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Antioxidant Effect of Aqueous Extract of (*Crocus Sativus L.*) on Rats Exposed to Oxidative stress

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Abstract: The aqueous extraction of Saffron Crocus sativus were studied against H_2O_2 induced oxidative stress in the serum of albino rats for 15 day. Twenty male rats with age (3-4) months and weight (200-300) g were divided into 4 groups (1) is control group received drinking tab water and ideal diet, group (2)received 1% H_2O_2 drinking tab water group(3)received 1% H_2O_2 and i.p dose of 60 mg/kg from B.W Saffron extract once daily group (4) received 60mg/kg from B.W Saffron extract H_2O_2 treated group should elevated malondialdehyde (MDA) and reduction in glutathione (GSH) level and super oxidedimutase (SOD) level compared with control group in P<0.05. Treatment with saffron extract should decreasing in the (MDA) level and increasing in the (GSH) and (SOD) levels, the result of this study provided the protective effects of Saffron extract by increasing antioxidant defense and suppression free radicals production in serum.

INTRODUCTION

Antioxidant compounds in food play an important role as health protecting factor, Scientific evidence suggests that antioxidant reduce the risk for chronic disease including cancer and heart disease primary sources of naturally occurring antioxidants are whole grains, fruits and vegetables plant sourced food antioxidants like vitamin C and E, carotenes, phenolic acids (1,2). Free radical scavengers in the body include super oxide dismutase (SOD) catalase, glutathione peroxidase and malondialdyde. Many of approaches used in free radicals studies provide in aggregate assessment of oxidative stress (3,4). (GSH) is a tripeptide consisting of glutamate cysteine and glycine which is present in most mammalian tissues and concentration of 0.1-10mml. In contrast to tissue glutathione is present in plasma at much lower concentration. (GSH) roles inducing its functions as an important physiological antioxidant which protects cell from oxidative damage by its ability to donate hydrogen atom from thiol groups of its cysteine residue to most carbon (5).

Crocus Sativus L. commonly known as saffron is a plant cultivated in various parts of the world such as Iran, China, Spain, Italy and Greece, chemical analysis of its stigmas has shown the presence of water soluble carotenoids, small amounts aldehyde and itsglucosids (safranal and picrocrocin) and flavonoids. The pistils of Crocus sativus L. are used traditional medicine as an antispasmodic, eupeptic, nerve sedative and crud extract have been demonstrated to prevent tumor formation , atherosclerosis or hepatic damage (6,7). The aim of this study was to further investigate the role of saffron in some antioxidant enzymes activity.

MATERIALS AND METHODS

Animals:

Adult male Wister rats weighting 200-300 gm., age of 3-4 months were used through the study. All of them were kept in the same room under a constant temperature (22 C°± 2) with food pellets and water available adlibitum. The animals were divided in to four groups, each of one contained "5" rats. Group (1) was control in which water enough, group (2) was exposure to oxidative stress H_2O_2 in 1% concentration, group (3) was given aqueous saffron extract (60mg /kg) BW. throughi.p. injection with H_2O_2 1%, group (4) treated with saffron (60mg/kg) for 5 days only.

Preparation of plant extract :

The dried pate let of saffron was obtained from local markets, about 50 g of stigmas were ground to powder and dried at room temperature , dried stigmas were decocted in water for 30min. then after the extract was filtered and concentrated using rotary evaporation apparatus and the residual extract were dissolved in normal saline whenever usedin experiment (8).

Sample Preparation for (MDA), (GSH) and (SOD) measurement.

Blood sample were collected after 2weeks by Jugular vein then centrifuged for 15 minutes with 3000 rpm to separate plasma and kept frozen at (-20) C° until assay. Malondialdehyde (MDA) levels of the plasma were measured according to this procedure: 0.5ml plasma was shaking with 2.5ml of 20%trichloroacetic acid (TCA) in a10ml centrifuge tube. 1ml of 0.6% 2-thiobarbituric acid (TBA) was added to the mixture shaken and wormed for 30 m in aboiling water bath followed by rapid cooling. Then it was shaken with 4ml of n-bytyle-alcohol layer in a separation tube and MAD content in the plasma was determined from the absorbance at 535 nm by Spectrophotometer against butanal (9).

While (GSH) level was measured by alternative method y (10). This method depend on Ellman's solution content the 5,5-dithiobis 2-nitrobenzoic acid (DTMB) detector. The reduction is thus measured by the decrease in absorbance at 412 nm thus providing a spectrophotometric which is directly proportional to GR activity in the sample. The activity of (SOD) levels in blood serum was determined using photochemical method described by (11) this methods depends on an indirect approach to determine the SOD activity through the change in formazene absorbance formed from the reduction of O_2 (which is produced by radiating the sample of serum with light). fornitrobluetetrazolum (NBT) decreased difference in formazene absorbance means increased SOD activity.

STATISTICAL ANALYSIS

Statistical analysis was performed using one way analysis of variances (ANOVA)P-values of 0.05 or less were considered significant, statistical analysis was performed using Duncan multiple test. (12)

RESULT AND DISCUSSION

The MDA level increased significantly following H2O2 treatment (P≤ 0.05) compared with the control group (fig 1) then group 3 Saffron &H2O2 increased significantly with control group 4 Saffron alone MDA level decreased compared with control group. GSH&SOD concentration fig 2&3 showed a significant decreased in GSH&SOD levels in H2O2 treated group (p≤ 0.05) compared with control group Then Saffron &H2O2 and Saffron group alone GSH&SOD levels increased significantly with control group. This results was explain the important role of H2O2 asapotent oxidizing agent which cause the oxidative stress by increasing the reactive oxygen species (ROS) or decreasing the oxidative defense (13,5) The evidence of involvement of free radicals and reactive oxygen species(ROS) in the pathogenesis of number of disease and toxicity . They are involved in the biological damage induced by number of Therapeutic molecules ,Poisonous chemicals and toxins (14). Saffron treated groups reversed the increasing of MDA level to consider able extent(fig. 1) Saffron a scavenging activities by having chemical components present in stigma these components include carbohydrates, minerals, vitamins such as riboflavin and thiamin , color pigments such as crocin, anthocyanin ,carotene, lycopene, Zeaxanthin and aromatic terpenic essence called (Saffranal) (15).

GSH levels fig(2) and SOD levels fig(3) showed a significant decrease with H2O2 treated group (P≤0.05) compared with the control group this result agreement with that obtained by (16) that used omega 3 against acrylamid toxicity and (17) that used protective effect of aqueous extract and crocin its active constituent on renal ischemia –reperfusion - induced oxidative damage in rats. Saffron and its characteristic component possess anticarcinogenic and antitumor activities in vivo and in vitro it was shown that Saffron extract and its purified characteristic compounds crocin, safranal, different types of tumor cell growth it was reported that anovalgluco conjugate isolated from corms and callus of Saffron possessed cytotoxic activity against different tumor cells.(18)Saffron have defense effect against oxygen toxicity in this investigation used method were compared for the measurement of Super oxid dismutase (SOD) activity in crocus sativus effect(19). The methods based on a competition between the enzyme itself and another superoxide scavenger involved respectively cytochrome Creduction, nitro blue tetrazolium reduction and pyroyallol oxidation (20).The treatment of mice with aq. extract of saffron can significantly inhibit genotoxicity produce by cisplatin, cyclophosphamide , mitomycin these genotoxins alone can inhibit glutathione S- transferase (GST) activity , it was also observes that inhibitory effects 0f genotoxins on (GST) activity (21).

REFERENCES

[1] Jayachitra A.,Krithiga N.Study on antioxidant property in selected medicinal plant extracts. Int. J. Med. Arom. Plants.(2012) Vol.2, No.(3), pp. 495-500.
[2] Katariya DC.Detailed profilof Crocussativus. Int. J. Phar. and Bio Sci. (2011) Vol. 2pp: 530-540.
[3] Furst A.Can nutrition affect chemical toxicity. Int. J. Tox.(2002) Vol. 21pp: 412-424.

[4] Hossein H., Mohsen I., Alireza A.Effects of aqueous Saffron extract(crocus sativus L.)on the acquisition and reinstatement of morphin induced conditioned place preference in mice.Avicenna J. Phytomed. (2012) Vol.2 , No (1) pp: 24-30.
[5] Kamashi K., Reddy KS., Reddy VR. Effect of zinc against salinomycinltoxity. Ind. J. Physiol. Pharm. (2004) Vol. 48 pp: 89-95 .
[6] Mohammad H.M., Masoud S., Habib-Allah E., Omid R., Hossein H. Safety evaluation of saffron (crocus sativus) tablets in healthy volunteers.Phytomed. (2008) Vol.15 pp: 1032-1037
[7] Maryam S., Zohreh M., Shahrzad ZTR., Dariush H., Mohammad BM., Hossein H., Nafiseh T., Mahmoud M. Effect of aqueous extract of crocus sativus L. on morphin –Induced memoryimpairment . Pharmacol.(2011)Vol.3 pp: 808-838.
[8] Khalili M., Mehrdad R., MajidE. The effect of aqueous crocus sativusL.extract on Intacerebroventricularstreptozotocin –Induced cognitive deficits in rat:abehavioral analysis. Iran. J. Pharma. Res.(2009) Vol. 8 No (3)pp:185-191.
[9] Beuge J. A., Aust S. D.Estimation of serum malondialdehyde level methods in enzymology. Acad. Press. London .(1978) 51: pp: 302
[10] Burtis C. A., Ashwood E. R. W.B.Saunders co. Tietz text book of clinicalchemistry. 3ed edn. USA.(1999).
[11] Brown M. S. , Gold F.Detection the level of peroxynitrite and related with antioxidantstutus in the serumNation. J. Chem.(1983) Vol. 4 pp: 625 – 637.
[12] Steel R.G.D., Torrie J.H. Principle and procedure statistics. NewYork: McGraw- hill book 2ed.(1960)
[13] Ratan K. M.,Gopala R.A., Anjane Y.Y., Dilip R. Oxidative stress Induced by Lead and antioxidant potential of certain Adaptogensinpoultry . . Toxicol. Inter.(2010) Vol. 17 (2) Ju-Des.
[14] Loguerico C., De Girolame V., De sio I., Tuccillo C., Ascione A., Baldi F. Non alcoholic fatty liver disease in an area of souther Italy, main clinical histological and pathophysiological aspects. J. Hepatol.(2001) 35 pp: 568-574.
[15] Moghaddasi M., Sh. Saffron chemicals and medicine usage. J. Medic. Plant. Res.(2010)Vol.4(6) pp:427-430.
[16] Kadhum Sh. H. Measurement of malondialdehyde and glutathione concentration of plasma of male rates that drenched with acrylamide and omega 3.Karbala. J. Pharma. Sci.(2012) No.(4).
[17] Hossein H., Hamid R., ToktanZ., Aghdas D. Saffron as aprotectiveeffect of aqueous extract and crocin its active constituent on renal ischemia-reperfusion induced oxidative damage in rates. Cana. soci. Pharmace. Sci.(2005).
[18] GarciaDC.,RieseHH.Effectsof long-term treatment of colon adenocarcinoma with crocin, a carotenoid from saffron (Croccussativus L.) an experimental study in the rats. Nutr. Cancer. (1999) Vol. 35(2) pp: 120-126.
[19] Abdullaev FI.,Frenkel GD.Effect of saffron on cell colony formation and cellular nucleic acid and protein synthesis.Bio.Factors.(1992)Vol:3(3)PP 43-45.
[20] Bown D.Encyclopedia of herbs and their uses . Dorling Kindersley London, ISBN (1995) .
[21] Daly ES., Protective effect of cysteine and vitanine E, Croccussativus and Nigella sativa extracts on cisplatin-induced toxicity in rats. J. Pharm. Belg.(1998) Vol:53;PP87-93.

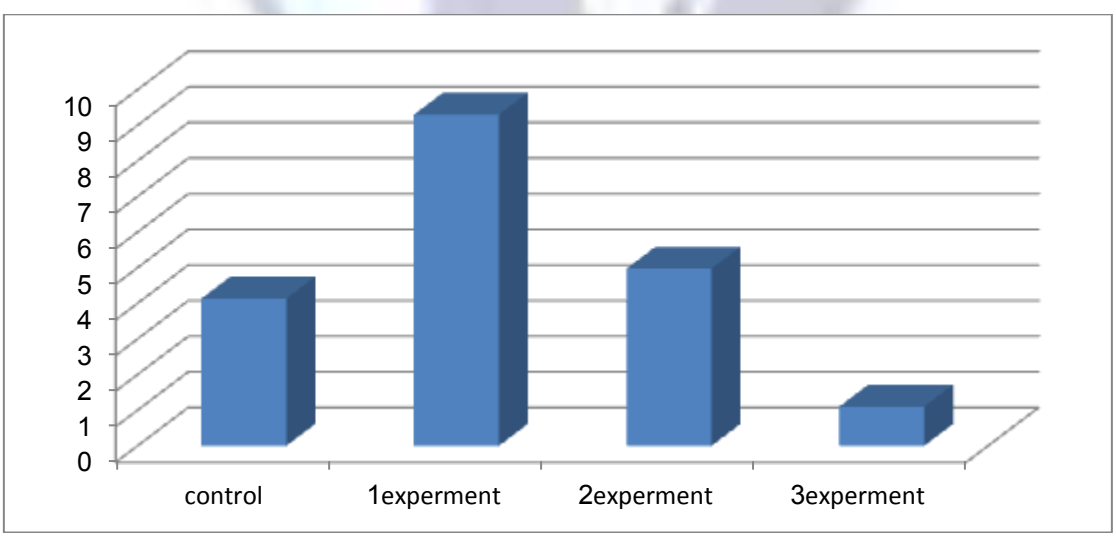

Fig. (1): Effect Saffron extract on MDA levels (micromole/L)

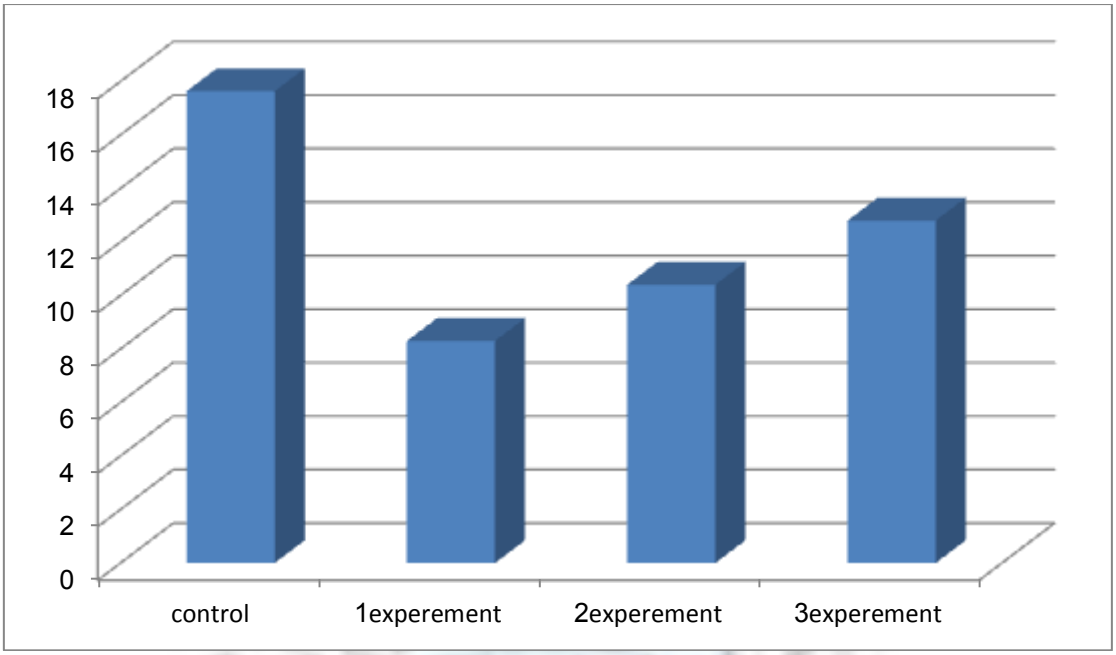

Fig. (2): Effect Saffron on GSH levels (micromole/L)

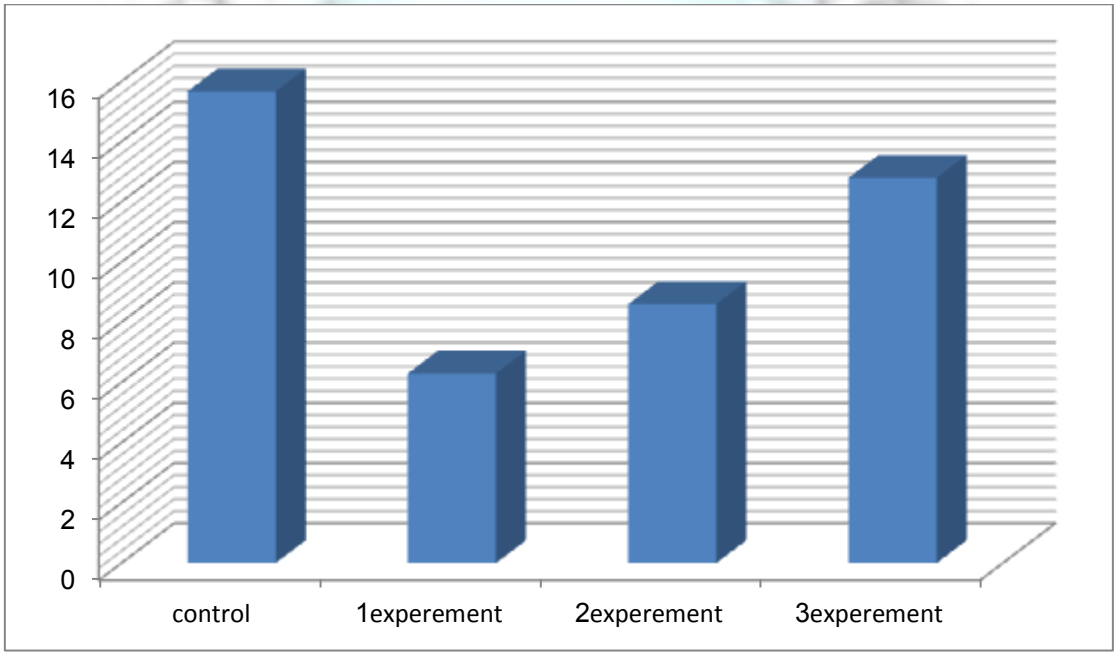

Fig. (3): Effect saffron on SOD levels (Micromole/ L)