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THE CHEMISTRY EFFECTS OF GARLIC ON HORMONES IN MALE RABBITS

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ABSTRACT
Garlic contains more than 200 chemicals. It contains sulfur compounds (allicin, alliin and agoene), unstable oils, proteins (allinase, peroxidase and miracynase), carbohydrates (sucrose and glucose), and minerals (selenium). It too contains amino acids (cysteine, glutamine, isoleucine and methionine), which offer assistance to ensure cells from the hurts of free radicals, bioflavonoids (quercetin and cyanidin, allistatin I and allistatin II and vitamins C, E and A), which offer assistance to secure us from oxidation operators and free radicals. Comes about demonstrated that treatment with garlic caused critical ($P<0.05$) increment in body weight (BW) and relative weight of, brine, testicles, testosterone, T_3 and T_4. Whereas, diminish the levels of FSH, LH, estradiol and progesterone in plasma compared to control creatures.

Keywords: Garlic, TBARS, hormone andrabbits.

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INTRODUCTION

Therapeutic plants have been a great source of unused pharmacologically dynamic atoms. For case, characteristic items may well be a potential elective for controlling the pathogen related with infections [1]. As of late, anti-microbials and most drugs on the showcase have appeared undesirable side effects and theemergence of safe pathogenic microorganisms, harmful impacts related to these drugs, and withdrawal issues confining them utilize in numerous nations [2]. subsequently, much consideration has been paid to the home grown extricates and pharmacologically dynamic atoms extricated from different plant species that are utilized already within the conventional medication [3].Numerous plant species have been detailed to apply pharmacological properties due to their phytoconstituents such as glycosides, alkaloids, saponins, steroids, flavonoids, tannins, and terpenoids (e.g., monoterpenes, diterpenes, and sesquiterpenes). These days, eighty percent of the world's populaces depend on conventional medications as an basic source of their essential wellbeing care [4]. Restorative plant extricates and their constituents moreover have different organic exercises counting virucidal, bactericidal, fungicidal, anti-inflammatory, pain relieving, narcotic, spasmolytic, and neighborhood anesthetic exercises among others [5].Garlic (Allium sativum L.; Family: Amaryllidaceae) is an fragrant herbaceous yearly zest and one of the most seasoned verified and most imperative herbs that have been utilized from antiquated times as conventional medication [6]. It is considered the moment broadly utilized Allium species with onion (Allium cepa L.), which is utilized as a cure against a few common infections such are cold, flu, wind chomps, and hypertension [7].Allium species and their dynamic components are detailed to diminish the chance of diabetes and cardiovascular infections, secure against diseases by actuating the resistant framework and have antimicrobial, antifungal, anti-aging as well as anti-cancer properties which affirmed by epidemiological information from human clinical ponders [8]. Garlic has been utilized for cooking purposes as a flavor that can flavor nourishments amid the cooking handle. As well, it has restorative purposes counting the treatment of lung disarranges, whooping hack, stomach clutters, cold, ear infection, and helps in anticipating cardiovascular illness [6].Whereas matured garlic

extricate (AGE), arranged from matured garlic may be a people home grown cure that has been appeared to improve the resistant framework and hence hinder cancer and heart disarranges. Crude garlic and its changed items have been detailed to contain different sulfur compounds that have been included in a few sorts of arrangements [9].Moreover, quercetin, the major flavonoid isolated from garlic, was found to interact with some medications such as vitamin E and C modify the in vitro as well as the in vivo transferases and cytochrome P450 isozymes activity [10]. Garlic increases antioxidant defence mechanism in animals [11]. Supplementation of garlic oil at 0.5 g/kg of diet has a positive effect on testes weight, antioxidant status, and testosterone hormone in rabbits [12]. [13] detailed that garlic moved forward the resistance reactions and brought down the lipid profile in blood, lipid peroxidation in liver, and expanded hepatic antioxidant action in treated rabbits. The major bioactive components in garlic such as Allicin are basically dependable for the positive impacts of garlic [14].Profitable and regenerative exhibitions as well as physiological parameters were moved forward altogether by expansion of garlic powder to rabbit eat less [15]. [16] detailed that noteworthy increment watched within the exercises of antioxidant chemicals and selenium level might conceivably be related with utilization of tall garlic slim down by the rabbits. Garlic as well expanded testicular testosterone after supplementation and related with the restraint of Leydig steroidogenic chemical expression and Sertoli cell markers, which are able of actuating apoptosis in testicular germ cells, characterised by expanded levels of dynamic Caspase [17]. [18] had too detailed that garlic upgrades testicular work and may well be utilized to enhance fertility. The reason for the opposite perceptions isn't exceptionally clear, but it may be related to extricate, dose and species of the garlic utilized. LH and FSH are gonadotropic hormones of the front pituitary organ, whereas testosterone is delivered and discharged by Leydig cell. The steroid hormone expression is dependent on LH, and the gonadotropic hormones are straightforwardly included within the direction of spermatogenesis [19].

MATERIALS AND METHODS

In this study garlic was used. Garlic oil was purchased from public market for medicinal herbs in Al-Bayda city. Mature male New Zealand White rabbits (age of 6 months and initial weight of (1.892 ± 50.79 Kg) were used. Animals were individually housed in cages and weighed weekly throughout 6- weeks experimental period. Feed and water were provided ad libtum. Rabbits fed pellets which consisted of 30 % berseem (Trifolium alexandrinum) hay, 25 % yellow corn, 26.2% wheat bran, 14 % soybean meal, 3 % molasses, 1 % $CaCl_2$, 0.4 % NaCl, 0.3 % mixture of minerals and vitamins, and 0.1 % methionine. The vitamin and mineral premix per kg contained the following IU/gm for vitamins or minerals: vit A-4000,000, vit D3-5000, 000, vit E-16,7 g, K-0.67 g, vit B1-0.67 g, vit B2-2 g, B6-0.67 g, B12-0.004 g, B5-16.7 g, Pantothinc acid-6.67 g, Biotein-0.07 g, Folic acid-1.67 g, Choline chloride-400 g, Zn-23.3 g, Mn-10 g, Fe-25 g, Cu-1.67 g, I-0.25 g, Se-0.033 g, and Mg-133.4 g (Rabbit premix produced by Holland Feed Inter. Co.). The chemical analysis of the pellets [20] showed that they contained 15.8 % crude protein, 11.3 % crude fiber, 3.7 % ether extract, 7.2 % ash, 92.9 % organic matter and 62.4 % nitrogen free extract % as DM basis.Ten mature male rabbits were randomly divided into two equal groups (each five rabbits) as follows: Group I: Rabbits were used as control daily for 6successive weeks. Group II: Rabbits were treated with garlic. Garlic was given daily by gavage at a dose of 40 mg/kg B.W, [21] for 6 successive weeks.Body weight of each animal was recorded weekly throughout the 6-week of the experimental period. The weight measurements were carried out in the morning before access to feed and water. At the end of treatment period, all animals of each group were slaughtered. Weights of testis were also recorded. These organs were individually identified and kept frozen (–20°C) until assays performed.Blood samples were collected from the ear vein of all animals every other week throughout the 6-weeks experimental period. Blood samples were obtained in the morning before accesses to feed and water and placed immediately on ice. The blood tests were collected in tube containing heparin to get plasma. Testosterone, Estradiol and Progesterone hormone concentration was tested by utilizing commercial pack that was provided by Coat – A – Tally testosterone RIA, from Demonstrative Frameworks Research facilities (DSL), from Texas, USA. Follicle Fortifying Hormone (FSH), Luteinizing hormone (LH) levels, Thyroxine (T_4) and Triiodothyronine (T_3) hormone concentrations were measured by utilizing commercial unit that was provided by Coat - A - Number, from Los Angeles, USA.Statistical Analysis.Where applicable, statistical analysis was carried out in Minitab software (version17)/ GraphPad prism8; statistical significance was assessed using ANOVA analysis with Tukey multiple comparison test after detection normal distribution to the data and appropriate $P < 0.05$ consider significant.

RESULTS

The changes in body weight (BW), brine weight and

testicles weight of male rabbits all through the 6-week experimental period of rabbits treated with garlic were summarized in (Table 1). In general, implies demonstrated that treatment with garlic alone altogether (P<0.05) expanded BW, testicles weight compared to control.

Table 1,Average of body weight (g), brine weight and testes weight (g/body weight) during treatment of male rabbits with garlic (means ± SE).

Animal Groups	*Body weight (g)*	*Brine weight (g)*	*Testes weight (g)*
Control (Mean±SE)	1892 ±50.79[a]	5.028 ± 0.486[ab]	4.432 ± 0.486[ab]
Garlic (Mean±SE)	1918 ± 39.84[a]	6.590 ± 0.406[a]	6.880 ± 0.730[a]

Data are expressed as mean ± SE of 5 rabbit. Within each row, means with different superscript (a, b, c or d) were significantly different at p<0.05. Where means superscripts with the same letters mean that there is no significant difference (p>0.05). The impacts of garlic on plasma testosterone, estradiol, progesterone thyroxin (T4), triiodothyronine (T3), luteinizing hormones and follicale-stimulating amid the 6-weeks test period are appeared in (Table 2 and 3) speaks to every other week mean values of these parameter communicated as supreme values. Garlic caused noteworthy (P<0.05) increment within the movement of testosterone, estradiol progesterone, T3 and T4 in plasma compared to control. Whereas, diminish the levels of FSH and LH in plasma.

Table 2. Changes in testosterone, progesterone and estradiol of male rabbits treated with garlic.

Animal Groups	*Testosteron (ng/ml)*	*Estradiol (mg/dl)*	*Progesterone (g/dl)*
Control (Mean±SE)	1.570 ± 0.063[b]	8.414 ± 0.062[a]	7.683 ± 0.041[b]
Garlic (Mean±SE)	2.857 ± 0.194[a]	8.514 ± 0.067[a]	8.170 ± 0.117[a]

Values are expressed as means ± SE; n = 10 for each treatment group. Mean values within a row not sharing a common superscript letters (a, b, c, d) were significantly different, p<0.05.

Table 3. Changes in Thyroxine (T_4), Triiodothyronine (T_3), Luteinizing Hormone (LH) and Follicle Stimulating hormone (FSH) of male rabbits treated with garlic.

Animal Groups	*Thyroxine T_4 (ng/dl)*	*Triiodothyronine T_3 (ng/dl)*	*Luteinizing Hormone LH (mIU/ml)*	*Follicle Stimulating hormone FSH (mIU/ml)*
Control (Mean±SE)	3.162 ± 0.019[ab]	1.666 ± 0.044[b]	0.801 ± 0.018[a]	0.805 ±0.009[a]
Garlic (Mean±SE)	3.471 ± 0.076[a]	1.992 ± 0.058[a]	0.708 ± 0.018[b]	0.824 ± 0.011[a]

Values are expressed as means ± SE; n = 5 for each treatment group. Mean values within a row not sharing a common superscript letters (a, b, c, d) were significantly different,p<0.05.

DISCUSSION

This improvement in development rate of rabbits bolstered garlic supplemented diets compared to the control is in assention with the discoveries of [15] who detailed increment in weight pick up of rabbits. This enhancement in development rate of rabbits encouraged garlic supplemented diets compared to the control is in line with the discoveries of [22,23] who detailed increment in weight pick up of rabbits and broilers bolstered garlic supplemented diets individually. Testosterone levels in rabbits treated with garlic (Table 2). Testosterone hormone was altogether higher in garlic-fed male rabbit [24]. [25] ascribed the garlic-induced increment in testosterone level to the height of sex hormone official globulin, which ties more testosterone, and subsequently, oblige the testis to discharge more male sex hormone in plasma.[26] recommended that garlic supplementation might improve protein anabolism and stifle protein catabolism due to hormonal control by the incitement of steroid hormones, driving to more noteworthy testis testosterone substance and lower plasma corticosterone concentration. [27] recommended that garlic compounds are dependable for the noteworthy increment in testosterone levels by influencing the execution of steroidgenerating proteins, testosterone hormone and its metabolites. They concluded that garlic supplementation likely increments testicular testosterone substance due to the incitement of LH emission from the pituitary organ, which fortify the testicles to extend its testosterone generation.

CONCLUSION

It is well illustrated that hormones play an imperative part within the male regenerative framework. So, the aim of the current ponder was to decide impact of garlic on sex hormones levels in rabbits.

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