

能源和环境工程

## 膜生物反应器对水源水中微量二氯酚的去除

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**摘要** 通过实验室小试, 研究了一体式膜生物反应器 (MBR) 对微污染湖水中的微量2, 4-二氯酚 (2, 4-DCP) 的去除效果。64 d的连续试验证实, 当进水2, 4-DCP浓度在2~200  $\mu\text{g} \cdot \text{L}^{-1}$ 时, MBR对2, 4-DCP的平均去除率达936%。出水2, 4-DCP浓度平均为428  $\mu\text{g} \cdot \text{L}^{-1}$ , 满足《城市供水水质标准》的要求。同时采用间歇试验对MBR去除2, 4-DCP的机理进行了研究, 证实生物作用在2, 4-DCP的去除中起主要作用, MBR对2, 4-DCP的去除符合零级动力学过程, 降解速率常数为106  $\mu\text{g} \cdot \text{L}^{-1} \cdot \text{min}^{-1}$ 。此外, 试验证实MBR对DCP的去除是基于二级基质原理, 而向反应器内投加葡萄糖并不能促进MBR对2, 4-DCP的去除。

**关键词** [饮用水处理](#) [微污染地表水](#) [膜生物反应器](#) [2,4-二氯酚](#)

分类号

## Removal of trace 2,4-dichlorophenol in drinking water source by membrane bioreactor

### Abstract

In this bench-scale test, a membrane bioreactor (MBR) was investigated for the removal of trace 2,4-dichlorophenol (2,4-DCP) from surface water with slight pollution. Sixty four days of continuous test proved that when the concentration of 2,4-DCP in the raw water fluctuated between 2—200  $\mu\text{g} \cdot \text{L}^{-1}$ , averaged removal efficiency reached 936%. And the averaged 2,4-DCP concentration in the treated water was 428  $\mu\text{g} \cdot \text{L}^{-1}$ , which could meet the Sanitary Standard for Drinking Water Quality issued by the Ministry of Health. At the same time, intermittent tests were carried out to study the 2,4-DCP removal mechanisms in MBR. It was concluded that biological degradation played a major role in 2,4-DCP removal by MBR. It was found that biodegradation of 2,4-DCP followed zero-order kinetics with a rate constant of 106  $\mu\text{g} \cdot \text{L}^{-1} \cdot \text{min}^{-1}$ . Besides, it was confirmed that secondary substrate utilization was the mechanism that allowed effective biodegradation of 2,4-DCP by MBR, however dosing glucose into the raw water could not improve the biodegradation.

**Key words** [drinking water treatment](#); [micro-polluted surface water](#); [membrane bioreactor](#); [2,4-dichlorophenol](#)

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