



## NEUROPROTECTIVE EFFECTS OF POMEGRANATE JUICE ON LEAD INDUCED NEUROTOXICITY IN MICE

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### ABSTRACT

**Objective:** This study evaluates the potential neuroprotective of the pomegranate juice against chronic intoxication with lead acetate for 3 months.

**Methods:** Twenty-one female Swiss mice divided into 3 groups were employed in the present investigation. Control group: received drinking water for 90 days, neurotoxic group were exposed to 1000 ppm of lead acetate in the drinking water for 12 weeks, and neurotoxic treated group represents the mice received treatment with juice pomegranate diluted with distilled water (v/v) orally for 4 h / day followed by lead acetate at a dose of 1000 ppm orally for 20 h / day for 90 days. After cessation of treatment, neurobehavioral studies using the open field test, black and white test box and swimming test were made. In the next phase, brain injury was assessed histologically with hematoxylin-eosin staining.

**Results:** Chronic exposure to lead led to significant increase in the level of anxiety, depression and the locomotor activity ( $P < 0.05$ ). It was confirmed by histopathological alterations in many areas of the cerebral cortex and hippocampus including neuronal degeneration and decrease cell density. Treatment with the juice significantly improve the level of depression, locomotor function ( $P < 0.05$ ) and anxiety ( $P > 0.05$ ) in mice exposed to lead as well as restored the histological structure in cerebral cortex and hippocampus of mice. The total phenolic and flavonoids content in juice of pomegranate was found to be  $3809.8 \pm 29.404$  mg GAE/l;  $2109.57 \pm 18.936$  mg QE /l of juice.

**Conclusion:** This finding suggests that phenolic compounds found in pomegranate juice provide a neuroprotective effect on behavioural impairments and histopathological change induced by lead.

**Keywords:** Pomegranate juice, Neurotoxicity, Neurobehavioral, Histopathology, Cerebral cortex, Hippocampus