Effects of Cumin Seeds in some physiological characteristics of quail

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Abstract. The present trial was conducted to know the effects of Cumin seeds powder at different concentrations (250, 500, 1000, 2000) mg/kg B.W on some physiological and reproductive characters of male Quail bird’s. (Coturnix coturnix) The study was included (25) male of Quail birds their age and weight were (60-75) days, (161-180) g respectively, the experiment randomly divided equally into 5 groups, 5 for each group First group was given a standard ration and empty capsules dose, considered the control group. Second group was given a standard ration and capsules contains Cumin seeds powder at 250 mg/kg B.W. Third group was given a standard ration and capsules contains Cumin seeds powder at 500 mg/kg B.W Fourth group was given a standard ration and capsules contains Cumin seeds powder at 1000 mg/kg B.W. Fifth group was given a standard ration and Cumin capsules at dose 2000 mg/kg B.W, this treatments was daily continue for 4 weeks. The results exhibited positive outcome significant through their effects on some physiological and reproductive characters where it rose by the concentration of the total antioxidants capacity (TAC) as compar with the control group, the increase was clearer by treating the birds with the 500 and 2000 mg/kg B.W concentrations, with (p ≤ 0.05) possibility level. The hormonals concentrations were increased such as Testosterone, Spermatogenic Stimulating Hormone (SSH) and the Interstitial Cell Stimulating Hormone (ICSH) compared with the control group with (p ≤ 0.05) whereas the Corticosterone decreased over the whole Cumin seeds powder treatment groups within all concentrations compared with the control group at (p ≥ 0.05), the decrease was clearer within birds group treated with 2000 mg/kg B.W concentration. The study results suggest that the Cumin seeds powder has positive effects over concentration of the total antioxidants capacity for and some male sexual hormones while inhibition occurs in other hormones as cortisol.

Keyword: Quail birds, TAC, SSH, ICSH, testosterone, Corticosterone

Introduction

Despite providing the traditional treatments by using plants, herbs and condiment in treating many diseases, but, only a few taken the searchers interest. Condiment has a great influence on human’s culture, has entered our lives since the very beginning and became a part of it. Also considered a part of our trace for human since ancient time specially Babylonians and Egyptian vastly used condiments not only as flavors to be added to food and sweets but also as incense used in the medical field. (1).
Cumin is considered as one of the most important condiments used as anti-bacterial with wide range of Gram stain positive and negative bacteria, It has an inhibitory effect on the growth of bacteria causing urinary tract infection and pneumonia as well as wound inflammation (2) and anti-fungal (3). It is used to decrease sugar level and inhibits weight increasing by dosing the experimental mice (4) and works on supporting the immune system for having vitamins A, C (5). (6) Have pointed that the alcoholic extract of Cumin seeds inhibits the growth of cancer cells, Cumin seeds also considered one of the most important medicines for intestinal cramps (7) as well as stimulate Insulin hormone secretion and thyroid hormones (8).

Cumin seeds contain Carbohydrates, fibers, proteins, oil vit.C, vit.E, Saponin, Tannins, Alkaloids and many phenolic compounds. And some minerals such as Mg and Ca (9).

**Classification of the plant:**

Kingdom: Planta
Sub kingdom: Tracheobionta
Sub division (phylum): Spermatophata
Division: Magnoliphytina
Class: Magnoliopsida
Order: (Apia Ceae) Umbelli Ferae
Genus: Cuminum
Species: Cyminum (10)

**The Aim of Study**

This study aimed to know the role of Cumin seeds powder with various concentrations in effecting some male sexual hormones and Corticosterone as well as the total antioxidants capacity.

**Materials and methods**

The study was allocated in 25 quail birds (Coturnix xolurins qual) their age and weight were (60-75) days and (161-180) gm respectively all birds underwent same conditions of housing, feeding and environmental status (Temperature. 26-30 C, 14 hours of light) water freely provided. The cumin plant was obtained from the local market and prepared as powder (11). The birds were fed on a special ration, this ratio were provided protein and energy according to the decisions of the national research council (12).

**Experiment design**

The birds were randomly divided into five groups, 5 birds per group and the birds were dealt with on a daily basis for four weeks’ time via dosing them capsules according to the treatment.all the groups were given the standard ration and normal water.

The first group (Control group): 5 birds were given a standard ration and normal water and an empty capsules to equation the effort of birds catching. (13). the initial weight 178.9
The second group: 5 birds were given a standard ration and the Cumin seeds powder at dose 250 mg/kg body weight and the initial weight average was 171.98 g, normal water was given as well.

The third group: 5 birds were given a standard ration and normal water with capsules contain Cumin seeds powder with 500 mg/kg body weight concentration, the initial weight average was 171.03 g.

The fourth group: 5 birds were given a standard ration and normal water with capsules contain Cumin seeds powder with 1000 mg/kg body weight concentration and the initial weight average was 169.3 g.

The fifth group: 5 birds were given capsules contain Cumin seeds powder with 2000 mg/kg body weight concentration alongside to a standard ration and normal water as the initial weight average was 174.74 g.

Body weight and calculation

After having the birds randomly divided into 5 groups, the initial weight average/group was calculated.

Biochemical Analysis

Total Antioxidants Capacity estimation

To estimation the concentration of the total antioxidants capacity for the in the quail serum from the males various amount of Cumin seeds powder, the kit was used produced by the American "My Biosours" and by using the ELISA technique estimating it with 450 nanometer of wavelength during 15 minutes via using the ELISA produced by Organon Teknika Australian company, the principle of these books is based on an enzymatic immune system linked to a double antibody when the standard already tested sample and the (HRP) Horseradish Peroxidase to the antibodies of the total antioxidants capacity of the to the enzyme after covering it with the antibody of the total antioxidants capacity of the antioxidants Incubate and wash to remove the unbound enzyme then add chromium solution B, A liquid color will change to blue and the reaction with acid will cause the color change to become a dark yellow sample color, positively connect with the total capacity concentration of the antioxidants

Hormonal assay

Sexual hormones and Corticosterone in quail male birds blood serums for the working groups as follow :

1- Spermatogenic Stimulating Hormone (SSH)
2- Interstitial Cell Stimulating Hormone (ICSH)
3- Testosteron, Hormone
4- Corticosterone

The hormones were estimated by using Mini-ViDAS system a product from Nassaa USA company through enzyme immune analysis using Enzyme Linked Immune Fluorescent Assay
Technique (ELIFA) when the time duration went between 30-40 mins inside the device depending on the measured hormone type, these tests were done in one of the private laboratories.

**Statistical analysis**

The statistical analysis was made using the complete random design (C.R.D) the one was analysis of Variance. The differences among the groups were identified using Duncan's Multiple Range Test for the whole sizes taken by the study when the statically distinguish level was (p ≤0.05) (14) using the (15)

**Results**

Figure (1) shows the significant (p ≤ 0.05) increase in the (TAC) concentration in all Cumin seeds powder groups with various concentrations (250, 500, 1000, 2000) compared with the control group, increase was clearer in (500,2000) respectively.

Means ± SD different letters means there is differences at (P ≤0.05).

**Figure(1)** Cumin seeds powder effect various concentrations (250, 500, 1000, 2000) mg/kg B.W, in total antioxidants capacity in quail serum.

Figure(2) revealed that the experimental groups showed that SSH was significant higher than control one at (p ≤ 0.05 ). While, there is significant variation between group five and other experimental groups at (p ≤0.05 ).
Means ± SD different letters means there is differences at (P ≤0.05).

Figure (2): Effect of Cumin seeds powder with various treatment (250, 500, 1000, 2000) mg/kg B.W in the Spermatogenic Stimulating Hormone (SSH) concentration in quail serum.

Figure (3) shows a significant increase (p ≤0.05) in the concentration of the Interstitial cells stimulating hormone in quail serum for all treatment groups powder in all various compared to the control group, the increase more obvious 2000 mg/kg B.W. Cumin powder treatment.

Means ± SD different letters means there is differences at (P ≤0.05).

Figure (3) Effect of Cumin seeds powder with various treatment (250, 500, 1000, 2000) mg/kg B.W, in groups of the Interstitial cells stimulating hormone concentration in the quail serum.
Figure (4) shows the occurrence of an increase in the Testosterone hormone concentration in the treatment groups of the Cumin seeds powder with various concentrations (250, 500, 1000, 2000) compared to the control group at \((p \leq 0.05)\). Possibility level as it appears in the diagram there is a difference among the treated groups compared to the control one where the increase was clearer in the treatment groups of 2000 mg/kg body weight concentration. The arithmetical averages of the groups were downward from 2000 mg/kg body weight concentration (2.14, 1.94, 1.68, 1.58) ng/ml whereas the arithmetical average of the control group was 1.37 ng/ml.

Means ± SD different letters means there is difference at \((P \leq 0.05)\).

**Figure (4)** shows Effect of Cumin seeds powder with various treatment(250, 500, 1000, 2000) mg/kg B.W in the concentration of the Testosterone hormone of the quail serum.

Figure (5) shows decrease in the concentration of the Corticosterone hormone in the quail serum in all experimental groups with the Cumin seeds powder for all concentrations, the decrease was clearer in the birds treatment group of 2000 mg/kg B.W, then the other concentrations following compared to the control group where the arithmetical average for the birds group dosed the Cumin seeds powder 2000 mg/kg B.W, was 26.13 ng/ml and the group dosed with 1000 mg/kg body weight was 26.80 ng/ml and the birds group dosed with 500 mg/kg B.W, was 28.63 ng/ml and the group dosed with 250 mg/kg body weight was 30.54 whereas the arithmetical average of the control group was 32.30 ng/ml.
Means ± SD different letters means there is difference at (P ≤0.05).

Figure(5): Effect of Cumin seeds powder with various concentrations (250, 500, 1000, 2000) mg/kg B.W on Corticosterone hormone in quail serum.

Discussion

Cumin seeds has the ability to improve the state of the antioxidants for they contain many of the compounds which have the ability to inhibit the free radicals specially the fenolic compounds which are perfect antioxidants (16) additionally they contain reductase vitamin C which is one of the most important antioxidants vitamins works on inhibiting the oxidation processes done by the free radicals that leads to increase the antioxidants concentration (17). Cumin seeds contain vitamins E and A dissolved in the fats, they inhibit the free radicals and increasing the antioxidants level (18) in addition to the Selenium that plays a key role in increasing the antioxidants level and that is what has been pointed to by (19).The reason behind the increase of the sexual hormone of SSH, ICSH and Testosterone regarding the groups treated with Cumin seeds powder, It can be attributed to the presence of many compounds such as tannins, saponin and vitamins such as vitamin A, E, C, and a lot of minerals such as Ca, Mg and Selenium, which play a major role in stimulating the endocrine, especially the pituitary gland secretion of SSH, which is affected on the cells of a few Lydeg cells Stimulating the secretion of the male hormone testosterone (20,8,18).

The fact of containing the Cumin seeds Vitamins C, A, E, Selenium and minerals Ca, Mg that related to free radicals inhibition, in addition to the existence of some compounds that work on inhibit the secretions of major stress hormone in birds. Corticosterone that is secreted from the adrenal cortex and have negative effects on birds (21; 18 ). The testosterone (20; 8;18)

References

[1] Al-Rawi, S. and Fetters, M. (2012). Traditional Arabic & Islamic Medicine: A Conceptual Model for Clinicians and Researchers. Global Journal of Health Science. 4(3): 164-169.
[2] Sattari, M.; Bigdeli, M. and Derakhshan, S. (2010). Effect of cumin (Cuminum cyminum) seed essential oil on biofilm formation and plasmid Integrity of Klebsiella pneumoniae. Pharm. Mag., 6(21): 57–61.
[3] Ertürk, Ö. (2010). Antibacterial and Antifungal Effects of Alcoholic Extracts of 41 Medicinal Plants growing in Turkey. Czech. J. Food Sci., 28(1): 53–60.

[4] Mohiti-Ardekani, J.; Akbarian, Z.; Piri-Ardekani, M. R. and Mohiti- Ardekani, A. (2012). Comparison of the Effects of Cuminum cyminum and Sibutramine on weight, serum Leptin, Glucose and Lipids in Rat. Iranian J. Diab. & Obes., 4(2):74-78.

[5] Chauhan, P.S.; Satti, N.K.; Suri, K.A.; Amina, M. and Bani, S. (2010). Stimulatory effects of Cuminum cyminum and flavonoid glycoside on cyclosporine-A and restraint stress induced immune suppression in swiss albino mice. Chem. Biol. Interac., 185(1):66–72.

[6] Prakash, E., and Gupta, D.K. (2014). Cytotoxic activity of Ethanolic extract of Cuminum cyminum Linn Against Seven Human Cancer Cell Line. Univ. J. Agric. Res., 2(1): 27-30.

[7] Saini, N., Singh, G.K.; and Nagori, B.P. (2014). Spasmolytic potential of some medicinal plants belonging to family Umbelliferae : Areview. Inter. J. Ayurveda. Pharm., 5(1): 74-83.

[8] Mushtaq, A.; Ahmad, M. and Jabeen, Q. (2013). Hepatoprotective action of a polyherbal aqueous ethanolic extract against intoxicated albino rats. Int. J. Pharmaceut. Sci. and Res., 2(6): 332-347.

[9] Ani, V. (2008). Studies on Phytochemicals and Properties of Bitter Cumin Centratherum antheiminticum (L.) Kuntze. Doctor of Philosophy. Biochemistry. University of Mysore, India.

[10] Cheijj, R. (1984). McDonald Encyclopedia of Medical Plant. McDonald and Co.,(publishers). Ltd. London, pp:209,309, 313.

[11] National Research Council. (1994). Nutrient requirement of poultry. 9th ed. Revised national academy press, Washington D.C.

[12] Batchelor, G.R. and Giddins, G. (1995). Body weight changes in laboratory rabbits subjected to transport and different housing conditions. Anim. Technol. (Sousse): The Insti. Ang., 46(2): 89-95.

[13] Steel, R. G. D. and Torrie, J. H. (1980). Principles and Procedures of Statistics. 2nd ed.New York. McGraw-Hill Book. Company. Inc. PP: 481.

[14] SAS. (2001). SAS / STAT Users Guide for Personal Computers. Release 6:12. SAS Institute Inc. Cary, N. C., USA.

[15] Al-Mamary, M., Al-Habori, M. and Al-Zubairi, A. (2010). The in vitro antioxidant activity of different types of palm dates (Phoenix dactylifera) syrups. Arabian J.Chem.,10.1016 / j.arab cjc. 2010.11. 014.

[16] Hassan, S.M.; Al-Kennane, E.R. and Al-Hafez, H.A.K. (2000). Hydrogen peroxide-induced atherosclerosis in chickens: Effect of Vitamin C. Iraqi J.Vet.,Sci.,13(2):249-270.

[17] Jood, I., M., S.,M (2017). Physiological and histological effects of Lemon Juice and Cumin seed extract in experimental embryonic rabbits, PhD Thesis, Faculty of Science, University of Mosul, Iraq

[18] Al-Annzi, Z., Sh,(2016). Effect of Cinnamomum Zylanicum and Sodium Selenates in the Physiological and Prosthetic Performance of Diabetes-affected rabbits, PhD Thesis, Faculty of Science, University of Mosul.

[19] Uboh, F.E.; Edet, E.E.; Eteng, M.U. and Eyong, E.U. (2010). Comparative Effect of aqueous extract of P. Guajava Leaves and Ascorbic Acid on serum sex hormones levels in male and female rats. J. Appl. Sci. Res., 6(4): 275-279.

[20] Al-Kattan, M., M and Jalod, I., M S. (2016). Effect of Cumin seed extract in the concentration of glucose and some hormones and alopecia in newborn neon Zealand rabbits experimental embryonic, Tikrit Journal of Pure Sciences, 21 (7) 2016.

[21] Hong, M.Y.; Seeram, N.P. and Heber, D. (2008). Pomegranate polyphenols down-regulate expression of androgen-synthesizing genes in human prostate cancer cells overexpressing the androgen receptor. J. Nutr. Biochem., 19(12):848-855.