



Treatment of ink production wastewater by chemical precipitation coupled with *Cyperus alternifolius*: pigments, organic compounds and ammonium removal

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ABSTRACT

Ink production wastewater is difficult to treat due to it consisted of pigments, acrylic resin, monoethanolamine, NH_4OH and additives, which have the effect of increasing of chemical oxygen demand (COD), ammonium nitrogen ($\text{NH}_4^+\text{-N}$), and suspended solids (SS). Therefore, the potential of chemical treatment of this wastewater coupled with phytoremediation was investigated. When treated with sulfuric acid, COD was decreased from 28,827 to 1,354 mg L^{-1} , and SS from 2,917 to 32 mg L^{-1} , while $\text{NH}_4^+\text{-N}$ decreased from 458 to 295 mg L^{-1} . Thereafter, precipitation by $\text{MgO} + \text{H}_3\text{PO}_4$ was the optimum for ammonium precipitation, it could reduce ammonium to 98 mg L^{-1} . Adjusting system pH by $\text{Ca}(\text{OH})_2$ for plant growth was better than using NaOH or KOH , due to the fact that calcium ions (Ca^{2+}) act as a nutrient. Phytoremediation by *Cyperus alternifolius* was investigated in the final treatment. It could decrease COD and $\text{NH}_4^+\text{-N}$ to 329 and 13 mg L^{-1} , respectively, and passed the effluent standards.

Keywords: Ink production wastewater; *Cyperus alternifolius*; Precipitation; Phytoremediation

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