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THE ROLE OF *PANAX GINSENG* PLANT AND VITAMIN D IN IMPROVING THE EFFECTIVENESS OF LIVER ENZYMES ALT, AST AND ALP IN RABBITS EXPOSED TO X-RAYS.

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ABSTRACT: *This study was conducted at Animal House, Faculty of Veterinary Medicine\ University of Tikrit , The dosage period was from the beginning of January for (10) days. This study was designed to investigate the protective role of ginseng root and vitamin D3 in animals irradiated by X-ray in rabbits. 50 domestic animals were used from local rabbits Lepus cuniculua domestica Which was obtained from the veterinary hospital at the Ministry of Agriculture - Samarra Agriculture Department, Ranging between 7-9 months and their weights (1250 - 1500 g), The animals were randomly assigned to (10) groups, and each group (5) animals.* ***The (Control) group*** *was the control group where the diet was given with regular drinking water,* ***the Second Group (A):*** *treated with X-ray for one day only,* ***The Third group (B)****: was treated X-ray and ginseng (150 mg/kg) for one day only,* ***The Fourth group (C)*** *was treated X-ray and ginseng (300 mg/kg) for one day only,* ***The Fifth group (D):*** *was treated X-ray and vitamin D3 (30 IU/kg) for two days only,* ***the Sixth Group (E):*** *X-ray and ginseng (150 mg/kg) and vitamin D3 (30 IU/kg) for only two days,* ***The Seventh group (F):*** *treated X-ray for only two days and left for only 10 days,* ***the Eighth Group (G)****: was treated X-ray and ginseng (150 mg/kg) for two days and left for only 10 days,* ***The Ninth group (H)****: was treated X-ray and vitamin D3 (30 IU/kg) for two days and left for 10 days, and* ***the Tenth group (I)****: was treated X-ray, ginseng (150 mg/kg) and vitamin D3 (30 IU/kg) for two days and left for 10 days.The results of the study showed an increase in the effectiveness of liver enzymes ALP, AST, ALT in X-ray exposed group compared to control group sound. As well as a significant decrease in most studied groups and variance in other groups compared to the group exposed to X-ray.We deduce the obvious effects on the enzymes and hormones of the body as a result of x-ray exposure and increase the oxidative stress on the surface of the cells and the effective protective role of ginseng root and vitamin D3 as effective antioxidants and reduce the damage caused by radiation.*

KEYWORDS: Panax gensing , Vitamin D , Liver enzymes **.**

INTRODUCTION

The use of irradiation in a wide range of fields, including medicine, industry, agriculture and other uses, which contributed to the air pollution by radiation and increased the possibility of human exposure to it further, so the impact of radiation on living cells and ways to prevent them are important topics [1]. Exposure to radiation during radiation therapy for malignant neoplasms of the body and during total body irradiation affects healthy body parts and long-term cellular damage, including the

effects of excessive fat levels and accumulation in the blood [2]. Fortunately, there are many natural antioxidants derived from plants that interfere with free radicals before they damage the body. Antioxidants work in several ways by reducing the energy of free radicals, stopping free radicals from forming in the first place, or cutting off the oxidation chain reaction to reduce the damage caused by free radicals [3]. Vitamin D3 is the most important anti-aging compound, a fat-soluble vitamin, which regulates the balance in calcium phosphate and metabolism, and consists of the influence of sunlight on the skin and is sometimes used as a supplement in vitamin D deficiency [4]. Vitamin D is one of the most important antioxidants that inhibit free radicals and reduce oxidative stress and many cancers and cardiovascular diseases [5]. The study was designed to determine the role of *panax ginseng* plant and vitamin D in improving the effectiveness of liver enzymes in rabbits exposed to X-rays.

MATERIALS AND METHODS

Plants used in the study:

The root part of *Panax ginseng* (Araliaceae family ginseng) was collected from local markets in Mosul province and confirmed by Dr. Mohammed Adnan, a specialist in plant classification / College of Education for Pure Sciences / Tikrit University. To remove dust and dried in the laboratory atmosphere, the dried ginseng roots were ground with an electric mill and then kept in an airtight container in moisture - free conditions and away from light to be dosed to animals.

Study Animals:

In this study (50) of the local male rabbits Lepus cuniculua domestica, obtained from the Veterinary Hospital of the Ministry of Agriculture - Samarra Agriculture Division and ranged between 7-9 months and weights (1250 - 1500) g. The floor was furnished with sawdust and the side of the cage hygiene and sterilization was taken into account with the change of sawdust every 2 days. They were well ventilated and left for a week to cope with the new conditions. Transactions were conducted in the current experiment in the animal house of the College of Veterinary Medicine / University of Tikrit / for the period from the beginning of December for a period of (10) days.

Distribution of study animals:

In this study (50) male rabbits were distributed randomly to (10) groups, each group included (5) animals, was taken into account the equal weight of each group as much as possible before the start of the study:

Group 1: (Control group) This group was treated by giving it drinking water and standard diet daily for 10 days.

The second group (A): (group exposed to X-ray only for one day) The animals of this group were exposed to X-ray KV 76 (bis) only for ten seconds for one day and then the blood was drawn in the laboratory.

Group B: (group exposed to X-ray + ginseng powder at 150 mg / kg body weight for one day) This group was treated with a dose of 150 mg / kg ginseng powder and an hour later was irradiated by X-ray for 10 seconds for one day, The blood was then drawn in the laboratory.

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Group C: (group exposed to X-ray + ginseng powder at a dose of 300 mg / kg body weight for one day) This group was treated with a dose of 300 mg / kg of ginseng powder and after an hour was irradiated X-ray for ten seconds for one day, The blood was then drawn in the laboratory.

Group D: (group exposed to X-ray + vitamin D3 at a dose of 30 IU / kg body weight) This group was treated at a dose of 30 IU / kg of vitamin D3 for two consecutive days, and then treated the same group at a dose of 30 IU / Kg of vitamin D3 after an hour was irradiated by X-rays for ten seconds and two days as well, and then blood was drawn from them in the laboratory.

Group E (group exposed to X-ray + vitamin D3 at a dose of 30 IU / kg + ginseng powder at a dose of 150 mg / kg body weight) This group was treated with a dose of 150 mg / kg ginseng powder + a dose of 30 IU / Kg of vitamin D3 for two consecutive days, then treated the same group at a dose of 150 mg / kg of ginseng powder + dose of 30 IU / kg of vitamin D3 and after an hour was irradiated by X-rays for ten seconds and two days as well, and then blood was drawn from them Laboratory.

Group 8 (G): (group exposed to X-ray + ginseng powder at 150 mg / kg body weight) This group was treated at 150 mg / kg ginseng powder for two consecutive days, then the same group was treated at 150 mg / kg dose Ginseng powder an hour later was irradiated by X-rays for 10 seconds and 2 days.

Group H: (group exposed to X-ray + vitamin D3 at a dose of 30 IU / kg body weight) This group was treated with a dose of 30 IU / kg of vitamin D3 for two consecutive days, and then treated the same group at a dose of 30 IU / Kg of vitamin D3 An hour later she was irradiated by X-rays for 10 seconds and two days.

Group 10 (I): (group exposed to X-ray + vitamin D3 at a dose of 30 IU / kg + ginseng powder at a dose of 150 mg / kg body weight) This group was treated at a dose of 150 mg / kg of ginseng powder + a dose of 30 IU / Kg of vitamin D3 for two consecutive days, then treated the same group at a dose of 150 mg / kg of ginseng powder + dose of 30 IU / kg of vitamin D3 and after an hour was irradiated by X-rays for ten seconds and also two days.

Biochemical tests:

The effectiveness of the enzymes (ALT, AST and ALP) was estimated using a standard ready-made analysis kit (Rondox Laboratories) ELISA Kit and following the instructions attached by the manufacturer [5].

Statistical analysis :

The statistical analysis of the results was carried out by the Analysis of Variance program of analysis of variance (ANOVA), and according to the Duncan test was determined the differences polynomial polynomial multiple ranges and probability level ($P \leq 0.01$) [6].

RESULTS:

1- Effectiveness of ALT in serum.
The results of the present study as shown in Figures (1) and Appendix 3 showed a significant increase ($P \leq 0.01$) in ALT concentration in the group exposed to X-rays A (45±5.57) Compared with control group (39.8 ± 1.483) IU / L and significant decrease ($P \leq 0.01$) for the groups I, F, D, C, B (33 ± 1.581) (41.4 ± 5.32) (38.8 ± 2.77) (41.8 ± 1.924) (43.8 ± 5.67) IU /

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L respectively and significant height (P≤0.01) for the groups H, G, E (51.2 ± 3.19) (53.6 ± 3.91) (48.8 ± 4.76) IU / L respectively compared with the exposed group X-ray A (45 ± 5.57) IU / L.

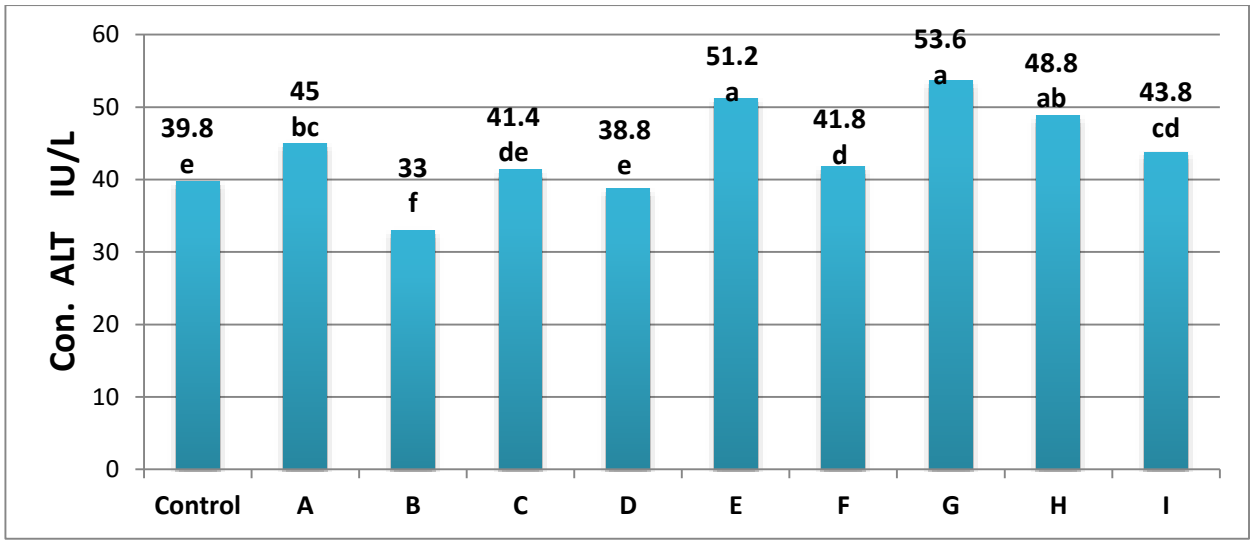

Figure (1) : Effect of X-ray treatment, ginseng root powder and vitamin D on ALT enzyme activity.

2- Effectiveness of AST enzyme in serum

The results of the present study as shown in Fig. (2) and Appendix 3 showed a significant increase (P≤0.01) in AST concentration in the X-ray exposed group A (111.2 ± 2.39) IU / L compared with the control group (90.2 ± 2.39). IU / L and significant decrease (P≤0.01) for groups D, B (96.4 ± 2.70) (81.2 ± 5.93) IU / L respectively and significantly higher (P≤0.01) in group I (124.8 ± 20.14) IU / L There was no significant difference in the groups H, G, F, E, C (109.4 ± 10.26) (105.6 ± 8.20) (102.8 ± 5.97) (110.8 ± 2.59) (111.4 ± 5.94) IU / L compared with the X-ray group A (111.2 ± 2.39) IU / L.

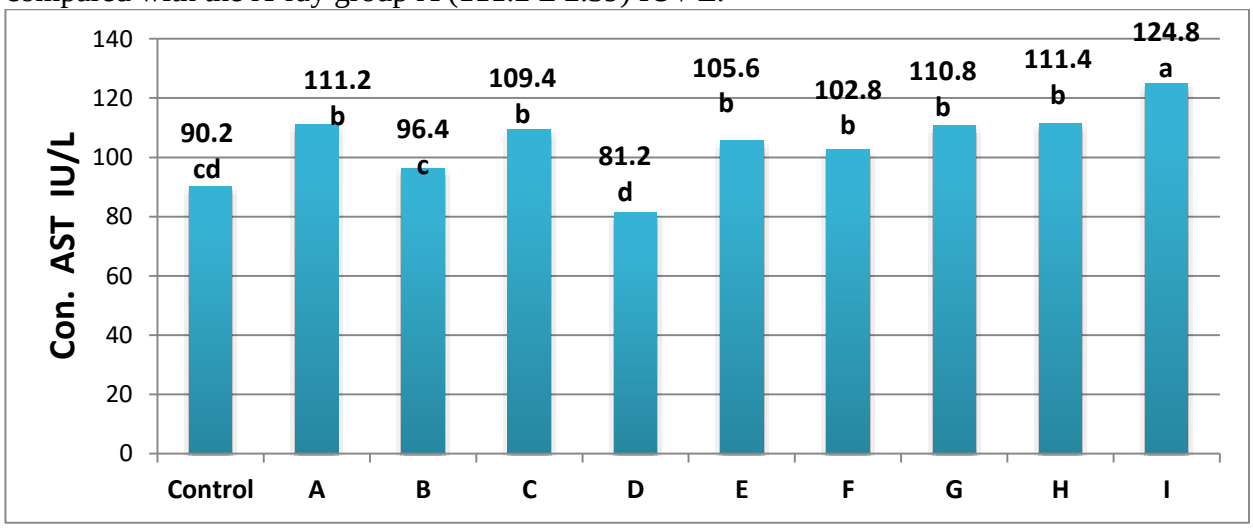

Figure (2) : Effect of X-ray treatment, ginseng root powder and vitamin D on AST enzyme activity.

3- Effectiveness of ALP enzyme in serum.

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The results of the present study as shown in Fig. (3) and Appendix 3 showed a significant increase (P≤0.01) in ALP concentration in the X-ray exposed group A (2.86 ± 0.321) KAU / dl compared with the control group (1.6 ± 0.255). KAU / dl and significant decrease (P≤0.01) for groups F, B (1.58 ± 0.581) (1.4 ± 0.1581) KAU / dl and significant increase (P≤0.01) for groups H, G, E, C (3.44 ± 0.321) (3.5 ± 0.941) (14.58 ± 1.820) (6.32 ± 0.661) KAU / dl, respectively, and no significant difference in groups I, D (2.34 ± 0.1817) (2.5 ± 0.543 (KAU / dl compared with X-ray group A) 1.6 ± 0.255) KAU / dl.

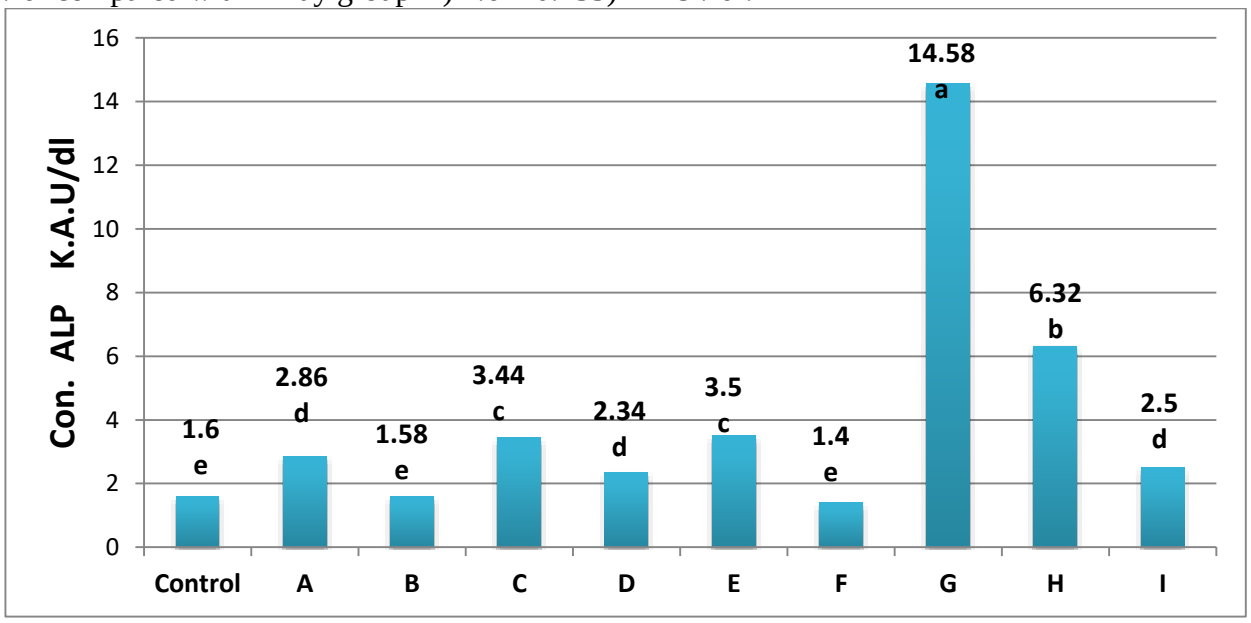

Figure (3) : Effect of X-ray treatment, ginseng root powder and vitamin D on ALP efficacy.

DISCUSSION

A study of the effects of radiation exposure on the body organs, as it breaks the DNA chains and then affects the nucleotides as a result of radiation exposure as the generation of effective oxygen species (ROS) by activating the oxidizing compounds increase the oxidation of fat In the cell walls, losing its functional role [7]. The increase in ALT, AST and ALP in the X-ray group is the result of the accumulation of free radicals through the oxidative stress caused by X-rays, which leads to damage to the liver cells and thus an increase in the effectiveness of liver enzymes [8]. As a result of exposure to ionizing radiation X-ray oxidative stress and thus increase the proportion of free radicals on the cells in the body and thus rupture cells and do not function normally and that liver enzymes ALT, AST and ALP [9]. The elevation of ALP may also be an indicator of damage to the heart muscle through the harmful effect of X-rays on the heart [10]. In the present results, we note that some groups of ginseng root powder at different doses show that liver enzymes decrease and return to normal due to the properties possessed by the ginseng plant, which is the elimination of free radicals and oxidative stress caused by radiation on the surface of cells [11]. Ginseng is instrumental in the elimination of free radicals and active oxygen varieties (ROS) that accumulate on normal cells in body tissues [12]. We also note the effectiveness of group F in liver enzymes begins to decrease as a result of leaving the body for a period of time after irradiation, because the body works to get rid of oxidative stress by effective antioxidants in the body [13]. In other words, the damaged cells in the body repair themselves after a period of time and once the oxidative

stress is removed and compensatory cell changes occur, the cells return to functioning properly. We also note a decrease in some groups also treated with vitamin D3, which is due to the role of vitamin D3 effective as an antioxidant and this role promotes the elimination of free radicals and oxidative stress and thus improve the functioning of cells functions [14].

CONCLUSIONS

The present study showed the active role of ginseng root powder and vitamin D in the improvement of liver function and oxidative stress.

References

[1] Alscher, R. G., and Hess, J. L. (2017). Antioxidants in higher plants. CRC press. Pp 83 – 146 .

[2] Amidani, L.; Korthout, K.; Van der Linden, M.; Meijerink, A.; Smet, P.; Poelman, D.; and Glatzel, P. (2015). Evolution of Eu and Mn oxidation state in doped BaMgAl10O17 during x-ray irradiation. In 4th International conference on the Physics of Optical Materials and Devices (ICOM 2015). Institut za nuklearne nauke'Vinca'. Pp 93.

[3] Andreoli, T.E.; Carpenter, J.; and Griggs, R.C. (2001). Cecil essentials of medicine: disorder of lipid metabolism. Herbert PN Philadelphia WB Saunders Company. London, Tornto, 16, Pp 526-532.

[4] Bhat, M.; and Ismail, A. (2015). Vitamin D treatment protects against and reverses oxidative stress induced muscle proteolysis. The Journal of steroid biochemistry and molecular biology, 152, Pp 171-179.

[5] Bruyere, O.; Cavalier, E.; Souberbielle, J.C.; Bischoff-Ferrari, H.A.; Beaudart, C.; Buckinx, F.; and Rizzoli, R. (2014). Effects of vitamin D in the elderly population: current status and perspectives. Archives of public health, 72(1), Pp 32.

[6] Burstein, M.; Scholnick, H.R.; and Morfin, R. (1970). Rapid method for the isolation of lipoproteins from human serum by precipitation with polyanions. Journal of lipid research, 11(6), Pp 583-595.

[7] Burtis, C.A.; and Ashwood, E.R. (1999). Teitz Text Book of Clinical Chemistry, 3rded.,W.B.Saunders Company, London, UK., Pp 840 843.

[8] De Vries, M.A.; Van Der Meulen, N.; Van de Geijn, G.J.M.; Klop, B.; Van der Zwan, E.M.; Prinzen, L.; and Castro Cabezas, M. (2016). Effect of a Single Dose of Vitamin D3 on Postprandial Arterial Stiffness and Inflammation in Vitamin D–Deficient Women. The Journal of Clinical Endocrinology and Metabolism, 102(3), Pp 992-1000.

[9] Fagundes, G.E.; Macan, T.P.; Rohr, P.; Damiani, A.P.; Da Rocha, F.R.; Pereira, M.; and Silveira, P.C.L. (2019). Vitamin D3 as adjuvant in the treatment of type 2 diabetes mellitus: modulation of genomic and biochemical instability. Mutagenesis. 34(2), Pp 135-145.

[10] Fossati, P.; and Prencipe, L. (1982). Serum triglycerides determined colorimetrically with an enzyme that produces hydrogen peroxide. Clinical chemistry, 28(10), Pp 2077-2080.

[11] Gao, F., Liu, C., Guo, J., Sun, W., Xian, L., Bai, D., ... & Zhang, C. (2015). Radiation-driven lipid accumulation and dendritic cell dysfunction in cancer. Scientific reports, 5, 9613.

[12] Getz, G.S. (2006). Reardon CA. Diet and murine atherosclerosis. Arterioscler Thromb Vasc Biol, 26, Pp 242-249.

[13] Idziak, S.H. (2018). Powder X ray Diffraction of Triglycerides in the Study of Polymorphism. In Structure-Function Analysis of Edible Fats. (Pp. 73-99). AOCS Press.

[14] Meiattini, F.; Prencipe, L.; Bardelli, F.; Giannini, G.; and Tarli, P. (1978). The 4-hydroxybenzoate/4-aminophenazone chromogenic system used in the enzymic determination of serum cholesterol. Clinical Chemistry, 24(12), Pp 2161-2165.