

Title : APPLICATION OF FABRICATED GRAPHENE BASED MATERIALS CONCURRENT WITH OTHER TREATMENT METHODS TO ELIMINATE ORGANIC POLLUTANTS FROM AQUEOUS PHASE

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Abstract : The present work and its findings aim to fabricate graphene oxide and reduced graphene oxide analogous materials and its utilization to treat organic pollutants present in the aqueous matrix. Organic pollutants possess serious threat to aquatic organisms as well as it affects health conditions of humans. Generally, the organic pollutants are considered to have teratogenic, mutagenic and carcinogenic properties thereby treatment of organic pollutant contaminated water is of utmost important research niche. The laboratory fabricated nanomaterials were utilized for treatment of model organic pollutant compounds solely as well as they were also used in combination with other treatment methods to improve the efficiency of the remediation methods. The nanomaterial was used in concurrent with gamma radiation to treat model organic pollutant from aqueous matrix. Biodegradation still remains the preferred choice for treatment of hazardous pollutants for its cost effectiveness, easiness as well as wide applicability. The fabricated materials were also used in concurrent to microorganisms to remove PAH compounds and phenol (organic contaminants) from its aqueous solutions. The laboratory fabricated nanomaterial occurred to be biocompatible with microorganism as it showed little to no antibacterial effects against gram-positive and gram-negative microorganisms and thus obligated a synergistic effect in removal of aromatic pollutants. Adsorption treatment method is widely accepted for its simplicity but has a major drawback in terms of waste generation. Combination of sorption – biodegradation thus solves the problem of pollutant laden waste generated by the adsorption process. Residual toxicity of the treated synthetic wastewater was estimated by germination and root length analysis of plant model *Cicer arietinum* (Chickpea).

Thus, fabrication of graphene family nano materials and its utilization in various treatment processes were investigated in synthesized wastewater along with the detoxification efficiency was elucidated via chickpea plant model. Real time petrochemical effluent treatment was also done for upscaling the bench top scale experiment and to further investigate real time utilization of the fabricated materials.

Keywords : Graphene oxide and reduced graphene oxide analogous material, Fabrication, Gram-positive and Gram-negative bacteria, Positive synergism, Organic aqueous pollutants

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