Evaluating the Impact of Coal Ash Pollution through a C. elegans Developmental Model

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The purpose of this experiment was to better understand the impact of coal ash pollution in the environment through studying its impact on the model organism C. elegans. Coal ash, a pollutant formed from burning coal for energy, is composed of several heavy metals and known carcinogens and it was therefore hypothesized that the substance would negatively impact the worm behavior. In the experiment several strains of C. elegans, one wildtype and two fluorescent mutants, were cultured and two different environments polluted by coal ash were created for their evaluation. The wildtype worms were first placed in varying concentrations of coal ash in K buffer. The worms were incubated for 48 hours then transferred (along with the coal ash solution) to plates seeded with E. coli where they remained for 48 hours. The second growth environment was a solid habitat created by mixing coal ash with NGM agar as it was poured into plates. The different strains of worms were grown on lawns of E. coli on these contaminated plates for 48 hours. Behavior of all the worm cultures was determined by transferring the worms onto slides and evaluating their thrashing movements via video microscopy. The experiment found a statistically significant difference between each strain grown on a coal ash plate and its respective control. Moreover, the data showed there to be a statistically significant difference between all data collected from the worm cultures in the different coal ash solutions. The data further confirmed that all the worms exposed to coal ash experienced decreased movement, with the greatest decrease in movement in the worms exposed to coal ash via the liquid medium, supporting the hypothesis and confirming the negative impacts of coal ash pollution on living organisms.

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