P004 Acute exposure of fish to nano-TiO_2 at environmental levels of ultraviolet light

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Studies about the potential ecotoxicological risks of TiO_2 nanoparticles have been published but the results are still inconclusive. TiO_2 has important photocatalytic properties and its photoactivation occurs in the ultraviolet range. The aim of this work was to evaluate the effects on fish exposed to different nano-TiO_2 concentrations and illumination conditions.

Fish (*Piaractus mesopotamicus*) were exposed during 96 h to 0, 1, 10 and 100 mg/L of nano-TiO_2 (Sigma Aldrich, 100% anatase, 25 nm). Exposure was performed under both types of illumination: visible light without and with ultraviolet radiation at environmental levels (UVA and B, 22.47 J/cm^2/h). The following biomarkers were analyzed: metallothionein (MT) concentration in gills, the specific activities of acid phosphatase (AP) and glutathione s-transferase (GST) in liver. Comet assay was performed with blood.

There was no mortality under any of the conditions tested. There was a concentration-dependent inhibition of AP ($F = 4.45$, $p = 0.007$). MT was affected by the interaction between the nano-TiO_2 concentration and illumination ($F = 5.17$, $p = 0.003$). MT was statistically higher for the group exposed to 1 mg/L and visible light, compared to the other concentrations. No statistically significant differences between the groups were observed for the other biomarkers.

Our results corroborate with literature, showing low toxicity of nano-TiO_2 in fish. However, sublethal effects were observed. The findings contribute to the development and implementation of protocols for use in nanoecotoxicology.

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