

Using *Cyperus alternifolius* for treating ink factory wastewater: effect of microbial communities in the system

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ABSTRACT

In this study, the performance of phytoremediation by *Cyperus alternifolius* on treating ink factory wastewater is investigated. The wastewater from ink factory showed high levels of colorants, vehicles, solvents, and additives that affected to high total dissolved solids (TDS), chemical oxygen demand (COD), biochemical oxygen demand (BOD), and total Kjeldahl nitrogen (TKN) that are approximately 6,426, 987, 258, and 156 mg L⁻¹, respectively. Phytoremediation of wastewater by *C. alternifolius* is an effective method to remove pigments, organic carbon and nitrogen compounds. Plant absorption, soil adsorption, including microbial activities played important roles for cleanup of wastewater as final step for removing TDS, COD, BOD, ammonium, nitrate, and colors. Using denaturing gradient gel electrophoresis technique and then sequencing of partial 16S rDNA revealed that the microbial community was aerobic and facultative-anaerobic groups. The major group affiliated with Proteobacteria was *Pseudomonas*, *Diaphorobacter*, *Sulfurospirillum*, and especially *Azospirillum*, as a dominant group. The result confirmed that the efficient process of plant and microbe cooperation for the treatment of wastewater was a suitable and sustainable technology. In addition, the data of microbial diversity can be useful in understanding plant–microbe interactions for improving system performance.

Keywords: *Cyperus alternifolius*; Ink factory wastewater; Phytoremediation; Microbial community

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