

Remediation of pulp and paper mill effluent and CO₂ sequestration using microalgal polycultures

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This study was undertaken to evaluate the use of mixed microalgal cultures (MMC) of *Chlorella minutissima* (*C. minutissima*) and *Scenedesmus abundans* (*S. abundans*) for pulp and paper mill effluent (PPME) remediation in batch mode. Effects of different photoperiods (light:dark); 12:12, 18:6 and 24:0 h, and different concentrations of CO₂ supply were also observed on the biomass growth of MMC and removal of pollution load from PPME. A remarkable variation was noticed among the growth profiles of MMC at different photoperiods and different CO₂ concentrations. Supply of 10 g/L of glucose in culture broth resulted in

improved biomass growth of MMC. Highest biomass of 0.67 g/L and lipid yield of 73.7 mg/L were achieved with 5% CO₂ supply and 18:6 h photoperiod at 25±1°C. Removal of various parameters were achieved as 73% COD, 81% BOD, 85% TDS, 68% phenols, and 61% color. This study suggests that the mixed microalgal cultures can offer a simple and effective remediation of PPME and simultaneous CO₂ sequestration. GC-MS analysis of fatty acid methyl esters (FAMEs) shown the presence of C16:0, C18:0, C18:1, C18:3 and C20:0 as major fatty acids.

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