Researchers develop advanced wastewater treatment system with promise for greener future

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Researchers from King Khalid University have made significant progress in addressing environmental concerns related to the oil industry

by developing an advanced wastewater treatment system. The team, led by Dr. Atef El Jery, recently published their groundbreaking findings in *PeerJ Life & Environment*.

The oil industry generates large amounts of wastewater that can harm the environment if not properly treated. To tackle this issue, the researchers focused on a method called electrocoagulation, which has shown promise in removing a harmful pollutant known as chemical oxygen demand (COD) from oil refinery wastewater.

The study's findings are expected to have a significant impact on the field of wastewater treatment in the oil industry, contributing to a cleaner and more sustainable future. The complete research article titled "Optimization of oil industry wastewater treatment system and proposing empirical correlations for chemical oxygen demand removal using electrocoagulation and predicting the system's performance by artificial neural network" is publsihed in *PeerJ Life & Environment*.

Through a series of experiments, the team identified the best conditions for effective COD removal. They tested various factors, such as current density, pH levels, COD concentration, electrode surface area, and salt concentration. The results revealed that optimal COD removal occurred at a current density of 24 mA/cm^2, pH level of 8, COD concentration of 500 mg/l, electrode surface area of 25.26 cm^2, and salt concentration of 0.5 g/l. These findings indicate that electrocoagulation can efficiently treat wastewater and remove harmful COD pollutants.

Additionally, the researchers developed an artificial neural network (ANN) model, a type of machine learning technology, to predict COD removal from oil industry wastewater. The ANN model proved highly accurate, with a mean absolute error of only 1.12% and a coefficient of determination of 0.99. This suggests that the ANN model could be a valuable tool for reliably predicting COD removal in real-world

scenarios, providing a more efficient and sustainable approach to wastewater treatment.

More information: Atef El Jery et al, Optimization of oil industry wastewater treatment system and proposing empirical correlations for chemical oxygen demand removal using electrocoagulation and predicting the system's performance by artificial neural network, *PeerJ Life & Environment* (2023). DOI: 10.7717/peerj.15852

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