



EVALUATION OF CYTOTOXICITY INDUCED BY METHIDATHION: PROTECTIVE EFFECTS OF OLIGOELEMENTS

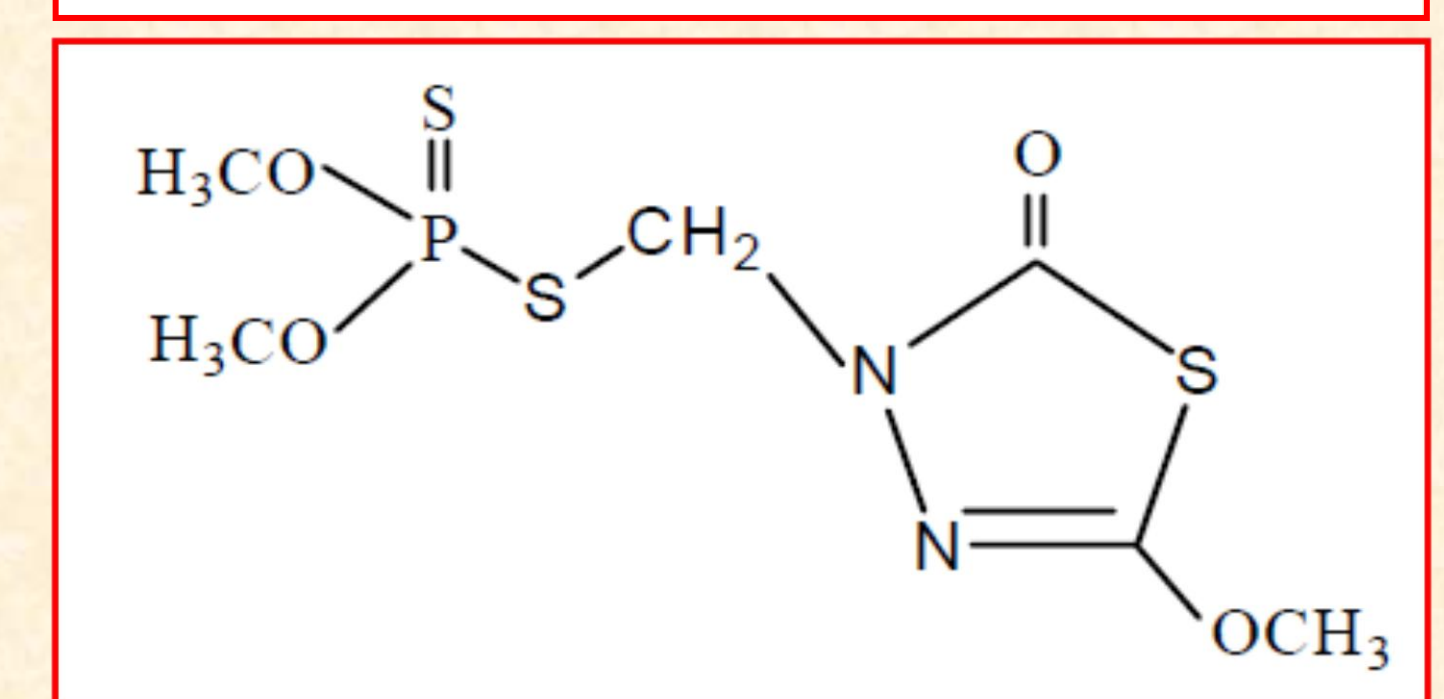
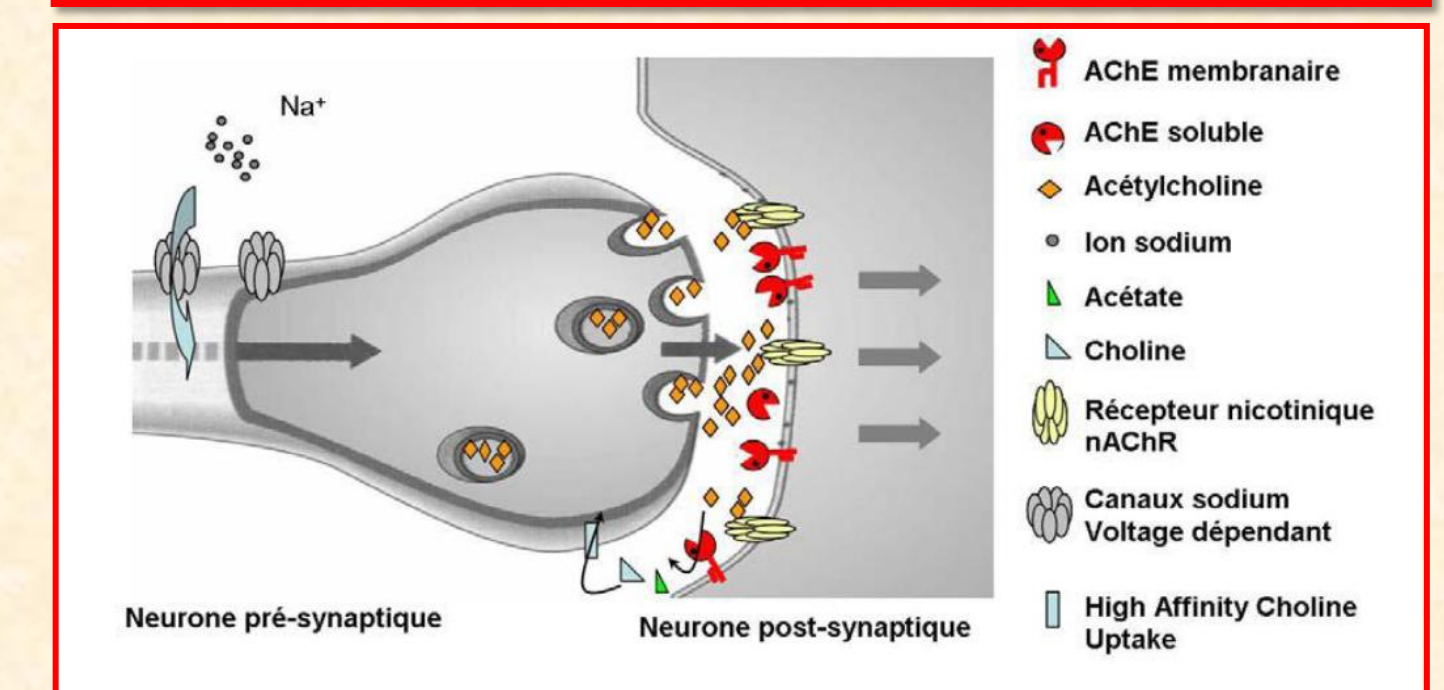


Leila Barkat, Amel Boumendjel, Abdelfattah El Feki & Mahfoud Messarah

Introduction

Organophosphate insecticides (OPIs) are widely used in agriculture, in order to enhance food production against insects and micro-organisms throughout the world. The predominant action of OPIs is to cause inhibition of acetyl cholinesterase (AChE) activity in the target tissues leading to the accumulation of acetylcholine substance. The latter represent the chemical mediator of nervous system, and it is responsible for the transmission of nervous function by binding to post synaptic acetylcholine receptors, resulting in muscle contraction or glands secretions.

Methidathion is one of the most widely used OPIs for agriculture and public health programmes. Chronic and subchronic exposure of methidathion may induce oxidative stress leading to the generation of free radicals and alteration in antioxidants or reactive oxygen species (ROS) scavenging enzymes. However, the supplementation of antioxidants can be useful to constrain the oxidative damage, Zn and Se are considered essential for the correct functioning of an organism. Additionally to being a co-factor of SOD, Zn is required, as a functional component, in more than 200 enzymes and transcription factors.



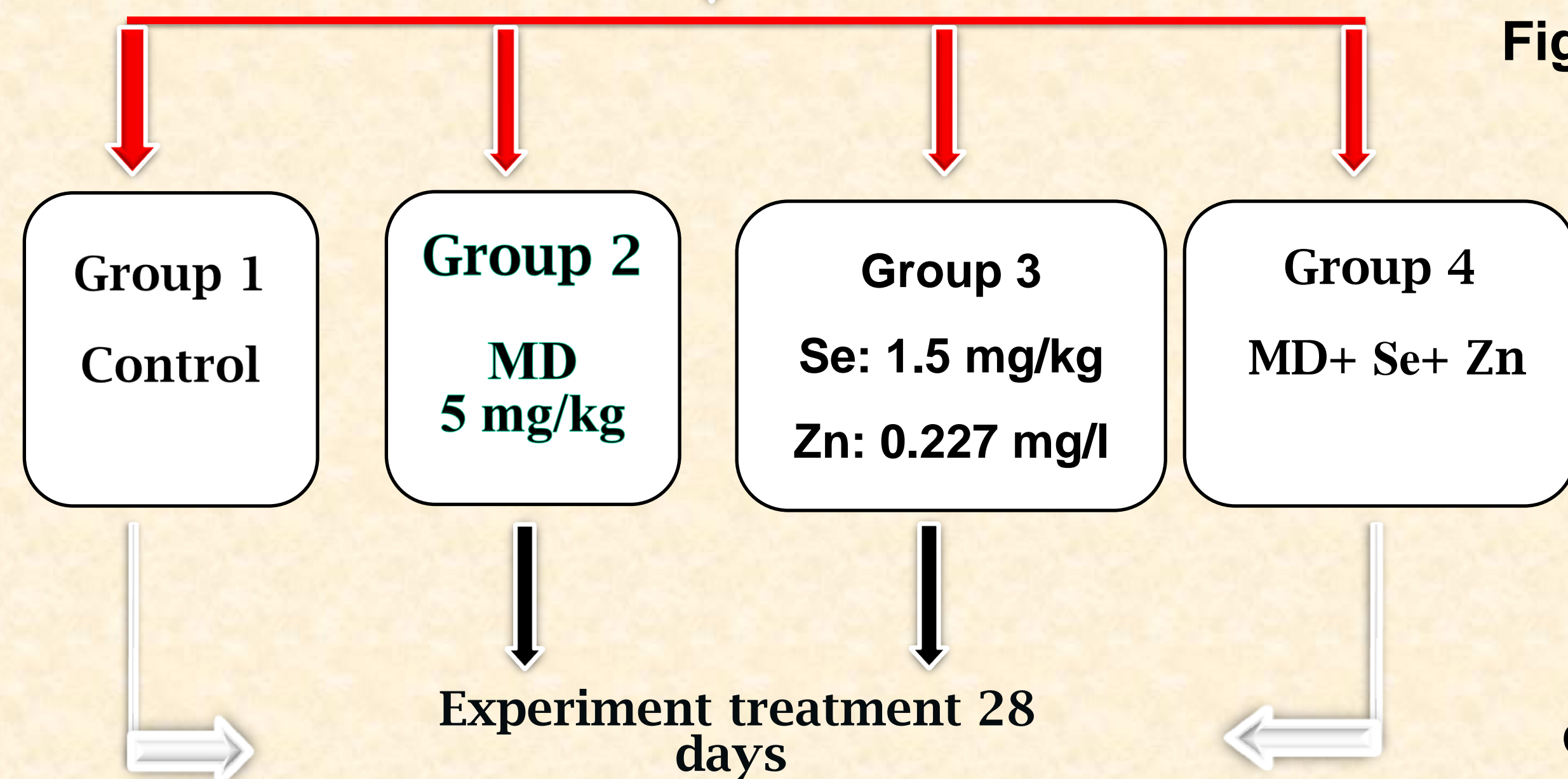
Objectif

The aim of this study was to evaluate the effect of methidathion on biochemistry, lipid peroxidation and enzyme activities and to investigate the combined administration of selenium and zinc in alleviating the methidathion induced toxicity.

Materials and methods

28 male wistar rats

After acclimated 2 weeks



Conclusion

In conclusion, this study demonstrates that exposure to MD provoked hepatotoxicity by inducing lipid peroxidation and depletion in antioxidant enzyme activities of rats. However, Se and Zn treatment could improve the histological alteration induced by MD which could be related to the antioxidant efficacy of the synergy effect given by selenium and zinc.

Similarly Se and Zn could protect liver against MD toxicity by reducing MDA level and increasing the activities of antioxidant enzymes. Thus to cope with MD toxicity, more attention is needed to limit its use, in one hand, and to supplement food with antioxidants as that of Se and Zn, on the other hand.

Results

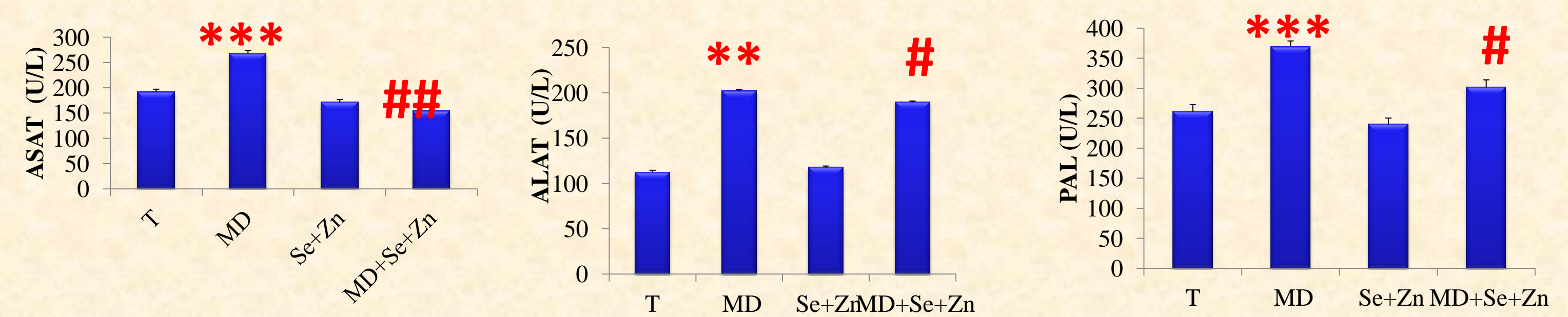


Figure 1. Changes in biochemical parameters of control and rats treated with selenium plus zinc (Se+Zn), methidathion (MD) or their combination (MD+Se+Zn).

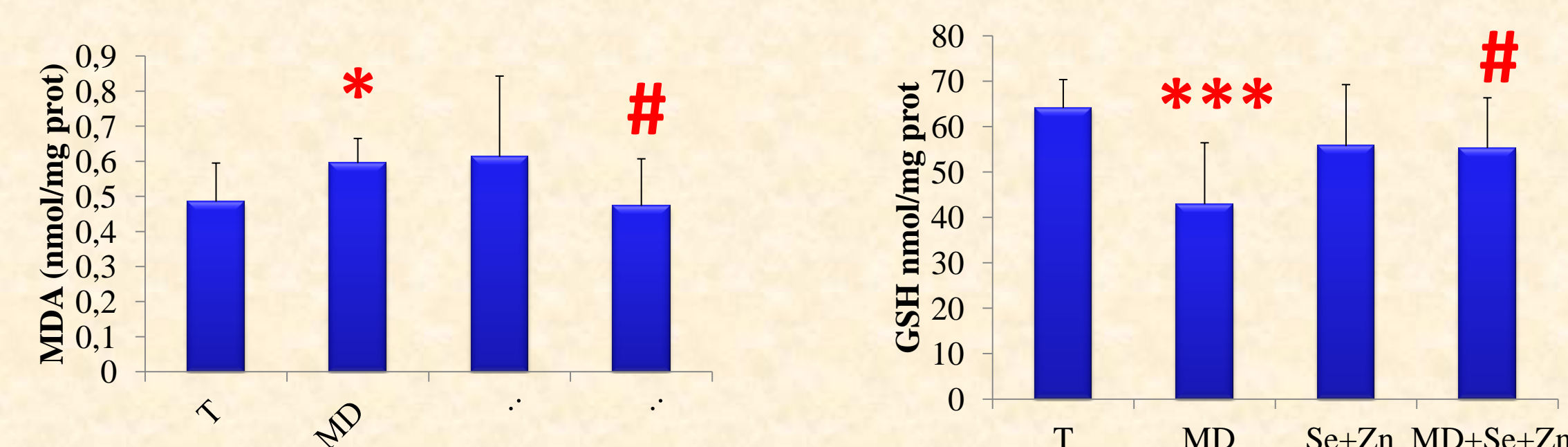


Figure 2. Liver malondialdehyde (nmol/mg prot.) and reduced glutathione (nmol/mg prot.) levels of control and rats treated with selenium plus zinc (Se+Zn), methidathion (MD) or their combination (MD plus Se+Zn).

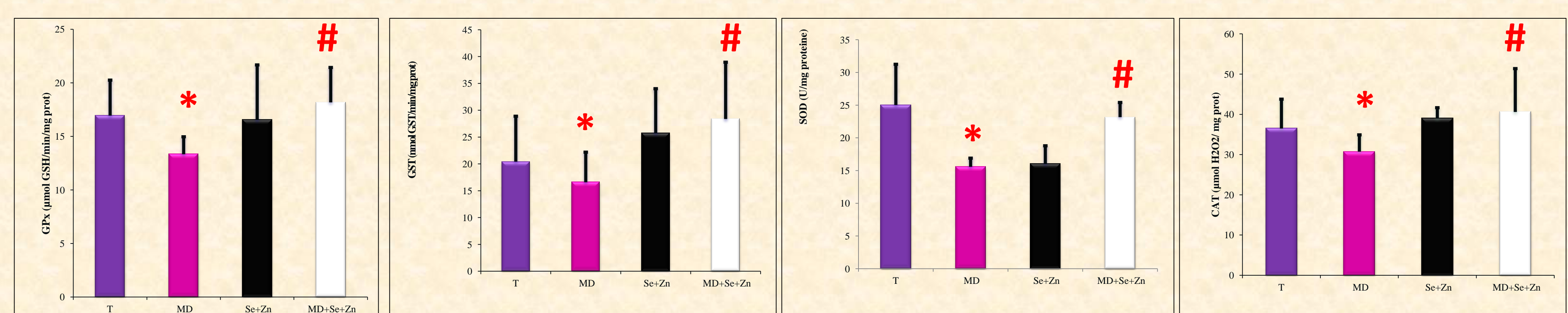


Figure 3. Activities of antioxidant enzymes of control and rats treated with selenium plus zinc (Se+Zn), methidathion (MD) or their combination (MD+Se+Zn).

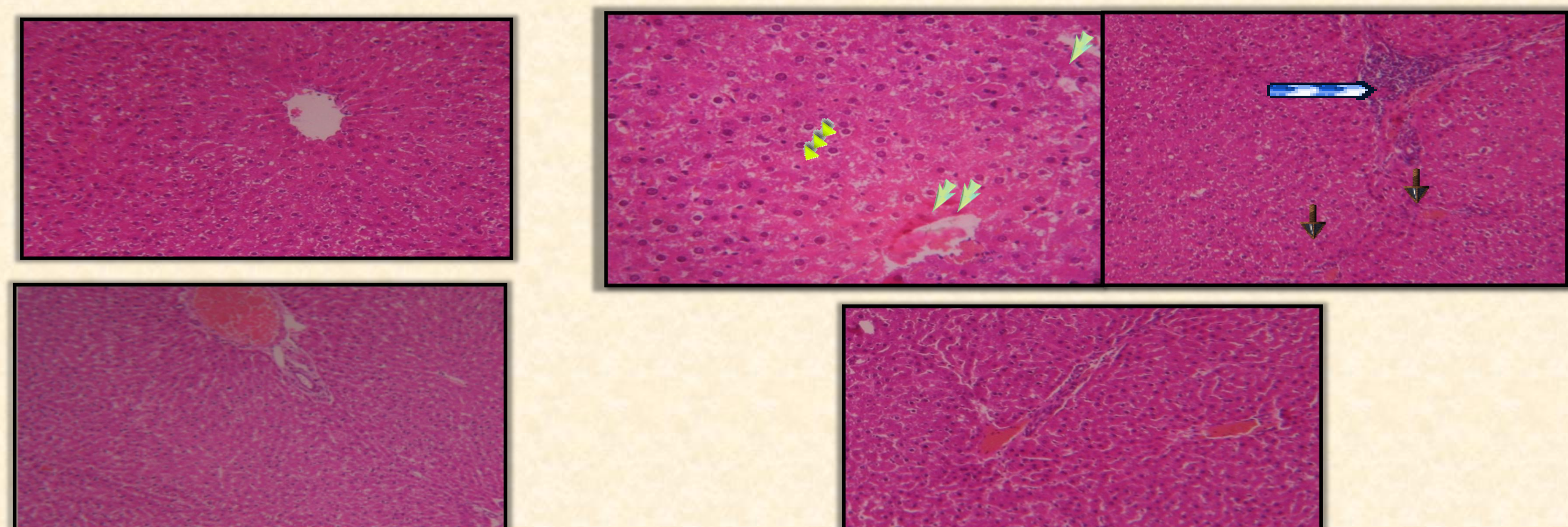


Figure 4. Effect of methidathion (MD) and selenium plus zinc (Se+Zn) co-administrated with MD on histopathological damages in the liver. Controls (A, x100), treated with Se+Zn (B, x100), MD (C and D, x250) and Se plus Zn co-administrated with MD (E, x100) after 4 weeks of treatment, as revealed by photomicrograph of H&E.

