



## Comparison of bioremediation and phytoremediation in treatment of diethylene glycol from stationery industry

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### ABSTRACT

Diethylene glycol (DEG) was found to contaminate wastewater from the stationery industry. The wastewater, after chemical precipitation, still had high DEG and Chemical oxygen demand (COD) resulting in undischARGE according to the standard wastewater policy. Bioremediation and phytoremediation were chosen to solve this problem. Comparison of bioremediation and phytoremediation revealed that adding nutrient rich microorganisms removed more DEG, but less COD than using plants grown under hydroponic conditions. However, the bioremediation system had lower potential than plant + soil conditions. The application of a plant-soil system as a constructed wetland was able to remove all DEG (1,500 mg/L) in the wastewater within 8 d. The potential of a constructed wetland system can be enhanced by the addition of microorganisms and nutrients, reducing the time of remediation from 8 to 5 d. In addition, COD reduction to 110 mg/L was reduced from 14 to 11 d, which was lower than the acceptable level (COD ≤ 120 mg/L). However, the use of microorganisms alone cannot reduce COD in contaminated wastewater to the acceptable level. Using constructed wetland with the addition of microorganisms and nutrients is an effective way to remediate DEG and COD from stationery industry wastewater.

*Keywords:* Bioremediation; Phytoremediation; Constructed wetland; Diethylene glycol; *Echinodorus cordifolius* L. Griseb

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