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 to detect 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.)