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## Hydrogel-based biofloculants for the removal of organic pollutants from biodiesel wastewater

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### Abstract

Hydrogel based biofloculants namely Gelatin and acrylic acid-co-acrylamide [GL-cl-P(AA-co-AAM)] and hybrid hydrogel composite with good adsorption potential, were synthesized in this study for the treatment of biodiesel wastewater. The two hydrogels were characterized using X-Ray diffraction, Fourier transformed infra-red spectroscopy and scanning electron microscope. It was found that the synthesis provided the composite with the functional groups of the individual components. The hydrogels were found to achieve around 65 % of BOD removal and exhibited a maximum performance at a dosage 12.5 mg/L. The kinetic studies of the removal of BOD by all the hydrogels were found to follow the pseudo-second order kinetic model; the adsorption capacities of the GL-cl-P(AA-co-AAM) and the hybrid hydrogel composite were 11,368.8 and 12,787 mg/g, respectively. The flocs formed by the hybrid hydrogel composite and polyferric chloride were also more stable than those formed by the GL-cl-P(AA-co-AAM) and MgOH; implying that the incorporation of the attapulgite into the composite had resulted in the development of a better coagulant. The viability of the application of the hybrid hydrogel composite for the treatment of biodiesel wastewater could therefore be further investigated at pilot scale to prepare the implementation at large scale.