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Ameliorating Effect of 6-paradol Nanoparticles on Bisphenol A-Induced Liver Toxicity in Male Rats

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Abstract :

The aim of the current study is to determine the effect of Pradol-6 nanoparticles on the side effects of bisphenol in liver enzymes and some antioxidants in male rats, 40) rats were used in the study.

The control group was given distilled water only, the T1 group was given bisphenol A at a concentration of 150 mg/kg of body weight, the T2 group was given the nanomaterial of Pradol-6 at a concentration of (30) mg/kg of body weight, while the T3 group was dosed with bisphenol at a concentration of 150 mg/kg. of body weight and Alpradol-6 nanoparticles at a concentration of (30) mg/kg body weight simultaneously, and the results showed that the effect of bisphenol A was significant, and Alpradol-6 nanoparticles had a significant effect in reducing the side effects of the drug.

Introduction:

Medicinal plants and herbs, and since time immemorial, are still the common means of treating many diseases that humans suffer from, and recent studies have taken a direction towards the use of medicinal plants. Tropical used in Chinese and Indian medicine (Cattleman, 2001), ginger plays a role in the treatment of many diseases, including protection of the liver from cancer and toxicity caused by chemicals (Habibs*et al*., 2012)) It was also used in the treatment of infections and respiratory diseases and other diseases (Grunewald, 2004).

In recent years, diseases, including liver and kidney diseases, have increased due to the influence of substances that have the ability to disrupt the function of the liver and kidneys. One of these substances is (Bisphenol-A), or Bisphenol A, which has spread everywhere during the past eighty years. It is an organic compound of bisphenols, the most famous of which is found in Daily consumer products such as plastic bottles, baby bottles,

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building materials, food containers, toys, cosmetics, electronic items and many other items (chapin *et al*., 2008).

Materials and working methods:

In the current study, 40 rats were randomly divided into four groups, with (10) rats for each group. My agencies are:

1. Negative control C: included (10) animals that were dosed with distilled water only for four weeks.

2. Group T1: included (10) animals that were orally dosed with bisphenol A at a dose of 150 mg/kg of body weight (Kitraki et al., 2015) at a rate of (1) ml for four weeks.

3. Group T2: included (10) animals that were dosed with Pradol-6 nanoparticles at a dose of (30) mg/kg of body weight (Morgan et al, 2014) at a rate of (1) ml for four weeks.

4. Group T3: included (10) animals that were dosed with bisphenol A at a dose of 150 mg/kg body weight and Pradol-6 nanoparticles (30) mg/kg body weight and bisphenol A simultaneously for four weeks and at (1) for each substance.

Animals were anesthetized after the end of the experiment, by injecting a mixture of 0.3 ml ketamine and 0.1 ml xylazine per kg of body weight in the peritoneum, and blood was drawn from the heart of each animal directly by cardiac puncture using sterile medical syringes with a capacity of 5 ml. Save 4 ml of blood and put it in special tubes free of anticoagulant and they were rotated in a centrifuge at a speed of 3000 revolutions / min for 15 minutes for the purpose of obtaining blood serum. It was placed in plastic tubes of 1 ml capacity and kept at a temperature of _20 C until tests were performed on them.

Results:

The results of the study in Table (1) indicated a significant increase ($P<0.05$) in the level of enzymes (AST, ALT, ALP) for male rats treated with the drug at a concentration of 150 mg/kg compared to the negative control group (C), and the results also indicated a significant decrease ($P<0.05$) in the level of enzymes (AST, ALT, ALP) in groups T2, T3) compared with the group (T1), while there was no significant difference ($P>0.05$)) in the T2 group compared to the control group.

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Table (1): The effect of nanomaterials on the level of some liver enzymes (ALP-ALT-AST) in male rats treated with Bisphenol drug.

Groups	AST	ALT	ALP
C	**15.406±0.29 E**	**10.30±0.09 E**	**80.385±0.22 E**
T1	**26.904±0.74 A**	**21.413±0.34 A**	**121.647±1.17 A**
T2	**15.348±0.32 E**	**10.551±0.44 E**	**81.663±0.53 E**
T3	**19.348±0.32 C**	**14.651±0.47 C**	**101.391±0.73 C**

*Value represent the mean ± the standard error

* Different letters in one column indicate significant differences (P < 0.05) between the totals

*Similar letters in one column indicate that there are no significant (P < 0.05) differences between the groups

The different letters in the same row indicate significant differences (P < 0.05) between the groups

The results shown in Table (2) indicated a significant increase (P<0.05) in the level of MDA concentration for male rats treated with the drug at a concentration of 150 mg/kg compared to the negative control group (C)), and the results indicated a significant decrease (P<0.05) in The level of MDA concentration in the groups (T2,T3)) compared with the group (T1), and there was no significant difference (P>0.05)) in the group T2 compared to the control group.

The results of the study indicated that there was a significant decrease (P<0.05) in the concentration level of (SOD,GSH,CAT) for male rats treated with the drug at a concentration of 150 mg/kg compared to the negative control group (C), while the results indicated a significant increase (P<0.05) in Concentration level (SOD, GSH, CAT) in groups T2, T3) compared with group (T1), and it was noted that there was no significant difference (P>0.05)) in group T2 compared to control group.

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Table No. (2): Effect of nanomaterials on antioxidant parameters of male albino rats treated with Bisphenol drug .

Groups	MDA(µmol/m)	SOD	GSH(µmol/ml)	CAT(U/ml)
C	**1.678 ± 0.077 E**	**2.122 ± 0.032 A**	**2.431 ± 0.27 A**	**0.541 ± 0.011 A**
T1	**4.154 ± 0.061 A**	**1.027 ± 0.015 E**	**1.04 ± 0.022 E**	**0.116 ± 0.012 E**
T2	**1.682 ± 0.08 E**	**2.121 ± 0.023 A**	**2.396 ± 0.021 A**	**0.539 ± 0.011 A**
T3	**2.302 ± 0.022 D**	**1.413 ± 0.017 B**	**1.751 ± 0.039 B**	**0.349 ± 0.011 B**

*Value represent the mean ± the standard error

* Different letters in one column indicate significant differences (P < 0.05) between the totals

*Similar letters in one column indicate that there are no significant (P < 0.05) differences between the groups

The different letters in the same row indicate significant differences (P < 0.05) between the groups

Discussion:

The results showed a significant increase in the level of AST, ALT and ALP enzymes in the T1 group compared to the negative control (C). The reason for the high level of liver enzymes is due to the action of bisphenol in raising the oxidative stress in hepatocytes, which causes liver damage and a high level of AST, ALT and ALP (Mathuria and Vermu, 2008).

As for the significant decrease in groups T2, T3), the reason may be attributed to the role of the nanocarriers in enhancing the therapeutic index of Pradol-6 by increasing the bioavailability and biological efficacy while reducing the side effects as well as the effect of Alpradol-6, the antioxidant and superhydrogen depressant of peptides in Liver (Motawi*et al*., 2011; Ochekpe*et al*., 2009).

The reason for the high level of MDA and low level of (SOD, GSH, CAT) for T1 group compared to the negative control group is the use of antioxidants to eliminate free radicals (ROS) caused by bisphenol A drug (Abd- wahab, 2014).

As for the significant decrease in the level of (MDA) and the increase in the concentration level of (SOD, GSH, CAT) witnessed by the groups (T2, T3) due to the nanostructure of Pradol-6, which has an anti-oxidant effect as it removes super-oxidants (Khalaf*et al*., 2007). Also, the strong antioxidant effect of Pradol-6 is attributed to its ability to reduce the production of reactive oxygen compounds (Jeong and Joo, 2016).

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