Guillermo J Rincon, Trends in Green chem 2018, Volume 4
DOI: 10.21767/2471-9889-C2-011

Electro-coagulation/flotation for the simultaneous removal of oil and grease and heavy metals from artifitial bilge water

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The research presented herein discusses the feasibility of using electro-coagulation (EC) as a method to treat bilge water discharges, with an emphasis on emulsified oil and heavy metals (copper, nickel and zinc) removal. EC experiments were conducted using a bench-scale continuous-flow reactor (manufactured by Ecolotron, Inc.) and a synthetic oily emulsion as experimental fluid. The as-synthetized bilge water contained 5000 mg/L of oil and grease 5 mg/L, 1.5 mg/L and 2.5 mg/L of copper, nickel and zinc respectively. Experimental results showed high removal efficiencies for oil and grease, specially when using a combination of carbon steel and aluminum electrodes. Operating the bench-scale reactor to allow for 1 min retention time and 0.6 A/cm^2 produced pre-filtration effluent concentrations of oil and grease of less than 10 mg/L. High removal effciencies were also observed for heavy metals. 99% removal of zinc and 70% removal for copper and nickel resulted from using the same carbon steel and aluminum electrodes, retention time of 1 minute and a current of 7.5 A.

Biography

Guillermo J Rincon is an Assistant Professor of Civil and Environmental Engineering at the University of New Orleans in New Orleans, Louisiana. He has completed his PhD in Environmental Engineering and MS in Engineering at the University of New Orleans, and BSc in Chemical Engineering at La Universidad del Zulia in Venezuela. He has over 10 years of experience in produced water treatment and recovery and has conducted research in advanced treatment technologies for wastewater remediation, dealing specifically with applications of electrocoagulation, electrodisinfection and UV and solar photocatalysis.

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