World Academy of Science, Engineering and Technology
International Journal of Bioengineering and Life Sciences
Vol:18, No:09, 2024

Nanoparaquat Effects on Oxidative Stress Status and Liver Function in Male Rats

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Abstract : Background: One of the most often used herbicides in agriculture is paraquat (PQ), which is very harmful to both people and animals. Chitosan is a well-known, non-toxic polymer commonly used in preparing particles via ionotropic gelation facilitated by negatively charged agents such as sodium alginate. This study aimed to compare the effects of PQ and nanoparaquat (PQNPs) on liver function in male rats. Materials & Methods: Rats were exposed to PQ & PQNPs (4 mg/kg/day, intraperitoneally) for seven days. Then, rats were anesthetized, and serum and liver samples were collected. Later, enzymatic activities such as alanine transaminase (ALT), aspartate transaminase (AST), and alkaline phosphatase (ALP) in serum and oxidative stress biomarkers such as lipid peroxidation (LPO), total antioxidant capacity (TAC) and total thiol groups (TTG) levels in liver tissue were measured by colorimetric methods. Also, histological changes in the liver were evaluated. Results: PQ altered the levels of ALT, AST, and ALP while inducing oxidative stress in the liver. Additionally, liver homogenates with PQ exposure had challenged LPO, TAC, and TTG levels. The severe liver damage is indicated by a significant increase in the enzyme activity of AST, ALT, and ALP in serum. According to the results of the current study, PQNPs, as compared to PQ and the control group, lowered ALT, AST, ALP, and LPO levels while increasing TAC and TTG levels. Conclusion: According to biochemical and histological investigations, PQ loaded in chitosan-alginate particles is more efficient than free PQ at reducing liver toxicity.

Keywords : paraquat, paraquat nanoparticles, liver, oxidative stress
Conference Title : ICMBB 2024 : International Conference on Molecular Biology and Biochemistry
Conference Location : Toronto, Canada
Conference Dates : September 19-20, 2024