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Conference Abstract

Survival, metabolic rates and locomotory activities of a groundwater-obligate copepod species under long-term exposures to tetrachloroethylene

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Abstract

Volatile organic compounds (VOCs) are known to potentially cause a severe change in the respiratory metabolism of freshwater species, however the effect of these contaminants on groundwater-obligate species has not been investigated to date. Tetrachloroethylene (TCE) is a VOC frequently found in the groundwater bodies of industrialized areas, even years after a contamination event because TCE degradation takes several decades to occur. Contamination from TCE is considered persistent and difficult to remediate. Its high density favors a gravity-driven vertical infiltration into groundwater bodies. The TCE threshold value is 1.1 µg/L in groundwater bodies of Italy. TCE concentration in many Italian groundwater bodies is widely over this legal limit.

In this study, we investigated the effect of 1.1 µg/L TCE on the survival, oxygen consumption, and locomotory activities of a groundwater-obligate copepod species. The specimens required for the trials were collected in the Antro del Corchia Cave (Tuscany).

We measured the individual-based oxygen consumption of this species as a proxy of possible metabolic reactions to long-term (5 days) exposures to TCE at 8.0°C that is the mean annual temperature of groundwater flowing in the cave. To this end, we used a sealed glass microplate equipped with 24-planar oxygen sensor spots with optical isolation glued onto the bottom of 80-µL wells (Loligo Systems, Denmark) integrated with a 24-channel ?uorescence-based respirometry system (SDR Sensor Dish Reader, PreSens, Germany). The system allows simultaneous measurement of 20 replicates and 4 controls. Survival and locomotory activity assessments were performed by counting the number of alive individuals and measuring the number of moving animals in 5 mL glass vials each containing 20 individuals. Preliminary results showed a decreasing in oxygen consumption of the organisms exposed to 1.1 µg/L TCE for 5 days at 8°C respect to the control. However, neither survival nor locomotory activities appeared to have been affected by exposure to TCE. See Suppl. material 1.

Keywords

Copepods; tetrachloroethylene; traits

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Supplementary material

Suppl. material 1: Survival, metabolic rates and locomotory activities of a groundwater-obligate copepod species under long-term exposures to tetrachloroethylene doi

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