

# EVALUATION OF GRAPHENE OXIDE TOXICITY BY FET TEST IN THE PRESENCE OF HUMIC ACID

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**Introduction:** Sustainable development of nanotechnology requires the deep evaluation of the safety of its products. Despite nanotoxicological studies have been intensified in recent years, gaps remain in the methods used to assess the nanotechnology risks. These gaps are due to the complex nanomaterials behavior in the environment, especially in the presence of organic matter and depending on the nanomaterial characteristics. Studies indicate that humic acid present in the aquatic environment can increase the stability of nanomaterial dispersions and may change its toxicity to aquatic organisms.

**Objective:** The aim of this study is to evaluate the influence of humic acid in the toxicity of graphene oxide (GO) utilizing Fish Embryo Toxicity Test (FET test).

**Materials and Methods:** Zebrafish embryos (*Danio rerio*) were exposed during 96 h to GO (100, 10 or 1 mg.L<sup>-1</sup>, Sigma Aldrich) with or without humic acid (HA, 20 mg.L<sup>-1</sup>, Sigma Aldrich). Control groups exposed to water and HA were performed. At the end of the exposure period the larvae were measured and frozen at -20°C for subsequent evaluation of biochemical biomarker of oxidative stress (catalase and glutathione S-transferase activity). The stability of suspensions was evaluated through spectrophotometry and dynamic light scattering.

**Results and Discussion:** GO agglomerated and precipitated quickly in reconstituted water. The presence of HA in the medium stabilized the GO suspension similarly to that occurred with GO in ultrapure water. There was no difference between groups related to the occurrence of embryo malformation, mortality or total length of the larvae. The parameters of sublethal effects will be further analyzed.

**Conclusion:** GO did not show acute toxicity to zebrafish embryo and the presence of HA did not change acute GO effects. Nevertheless, sublethal effects must be evaluated to ensure GO safety.

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