

# DECLINES ON CAENORHABDITIS ELEGANS HEALTHSPAN IS INDUCED BY EXPOSURE TO A MIXTURE OF ENVIRONMENTALLY RELEVANT WATER CONTAMINANTS.

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**INTRODUCTION:** Environmental pollution constitutes a significant global health concern, with a report in 2019 indicating that nine million deaths were attributable to environmental pollution. A recent report (2021) identified water pollution as a secondary risk factor, contributing to 829,000 deaths. Analysis of drinking water and river surface samples found atrazine, iron, and bisphenol A, indicating these are primary pollutants. Regulatory agencies set acceptable limits for single contaminants but do not consider combinations, which are more realistic exposure scenarios. Accordingly, these pollutants are utilized in our research to address this lacuna in literature concerning the simulation of mixture exposures. **OBJECTIVE:** This work sought to answer a central question: What are the long-term effects of exposure to a mixture of environmental water contaminants. **MATERIALS AND METHODS:** Nematodes at the larval stage one were exposed to isolated contaminants or a mixture for 48 hours in a liquid medium, using concentrations environmentally relevant. Subsequently, parameters of survival, lifespan and locomotion analysis were conducted on adult days 1, 3 and 6. **RESULTS:** Survival, development or feeding after 48 hours is not affected by isolated or combination of pollutants, however, a long-term analysis (lifespan), revealed that exposure to atrazine and mixture resulted in a significant reduction in median lifespan of animals (29% and 64%, respectively). Furthermore, a significant reduction in mobility was observed in the atrazine and mixture groups on adult day one. Nonetheless, on days 3 and 6 analysis, only mixture group exhibited a reduction on locomotor parameters (swim, average speed, maximum speed and distance). The maximum velocity was utilized to categorize nematodes into two distinct groups: those exhibiting signs of healthspan and those displaying signs of gerospan. Was observed, on analyzed days, the majority of the animals in the mixture group demonstrating early aging characteristics. **CONCLUSION:** The findings of this study underscore the necessity of evaluating the combined effects of pollutants. Traditionally, regulatory agencies have established limits for individual pollutants. However, the present study demonstrates that the mixture of pollutants can elicit a more deleterious effect than the isolated pollutants, as evidenced by the induction of an early-aging paradigm in long-term exposures.

**Keywords:** locomotion; long-term; atrazine; iron; bisphenol A.

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