

Hexavalent Chromium-Induced Changes in Biochemical Parameters of Wistar Albino Rats

Authors : Ounassa Adjroud

Abstract : Potassium dichromate ($K_2Cr_2O_7$) is one of the most toxic elements to which man can be exposed at work or in the environment. The purpose of the current work is to compare the effect of $K_2Cr_2O_7$ using variations in the dose, route of administration and duration of exposure in male and female Wistar albino rats with a special focus on biochemical parameters. $K_2Cr_2O_7$ was subcutaneously administered alone (10, 50 and 100 mg/kg body weight) to female Wistar albino rats. Male rats received in their drinking water $K_2Cr_2O_7$ 30 mg/L/day for 20 consecutive days. The Biochemical parameters were evaluated on days 3, 6 and 21 after subcutaneous (sc.) treatment in female rats and on days 10 and 20 after oral administration in male rats. The subcutaneous (s.c.) administration of 25 mg/kg of $K_2Cr_2O_7$ to Wistar albino rats induced a slight change in plasma glucose levels during the experiment period. On the contrary, a significant decrease in plasma glucose levels was observed with 50 mg/kg mainly on days 3 (-26%) and 21 (-48%) after treatment compared to controls females rats. On the other hand, the higher dose provoked a significant increase in plasma glucose concentrations on days 6 (+31%) and 21 (+60%). similarly, the lower dose of chromium had no effect on the plasma urea levels. Conversely, a significant increase (122%) in this parameter was obtained during the first three days after treatment. In addition, a significant decrease in plasma glucose levels was observed with 50 mg/kg mainly on days 3 (-26%) and 21 (-48%) after treatment. On the other hand, the higher dose provoked a significant increase in plasma glucose concentrations on days 6 (+31%) and 21 (+60%). similarly, the lower dose of chromium had no effect on the plasma urea levels. Conversely, a significant increase in this parameter (122%) was obtained during the first three days after treatment. In addition, administration of 100 mg/kg of $K_2Cr_2O_7$ by s.c markedly augmented the levels of plasma urea on days 3 (62%) and 6 (121%). Administration of 30 mg/L/day of $K_2Cr_2O_7$ in the drinking water induced a significant augmentation in both of plasma glucose (27%) and urea (126%) during the first ten days of treatment. These results suggested that $K_2Cr_2O_7$ administered subcutaneously or in the drinking water may induce harmful effects on biochemical parameters.

Keywords : glucose, potassium dichromate, Wistar albino rat, urea

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