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Effect of Allium cepa Seed Extract on Serum Testosterone in Rats

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Abstract

Objective: Allium cepa has been used throughout history as a medicinal drug. It has many compounds mostly containing sulfur, such as dialkyl disulfide (Alicin), diallyl disulfide (DAS), that are the cause of its antioxidant and protective properties. The aim of this study was to investigate the effects of this extract on serum testosterone in rats.

Materials and Methods: In the present study, 30 male rats were randomly divided into 3 groups; control group (n = 10), extract group 1 (n = 10), and extract group 2 (n = 10). Extract group 1 and 2, respectively, received 0.5 cc and 1 cc Allium cepa seed extract for 60 consecutive days using gavage method. On the 60th day of study, 5 cc blood samples were obtained from the tail vein of each rat for analyses of serum testosterone.

Results: The results show that serum testosterone level increased in the extract groups.

Conclusion: Allium cepa seed extract has beneficial effects on serum testosterone; however, further research is necessary in order to gain more knowledge on the mechanism of action of this extract.

Keywords: Allium cepa Seed, Extract, Testosterone

Introduction

Testosterone is a steroid hormone from the androgen family which is found in mammals, birds, and other vertebrates. In mammals, testosterone is primarily secreted by the testes and ovaries, and to a lesser extent by the adrenal gland (1,2). This hormone is known as the main hormone and one of the anabolic steroids in men. The main role of testosterone is in the evolution of genitalia, especially prostate and testicular evolution (3,4). This hormone, as a secondary factor, causes the growth of body hair, and increases muscle mass and bone mass. Furthermore, this hormone has an essential role in health and prevention of osteoporosis (5). Onions (Allium cepa) are rich in two chemical groups that have perceived benefits to human health. These are flavonoids, such as quercetin, and alkenyl cysteine sulphoxides (ACSOs). Allium cepa has been reported to have medicinal potentials. Previous studies have also documented the antioxidant value of A. cepa. Research has shown that onion contains exogenous and endogenous antioxidants such as selenium, glutathione, vitamins A, B, and C, and flavonoids, such as quercetin and isorhamnetin. The antioxidant effect of A. cepa has been associated with reduced lipid peroxidation index [malondialdehyde (MDA)] and increased superoxide dismutase (SOD) (6).

The aim of the present study was to investigate the effect of A. cepa seed extract on serum testosterone level in male rats.

Materials and Methods

The experiment was carried out on 30 male Wistar rats (200 ± 20 g body weight). They were housed in a temperature controlled room (25-28 °C) with 12-hour light and 12-hour dark cycles with free access to water and food in cages placed in the Animal Husbandry of the school of Veterinary of Tabriz Branch, Islamic Azad University. All animals were treated in accordance with

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the principles of the Laboratory Animal Care. The rats were randomly divided into 2 experimental groups [extract group 1 (n = 10) and extract group 2 (n = 10)], and 1 control group. The control group received 1 cc equal volume of distilled water daily with no extract using gavage method.

Onion (Allium cepa) seeds were bought from local market in Tabriz, Iran. Seeds (100 g) were washed and dried, and were extracted using 80% methanol in Soxhlet extractor for 72 hours. After extraction, the solvent was filtered, evaporated using a rotatory evaporator, and dried.

The 20 rats were fed normal diets. Extract group 1 and 2, respectively, received 0.5 cc and 1 cc Allium cepa seed extract for 60 consecutive days using gavage method.

Data analysis was performed using analysis of variance (ANOVA) method to determine whether there were differences among the two groups. All experimental data are presented as mean ± SD. A P value below 0.05 was considered significant.

Total serum concentration of testosterone was measured using a double-antibody RIA kit (Immunotech Beckman Coulter Co., USA). The testosterone detection sensitivity per assay tube was 0.025 ng/ml.

Results

Administration of 0.5 cc and 1 cc Allium cepa seed extract for 60 consecutive days significantly increased serum total testosterone in experimental groups as compared with the control group ($P < 0.05$). The mean increase in serum total testosterone was 2.91 ± 0.11 and 3.01 ± 0.11 ng/ml in extract group 1 and 2, respectively, and 1.75 ± 0.11 ng/ml in the control group (Table 1).

Table 1. The effect of 0.5 cc and 1 cc Alluim cepa seed extract on serum testosterone of control and experimental groups in rats

Variables Groups	N	Serum Testosterone (ng/ml)
Control group	10	1.75 ± 0.11
0.5 cc Alluim cepa seed extract	10	2.91 ± 0.11
1 cc Alluim cepa seed extract	10	3.01 ± 0.11

Data are presented as mean ± SE

∗: $P < 0.05$

Discussion

Medicinal plants (medicinal herbs) have been proposed for the treatment of various diseases in the traditional medicine of Asia (Iran, China, and India) from the past to the present. Medicinal plants have been applied for the treatment of diseases throughout the history of mankind. Modern medicine recognizes herbal medicine as alternative medicine in human therapy. Modern medicine has standardized the use of various combinations of medicinal plants, which is named phytotherapy, with new scientific methods.

In this study, as shown in table 1, A. cepa seed extract significantly increased serum testosterone. Onion contains a wide variety of phytochemicals and microconstituents such as trace elements, vitamins, fructans, flavonoids, and sulfur compounds, which may have a protective effect against free radicals. Recently, much attention has been focused on the protective effects of onion against colon cancers in rats (7). Some unique properties of onion such as its antilipidemic and antioxidant potentials have been studied (8). Many studies have been performed to elucidate their mechanism of action (9). The present results clearly indicate that A. cepa seed extract has a positive effect on serum testesrone in male rats. The biological activity of an extract of onion or garlic depends on its mode of preparation (10). In the present study, the alcohol extract of onion was separately prepared. Khaki et al. found that onion has an androgenic effect on spermatogenesis in rats (11).

Compounds obtained from onion have been reported to have a range of health benefits which include anticarcinogenic properties, antiplatelet activity, antithrombotic activity, and antiasthmatic and antibiotic effects (12).

Conclusion

The present study provides detailed information on the effects of A. cepa seed extract on testosterone. This effect may be related to the compounds in onion. The dietary inclusion of onion in those who are suffering from sexual disorders may be useful and can be effective in relieving disability.

Ethical issues

We have no ethical issues to declare.

Conflict of interests

We declare that we have no conflict of interests.

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