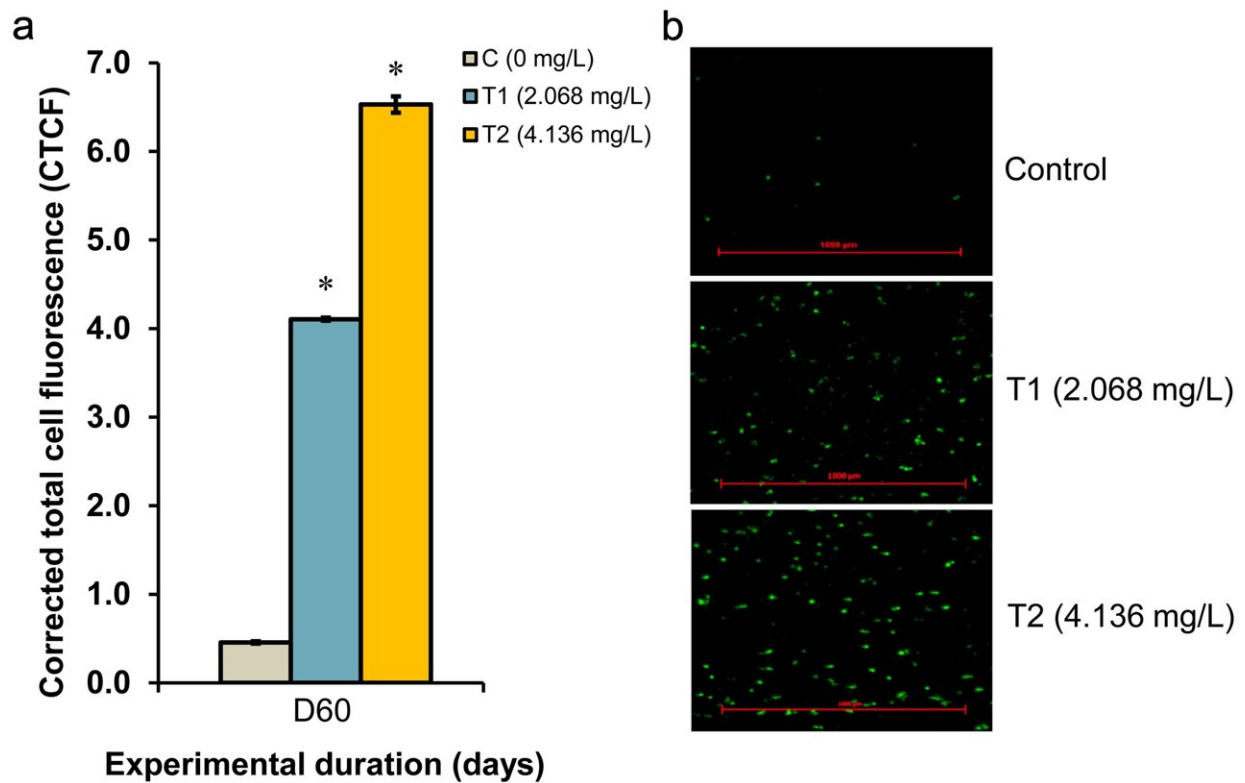


Perturbations in redox status, biochemical indices, genes in the liver following fish exposure to Mancozeb

March 5 2024



ROS induction in the erythrocytes of control and treated groups (T1 and T2). (a) The corrected total cell fluorescence (CTCF) values in fish exposed to T1 (2.068 mg/L) and T2 (4.136 mg/L) after 60 days. The stated values are mean \pm standard error; n = 3 fish were taken from each group; *p Gene Expression (2024). DOI: 10.14218/GE.2023.00049

Due to the increased demand for food for the growing population, pesticides are widely used to control diseases and boost productivity. A study [published](#) in the journal *Gene Expression* was designed to evaluate the toxic effects of the fungicide Mancozeb (MZ) in the liver of the fish strain *Channa punctatus*.

Fifty-four healthy *C. punctatus* fish (24 ± 4.0 g, 11.0 ± 2.0 cm) were divided into three groups (n = 18 per group): control, T1 (20% of 96 h-LC50—2.068 mg/L) and T2 (40% of 96 h-LC50 – 4.136 mg/L). Reactive oxygen species, redox imbalance, and liver biomarkers were measured after 20, 40, and 60 d of MZ exposure. Transcriptional profiling of XBP1s and NOX4 genes was performed after 60 d.

There were significant (p) reactive oxygen species induction, oxidative stress biomarkers (lactate dehydrogenase enzyme activity, glutathione peroxidase, superoxide dismutase, and catalase), and liver biomarkers (alanine transaminase, aspartate transaminase, [alkaline phosphatase](#), and total bilirubin) after 20, 40, and 60 d of MZ exposure.

However, there were significant (p) inflammatory response triggered by MZ. It may serve as early bio-indicators of endoplasmic reticulum stress and in the prevention and treatment of liver diseases.

This study showed that MZ is a strong oxidative stress inducer that can trigger NOX4 and XBP1s [gene expression](#) in the liver. We also found that ROS levels and their related biomarkers were elevated during liver injury, indicating that MZ toxicity can exert its [toxic effects](#) even in sub-lethal concentrations in *C. punctatus* fish.

It is well known that ROS overproduction can cause [neurodegenerative diseases](#), cancer, and liver diseases. Future studies will focus on the possible molecular pathways that are affected by MZ toxicity, contributing to a better understanding of disease progression.

More information: Adeel Ahmad Khan et al, Perturbations in Redox Status, Biochemical Indices, and Expression of XBP1s and NOX4 in the Livers of *Channa Punctatus* Following Exposure to Mancozeb, *Gene Expression* (2024). [DOI: 10.14218/GE.2023.00049](https://doi.org/10.14218/GE.2023.00049)

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