Effect of pH variation on landfill leachate treatment using crude microbial exopolysaccharides

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ABSTRACT

The landfill leachate generation has become a major problem for the municipal solid waste management causing significant threat to the ecosystem. Landfill leachate contains various contaminants such as organic matter, ammonical-nitrogen (NH_4^+-N), heavy metals, chlorinated organic and inorganic salts, which are very toxic to the aquatic system.

This study presents the treatment of the landfill leachate collected from LET (lieu d'enfouissement technique) de la MRC (Municipalité régionale de comté) de La Nouvelle-Beauce, Frampton, Québec City, Canada, by coagulation-flocculation process using crude microbial EPS. The EPS was produced by the bacterial strain BRD10 with accession number MK239919 using pulp and paper industrial wastewater sludge (PPWAS) as raw material supplemented with glycerol from BIOLIQ Inc., Québec City, Canada. This study included the effects of pH variation on the removal efficiency of pollutants during landfill leachate treatment using EPS alone as well as the supplementation of the chemical coagulant, $FeCl_3$.

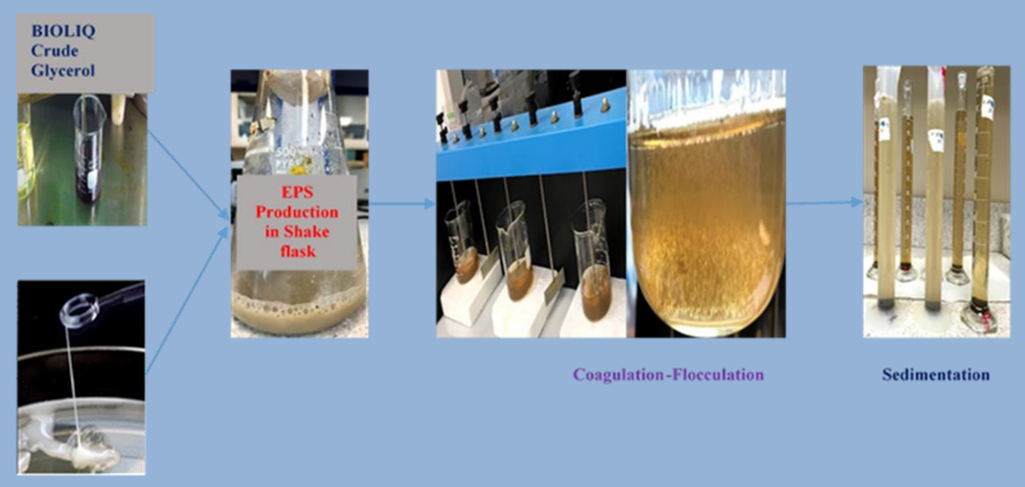
The results showed that the natural pH of the leachate (pH 8.12) was optimum for the removal efficiency (%) of COD, turbidity, o-PO_4, NH_4^+-N, Cr, and Fe with 56.0, 78.7, 88.4, 57.9, 42.9, and 47.4, respectively, for EPS bio-flocculation, and 69.7, 91.0, 95.0, 62.5, 50.0, and 38.7, respectively, for $FeCl_3$-EPS coagulation-flocculation experiments. The SS removal of 95.2 % was observed for the sample treated with $FeCl_3$ as coagulant and EPS as bio-flocculant.

PROBLEM CONTEXT

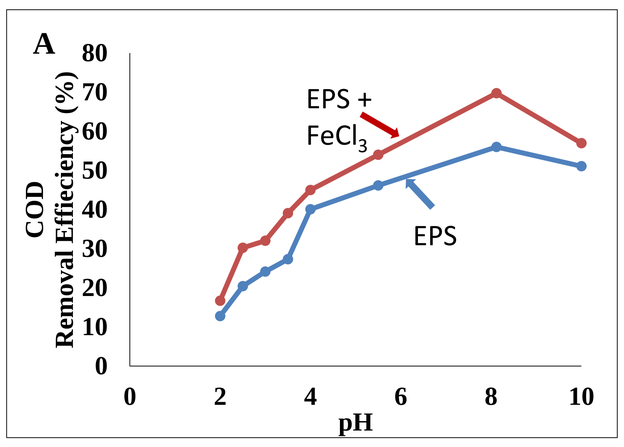
- Treatment of landfill leachate using crude microbial EPS
- EPS production using PPWAS supplemented with glycerol
- Biovalorization of PPWAS and crude glycerol

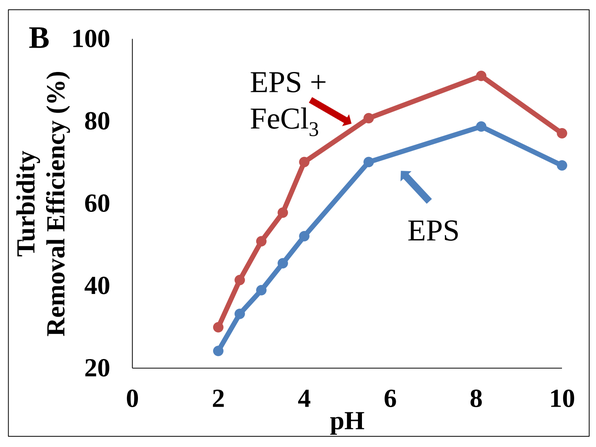
OBJECTIVE

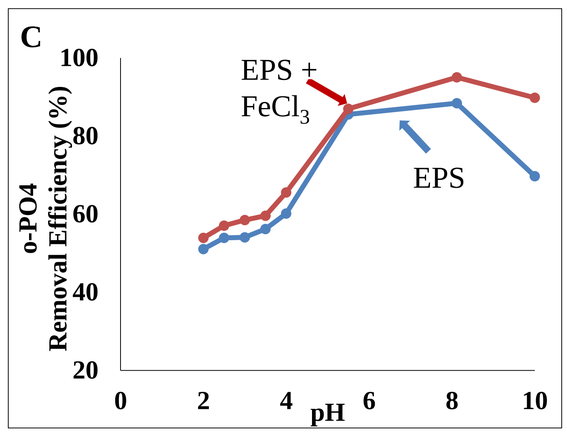
Comparing the effect of pH variation on landfill leachate treatment using crude microbial exopolysaccharides

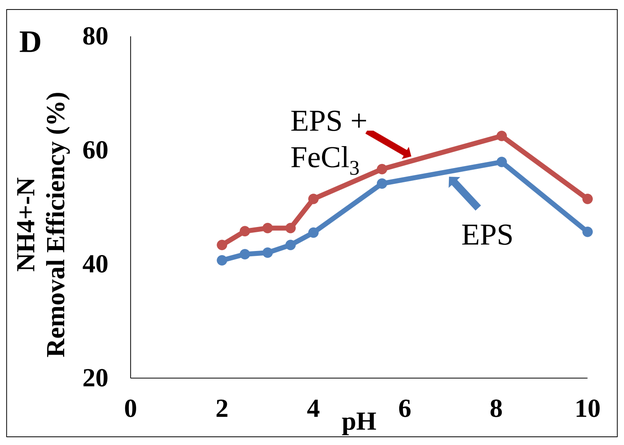


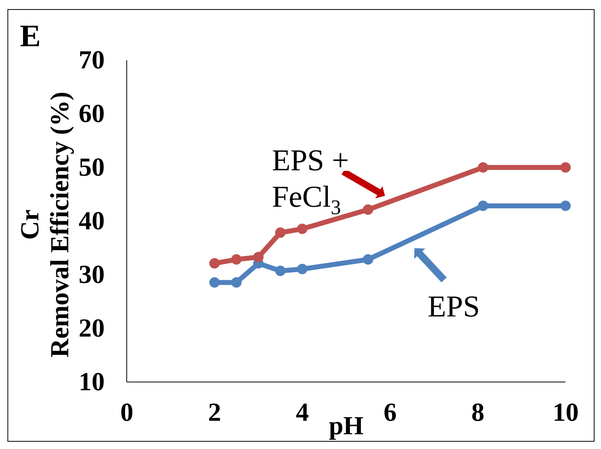
RESULTS

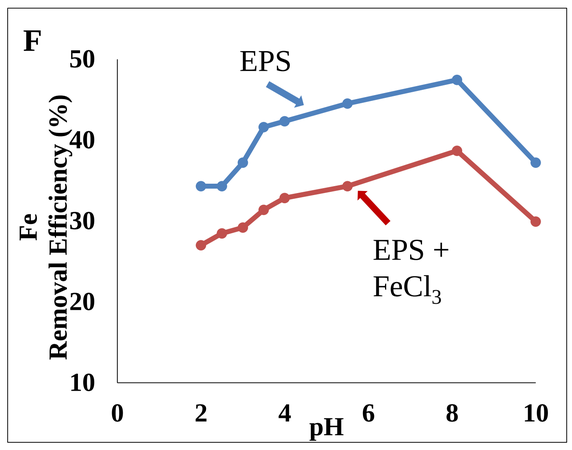












FUTURE RESEARCH

Optimization of dosage of coagulants and microbial EPS to optimize the process for the treatment of landfill leachate

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