as taurine of 0.5% with drinking water for six weeks.
- d) Group Four (hydrogen peroxide group0.5% +taurine treated 1%): The animals of the experiment are treated with hydrogen peroxide with the concentration (0.5%) as well as taurine of (1%) with drinking water for six weeks.

3. Ano-genital distance (AGD mm)

This distance is measured according to the method described in (Putz *et al.*, 2001).

4.Weight of the reproductive organs and the related glands.

After the treatment period was over the animals of the experiments were killed then the right testis was cut and the epididymis with its three parts (head, body, tail) independently and weighing each part alone, the same procedure has been applied on the left testis, after that the seminal vesicle was extracted, the right and left ones and then the prostate gland and each one was weighed.

5. Sperms count

The method stated in (Sakamoto and Hashimoto 1986) has been used to calculate the sperms in the head of the epididymis, sperm count was calculated in the one millimeter of the head of the epididymis as stated in (Bearden *et al.*, 2004).

6. Living and abnormal sperms

The method mentioned by (al-Saedy 2001) has been employed to measure the percentage of the living and abnormal sperms.

7. The diameters of the seminiferous tubules

These are measured by measuring the axes of the longitude and latitude diameters (micron) by using the ocular micrometer. The average of the diameter of each seminiferous tubule is taken then multiplied by the coefficient (10) of the ocular micrometer. Forty seminiferous tubules have been measured for each rat and so the diameter of each seminiferous tubule is as follows:

Seminiferous tubule diameter (micron)= average of longitude and latitude diameters of the seminiferous tubule, (calculated from the ocular micrometer) multiplied by (10) (coefficient) (Qasab-Bashi 2009).

8. Legdig and Sertoli cells

The method mentioned by (Luna 1968) is used to calculate these cells.

9. Statistical Analysis

Statistical analysis employed (SPSS) to analyze the results of the experiment and via which the data were analyzed statistically by using (one way analysis of variance) and by the complete randomized design (CRD) to analyze the difference of means; also the average and the standard errors have been extracted, as well as, the Duncan's multiple rang test has been used to measure the differences in the averages and to know differences among the treatments of the experiment which showed significant differences between each other at ($p \leq 0.05$).

RESULTS

Body weight

The treatment with the concentration of (0.5%) of peroxide hydrogen has led to an significant decrease ($p \leq 0.05$) in the body weight at the fourth and sixth weeks of the treatment when compared with the control group, Table (1). Whereas the treatment of peroxide hydrogen with taurine by (0.5 or 1%) has removed the negative effect of the treatment with the hydrogen peroxide on the body weight. The statistical analysis has shown that the control group and the two groups of treatment of peroxide hydrogen with taurine by (0.5 or 1%) have not shown significant differences between one another in the body weight at the fourth and sixth weeks of the treatment

Table 1: Effect of taurine with drinking water by (0.5 or 1%) of adult male rats which are exposed to oxidative stress by (0.5%) hydrogen peroxide in the body weight at (0, 2, 4, and 6) weeks.

Groups	0 time	2 weeks	4 weeks	6 weeks
Control groups	269.3 ± 10.7a	274.3 ± 17.4a	278.2 ± 20.1a	275.6 ± 19.9a
Hydrogen peroxide group (0.5%)	263.8 ± 27.1a	257.1 ± 8.7a	231.1 ± 11.3b	219.6 ± 9.9b
Hydrogen peroxide group (0.5%) +(0.5%) taurine	277.3 ± 15.4a	281.4 ± 13.8a	271.3 ± 11.2a	269.6 ± 10.1a
Hydrogen peroxide group (0.5%) +(1%) taurine	264.2 ± 11.9a	269.8 ± 9.6a	259.4 ± 10.1a	252.8 ± 12.3a

- The values are expressed by (Mean +/- Standard Error).

- The different letters in the one column indicate that there are significant differences among the groups at ($p \leq 0.05$).

2. Ano-genetal distance (AGD)

The treatment of hydrogen peroxide with taurine by (1%) has removed the negative effect of the treatment by (0.5%) with hydrogen peroxide alone. The treatment of hydrogen peroxide with taurine by (1%) and the control group has not shown significant differences at the fourth and sixth weeks of the treatment. Whereas the group treated with hydrogen peroxide and the group of hydrogen peroxide with taurine by (0.5) has shown a significant decline ($p \leq 0.05$) in this feature when compared with the control group and the group of hydrogen peroxide with taurine (1%) at the fourth and sixth weeks of the treatment, table (2).

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Table 2: Effect of taurine treated with drinking water by (0.5 and 1%) at the ano-genital distance of the adult male rats exposed to oxidative stress of the concentration (0.5%) with hydrogen peroxide.

Groups	Ano-genital distance (mm) at 0 time	Ano-genital distance (mm) at 2 weeks	Ano-genital distance (mm) at 4 weeks	Ano-genital distance (mm) at 6 weeks
Control groups	39.5± 3.3a	40.1± 3.1a	42.7± 3.2a	44.5± 3.7a
Hydrogen peroxide group (0.5%)	39.7± 3.1 a	37.8 ± 3.2a	36.6± 2.8b	35.2± 2.9b
Hydrogen peroxide group (0.5%) +(0.5%) taurine	40.6 ± 2.6a	39.2 ± 3.1a	38.1± 3.8b	36.9± 3.3b
Hydrogen peroxide group (0.5%) +(1%) taurine	38.1 ± 3.4a	39.7± 2.9a	42.3± 3.2a	45.3± 2.2a

- The values are expressed by (Mean +/- Standard Error).
- The different letters in the one column indicate that there are significant differences among the groups at ($p \leq 0.05$).

3. Sperm count

Viewing table (3), we notice that the treatment of hydrogen peroxide with taurine by (1%) has led to an significant increase of ($p \leq 0.05$) in the sperm count compared with the control group as well as the group treated with hydrogen peroxide by (0.5%) and the group treated by hydrogen peroxide with taurine (0.5%).

The treatment of hydrogen peroxide with taurine by (0.5%) has removed the negative effect of the concentration of (0.5%) of hydrogen peroxide in the sperm count. The statistical analysis has shown that there were no significant differences ($p \leq 0.05$) between the control group and the group treated by hydrogen peroxide with taurine (0.5%); whereas the group of the concentration (0.5%) which is treated by hydrogen peroxide has shown a significant decline ($p \leq 0.05$) when compared with the control group and the two groups treated by hydrogen peroxide with taurine by (0.5% and 1%) table (3).

Table 3: Effect of the treatment by taurine with drinking water (concentration 0.5 and 1%) in the sperm count and the percentage of the living and abnormal sperms of the already mentioned rats, concentration 0.5%, by hydrogen peroxide.

Groups	Total sperm counts (ml)	Live sperm %	Abnormal sperm %
Control groups	1.23*10 ⁶ ± 17122b	86.3 ± 3.2 a	10.5 ± 3.2b
Hydrogen peroxide group (0.5%)	1.09 *10 ⁶ ± 12007c	73.6 ± 9.8b	27.2 ± 6.9c
Hydrogen peroxide group (0.5%) +(0.5%) taurine	0.68*10 ⁶ ± 87492b	88.6 ± 2.7a	12.3 ± 4.6b
Hydrogen peroxide group (0.5%) +(1%) taurine	2.57*10 ⁶ ± 12756a	91.2 ± 2.7a	5.5 ± 2.4a

- The values are expressed by (Mean +/- Standard Error).
- The different letters in the one column indicate that there are significant differences among the groups at ($p \leq 0.05$).

4. Percentage of the Living Sperms

Table 3, shows that the treatment with the concentration of (0.5 and 1%) taurine has positively affected a living sperm percentage; the statistical analysis has shown that there are no significant differences between the control group and the two groups treated by hydrogen peroxide with taurine by (0.5% and 1%) table (3). Whereas the treatment with hydrogen peroxide alone has shown significant decline ($p \leq 0.05$) when compared with the control group as well as the two groups treated by hydrogen peroxide with taurine by (0.5% and 1%).

5. Percentage of the Abnormal Sperms

The treatment by hydrogen peroxide with taurine by (1%) has significant decline ($p \leq 0.05$) in the percentage of the abnormal sperms when compared

with the control group as well as the group treated by hydrogen peroxide (0.5%) and also the group treated by hydrogen peroxide with taurine by (0.5%) (table 3), whereas the treatment with hydrogen peroxide alone has shown a significant decline ($p \leq 0.05$) when compared with the control group as well as the two groups treated by hydrogen peroxide with taurine (0.5 and 1%).

6. The Percentage Weight of the Testes and Prostate Gland

The treatment by hydrogen peroxide with taurine by (0.5% and 1%) has shown a significant

increase ($p \leq 0.05$) compared with the group treated by (0.5%) by hydrogen peroxide alone in the percentage weight for both the testes and the prostate gland, table (3), whereas treatment, by (0.5%) concentration, by hydrogen peroxide showed significant decline ($p \leq 0.05$) compared with the control group, and the control group together with the two groups treated by hydrogen peroxide with taurine by (0.5 and 1%) have not shown significant differences between one another, table (4).

Table 4: Effect of the treatment by taurine with drinking water by (0.5 and 1%) in the average of testes weight, seminal vesicles, prostate gland, and the average weight of the (head, body, tail) of the epididymis of the above mentioned rats with the concentration of 0.5%.

Groups	Average of Testes weight (mg/100g B.W.)	Average of Seminal Vesicles weight (mg/100g B.W.)	Average of Prostate Weight (mg/100g B.W.)	Average weight of Epididymis Head (mg/100g B.W.)	Average weight of Epididymis Tail (mg/100g B.W.)	Average of Epididymis body (mg/100g B.W.)
Control groups	379.4 ± 20.3a	31.6 ± 7.1b	29.4 ± 5.5a	26.3 ± 4.3b	21.4 ± 4.1b	10.3 ± 2.3a
Hydrogen peroxide group (0.5%)	287.3 ± 9.7b	22.4 ± 6.2c	21.7 ± 8.7b	19.5 ± 4.6c	18.9 ± 4.6c	9.9 ± 3.1a
Hydrogen peroxide group (0.5%) + (0.5%) taurine	399.5 ± 25.8 a	34.3 ± 7.5b	31.7 ± 6.1a	32.9 ± 5.2a	27.7 ± 3.6a	11.2 ± 2.9a
Hydrogen peroxide group (0.5%) + (1%) taurine	405.2 ± 30.7a	49.9 ± 7.3a	32.9 ± 5.2a	36.7 ± 6.8a	29.9 ± 4.9a	14.6 ± 3.8a

- The values are expressed by (Mean +/- Standard Error).

- The different letters in the one column indicate that there are significant differences among the groups at ($p \leq 0.05$).

7. Percentage Weight of Seminal Vesicles

The statistical analysis indicates that the group treated by hydrogen peroxide with taurine by (1%) shows significant increase ($p \leq 0.05$) in the percentage weight of the seminal vesicles when compared with the control group and the group treated by hydrogen peroxide alone as well as the group treated by

hydrogen peroxide with taurine by (0.5%); whereas the control group and the group treated by hydrogen peroxide with taurine by (0.5%) have not shown significant differences between one another, and the two other groups show significant increase ($p \leq 0.05$) in comparison with the group treated by hydrogen peroxide table (4).

8. Percentage Weight of the Head and Tail of Epididymis

The statistical analysis indicates that the treatment by hydrogen peroxide with taurine by (0.5% and 1%) has shown an significant increase ($p \leq 0.05$) in the percentage weight for both the head and tail of the epididymis in comparison with the control group and the group treated by hydrogen peroxide, concentration (0.5%), and the control group shows an increase significantly ($p \leq 0.05$) when compared the group treated by hydrogen peroxide by (0.5%); and the two groups treated by hydrogen peroxide with taurine by (0.5% and 1%) have not shown significant differences between each other, table (4).

9. Percentage Weight of the Epididymis Body

The four coefficients of the study have not shown significant differences between one another in the percentage weight of the epididymis body, table (4).

10. Seminiferous Tubules

Table (5) illustrates that the group treated by hydrogen peroxide shows a significant decline of ($p \leq 0.05$) in this seminiferous tubules when compared with the control group and the two groups treated by hydrogen peroxide with the concentration (0.5 and 1%) whilst the three last coefficients of the study show no differences between one another.

11. Legdig Cells

The group treated by hydrogen peroxide with taurine (1%) shows an increase significantly ($p \leq 0.05$) when compared with the control group and the group treated by hydrogen peroxide by (0.5%), as well as the group treated by hydrogen peroxide with taurine (concentration: 0.5%) and the control group and the group treated by hydrogen peroxide with taurine (concentration: 0.5%) have not shown significant differences between one another. The statistical analysis indicates that the two last groups have shown an significant increase when comparing each one with the group treated with hydrogen peroxide by (0.5%), table (5).

12. Sortoli Cells

Treatment by hydrogen peroxide with taurine (concentration: 1%) shows significant improvement in storli cell in comparison with the three groups of the other experiments, whereas the control group and the group treated by hydrogen peroxide with taurine (concentration: 0.5%) have not shown differences between each other. The two last groups have shown an significant increase with compared with the group treated by hydrogen peroxide (concentration: 0.5%), table (5).

Table 5: The effect of the treatment by taurine with drinking water (concentration: 0.5 and 1%) in the diameter average of the seminal vesicles and the number of the cells of Legdig and Sortoli of the rats mentioned above.

Groups	Average diameter of Seminiferous Tubules(Mi crons)	Legdig Cells	Sortoli Cells
Control groups	187.4 ± 11.4a	177.1 ± 7.7b	152.6 ± 10.3b
Hydrogen peroxide group (0.5%)	143.7 ± 9.3b	136.7 ± 12.4c	109.8 ± 12.5c
Hydrogen peroxide group (0.5%) +(0.5%) taurine	177.2 ± 13.8a	181.9 ± 11.3b	147.9 ± 9.9b
Hydrogen peroxide group (0.5%) +(1%) taurine	206.6 ± 8.1a	227.3 ± 13.8a	192.1 ± 13.4a

- The values are expressed by (Mean +/- Standard Error).
- The different letters in the one column indicate that there are significant differences among the groups at ($p \leq 0.05$).

DISCUSSION

The results of the current experiment have shown that the treatment with hydrogen peroxide (concentration: 0.5%) decreases significantly the ano-genital distance after (4-6) weeks of treatment which may be due to the significant decrease made by the treatment with hydrogen peroxide in the level of the testosterone hormone of the animal. It is referred by (Al.Ma'athedi 2009) that the treatment with hydrogen peroxide decreases significantly the testosterone concentration, as well as Wisiniwski et al., (2003) indicates that the ano-genital distance is affected by the testosterone concentration, whilst treatment with taurine (concentration: 1%) removes the negative effect of hydrogen peroxide in ano-genital distance. And Yang et al., (2010) mentions that taurine treatment leads to stimulating the secretion of testosterone in vitro or in vivo thus increases the concentration of testosterone in the blood.

The results of the current experiment have shown that the treatment with hydrogen peroxide (concentration: 0.5%) decreases significantly the body weight after (4-6) weeks of treatment. Hydrogen peroxide is one of the strong oxidative factors that create oxidative stress via increasing free radical or lack of defensive systems which may decrease the animal's appetite which is exposed to oxidative stress and this decreases the animal's consumption of the feed presented to it at lipitum the thing that decrease its

weight. This experiment coincides with what has been found by **Aziz (2000)** in adult cocks, whereas it has been noticed in the current experiment that the treatment done with taurine (concentration: 0.5, 1%) has removed the negative effect of hydrogen peroxide in the body weight. **Boatman et al., (1990, Yang et al., (2010)** show that one physiological influence of taurine is that it serves as an anti-oxidative substance.

The current study shows that the treatment with hydrogen peroxide decreases significantly the percentage of the living sperms and increases significantly the abnormal sperm and this result coincides with what is found by **Aziz (2000)** in mice. and **Kelso et al., (1996)** indicates that treating adults rats with hydrogen peroxide increases significantly the concentration of the (malondaldehyde) which produced from oxidizing unsaturated fatty acids in the cell membrane of the sperm and this causes disturbances in optional permeability releasing the two enzymes (aspartate aminotransferase and alanine aminotransferase) which increase the protein decomposition in the sperm cells. The active types of oxygen decompose cellular genes and release enzymes that decompose **protein (Ferrari 2000)**; as well as active types of oxygen decompose the padded cells of the seminal tubules which are represented by the cells producing the sperms as well as the sperm cells and Sertoli cells and so the percentage of the dead and abnormal sperms increases (**Hipler et al., 2000**).

Treatment with taurine (concentration: 0.5 and 1%) leads to activating the internal anti-oxidants which are represented in high concentration of vitamin (E and C) and glutathione; these compounds increase the percentage of living sperms and decrease the percentage of the abnormal sperm. Vitamin (E) is one of the anti-oxidants which are dissolved in fats and which suspend the reaction preserving the plasma membrane of the sperms and its stability for it exists within (phospholipids), sperm membranes (**Shiro 1993, Surari et al., 1996**), in addition to that vitamin (C) plays the role of anti-oxidants and decrease the oxidative stress in the various body cells by means of curbing free radicals and peroxidating fats and consequently improving the building of the tissues (**Ferrari 2000**) through its effect in producing glycogen for the joining tissues existing in the reproductive system and producing enzymes which protect the sperms from the fractioning of DNA and decrease the abnormal sperms (**Ciereszko et al., 2000**); this would protect the sperms and prevents the destruction of the bio-molecules such as proteins, fats, and the DNA (**Hsu et al., 1998, and Sikka 1996**).

Treatment with hydrogen peroxide has decreased significantly the sperm count and this result coincides with what is found by **Al.Ma'athedi (2009)** in adult rooster and does not coincide with **Aziz (2000)**

indicating that such treatment showed no significant effect on sperm count and the difference in our current study with the previous may be due to the period of treatment with hydrogen peroxide which is in our study (6) weeks whilst it was in other studies (15 & 30) days.

The treatment with hydrogen peroxide via drinking water produces oxygen in the stomach which flows in the blood increasing the pressure of oxygen in the tissues the thing that increases the production of active types oxygen (**Loven and Oberley 1983**) which causes the death of cells and tissues of which are sperms and via changing the nature of proteins in the plasma membranes of the sperms or via direct effect on the padded cells of the sperms (**Hipler et al., 2000 and Mahalakshmi et al., 2003**).

Treatment with taurine (with the concentration of 0.5%) in our current study has led to a significant increase in sperm count and this may be due to the role played by taurine as an anti-oxidant. And in addition to what has been mentioned by (**Mahalakshmi et al., 2003**), treatment with taurine leads to an increase in the concentration of the anti-oxidant, such as vitamins (C & E) and selenium element; vitamin (C) serves as a protective element for it inhibits the peroxidation of fats (**Hassan et al., 2000**). Vitamin (C) is one of the strongest natural anti-oxidants which decrease the risk of oxidative stress, it crushes other active free radicals such as hydrogen peroxide and it is responsible for destroying various body cells, thus vitamin (C) plays an important role in improving reproductive efficiency such as an increase in the anti-oxidation capacity for many factors that exist in the sperms and seminal plasma (**Feri 1999 and Isyaku et al., 2009**).

In addition to that, the treatment with taurine leads to a significant increase in the level of vitamin (E) in the blood for the taurine increases the absorption of vitamin (E) from the intestine and which has an important role in the spermatogenesis, for it produces steroid hormone via increasing the (LH) hormone and the response of Leydig cells to this hormone which in turn increases the concentration of testosterone hormone causing an increase in the production of sperms and improving the quality (**Less et al., 1982**). Vitamin (E) inhibits enzymes which produce free radicals or refreshes genetic codes of the anti-oxidant enzymes (**Aziz 2000**); it protects the cell from oxidation processes via combining with the enzyme (glutathione peroxidase) and oxidation of unsaturated fatty acids and protecting the padded cellular tissues of the seminal tubules from destruction and it equals the free radicals harming the cells and protects other anti-oxidants from oxidation (**Carmen 2002 and Buckingham 1985**). Also the high concentration of selenium in the blood, due to the taurine treatment, may be the role of the significant increase of sperm count, for the selenium is one component in the

enzyme of the glutathione peroxides which is one of the important anti-oxidant enzymes and which, together with vitamin (E), naturally decreases hydrogen peroxide thus protecting cells and tissues from the existing free radicals. Selenium is also one of the constituents of selenium enzymes which are connected with anti-oxidants. Selenium protein exists in the testes and its function in the testes resembles the function of the glutathione peroxides, as well as, it protects the testes from free radicals (Nishimura *et al.*, 2001) .

Treatment with hydrogen peroxide (concentration:0.5%) decreased significantly the percentage weight of the testes, epididymis, seminal vesicles, and prostate gland. This can be attributed to the changes in the tissues of the testes and the retraction of the pad of the seminal tubules together with regression changes that lead to a decrease and reduction in the weight of the testes (Gilbert *et al.*, 1984) in addition to the effect of hydrogen peroxide via increasing the active types of oxygen that are responsible for cell destruction and reducing the activities of the anti-oxidant enzymes and destroying the DNA (Hsu *et al.*, 1998 and Sikka 1996).

Declaration of Competing interest

On behalf of all authors, I hereby declare that no conflict of interest may interfere with the publication of the manuscript.

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