

Protective Role of Ethanolic Extract of Pomegranate
(*Punica granatum* L.) on Certain Physiological Aspects of
Adrenal, Pancreas and Blood in Rats Toxicated with Lead
Acetate

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Summary:

The present study was carried out to investigate the protective role of pomegranate peel extract to prevent or suppress harmful effects of lead acetate on the adrenal cortex, pancreas function and blood picture in adult male rats, by studying the following parameters: body weight, blood glucose concentration, total serum cholesterol concentration, serum cortisol concentration, estimation of Hb, PCV, RBCs count, total WBCs count and differential leukocyte in addition to histological study of adrenal cortex and pancreas.

The experiment was divided into two parts: First part was dealing with alcoholic extraction of pomegranate peel by using alcoholic extraction method then using (HPLC) to confirm the availability of ellagic acid in the obtained extract. The result of HPLC analysis revealed that pomegranate peel extract contain (25.560)% of ellagic acid. Whereas, the second part was dealing with biochemical, hematological parameters and histological examination of adrenal cortex and pancreas.

Thirty adult male rats ranged between 175-250 gm were randomly divided into three groups (ten to each group) and treated as following for eight weeks: Rats in the first group were received (10 ml/kg B.W) distilled water orally once a day and considered as control group, animals of the second group were received lead acetate (10 mg/kg B.W) once a day orally and termed as T1 group, while the rats in the third group were drenched pomegranate peel extract (100 mg/kg B.W) and after 3 hours given lead acetate (10 mg/kg B.W) once a day orally and termed as T2 group, body weight was determined and fasting blood samples were collected at 0, 2, 4, 6 and 8 weeks of the experiment for measuring the blood and serum parameters. At the end of the experimental period, six animals from each group were sacrificed to study the histology of adrenal cortex and pancreas. The results revealed a significant decrease ($P<0.05$) of body weight in two treated groups T1 and T2 in comparison with the control one. Data have showed that lead acetate T1 group caused a significant increase ($P<0.05$) in serum glucose concentration, serum total cholesterol concentration and serum cortisol concentration compared with control group, whereas, the results have revealed a significant decrease of these parameters in pomegranate peel extract with lead acetate treated group T2 in comparison with T1 group. In the same time the data of T2 group exhibited no significant differences as compared with control group and showed no significant differences within group along experiment periods. While, within T1 group the results showed significant differences. Furthermore, lead acetate caused a significant decrement ($P<0.05$) of RBCs, Hb and PCV in T1 group compared with the control group at the latter half of the experiment. While, the treatment of rats with pomegranate peel extract plus lead acetate T2 group showed a significant increase ($P<0.05$) in the values of RBCs, Hb and PCV and becoming nearly to the normal one at 42 and 56 days of experiment.

Total WBCs count was significantly increased ($P < 0.05$) in T1 group compared with the control group, while pomegranate peel extract plus lead acetate treated T2 group caused a significant decrease ($P < 0.05$) of WBCs count compared with T1 group, also there were a significant differences within T1 and T2 groups. Furthermore, lead acetate caused significant decrease of lymphocyte and eosinophil, with significant increase of neutrophils and monocyte, while basophile remained unchanged. Pomegranate peel extract with lead acetate treated T2 group exhibited a significant improvement of all cells types leukocytes and becoming nearly normal. Histological studies of adrenal cortex of lead acetate treated rats T1 group indicated a vacuolar degeneration of cytoplasm of adrenocortical cells especially in the region of zona fasciculata and zona reticularis in addition to inflammatory cells infiltration in the capsule of gland. The histological studies of pancreas of lead acetate treated rats T1 group showed marked atrophy of islets of Langerhans, while the adrenal cortex of the animals in T2 group revealed no significant lesion of the adrenocortical cells. Whereas, the histological study of pancreas showed hyperplasia of pancreatic islets in rats of T2 group. On conclusion it seems likely that dosage of rats with (10 mg/kg B.W) of lead acetate caused harmful effect on adrenal cortex and pancreas function in addition to blood picture, while the treatment of animals with (100 mg/kg B.W) of pomegranate peel extract showed marked improvement of these parameters but not complete protection in all studied parameters after long period of lead acetate exposure.