An Economical and High-Precision Approach for Nitrate Detection and Filtration to Ensure Quality Drinking Water

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There has been a rise in water pollution with nitrates over the past few years. Currently, there is no cost-effective option for the detection or filtration of nitrates in water, since the current options are expensive or have low accuracy. The goal of this research is to develop a process that can be used to detect and filter nitrates in water. A chemi-resistor sensor, based on a nanocomposite derived from carbon nanotubes and doped conducting polymers, was created to detect nitrates in water. The sensor was tested with various concentrations of nitrates, and a regression model was established. The model was used to determine the concentration of nitrates present in water to a high accuracy and display it on an LCD screen. Furthermore, a filter, using activated carbon coated with a nanocomposite derived from carbon nanotubes and doped conducting polymers, was created to filter nitrates in water. The filter showed that it could remove an average of 79% of nitrates in water, making it a highly efficient filter for nitrate removal. The removal and detection system was shown to be a highly economical and practical alternative for homes around the globe.

Awards Won:
United States Environmental Protection Agency: Honorable Mention (DO NOT READ: This finalist will receive mentoring with an EPA researcher with expertise relevant to their project.)