

The removal of phenolic compounds using *Navicula permitis* algae: a potential treatment method for olive mill wastewater

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Abstract:

Microalgae hold promise as sustainable and renewable resources for phenolic compound removal. Industrial mill wastewater often contained phenol. In this work, we isolated and identified a freshwater diatom through 18S DNA analysis, *Navicula permitis*. Then, we assessed its ability to grow and effectively eliminate phenolic compounds at concentrations ranging from 50 to 250 mg/L to address incomplete treatment issues. Chlorophyll fluorescence was measured under stress, and phenol degradation was examined through phenol hydroxylase and catechol dioxygenase activity in *N. permitis*. Our findings revealed that *N. permitis* could remove phenol concentrations up to 145.9 mg/L, with optimal conditions at 50.08 mg/L phenol, 106 cells/mL *N. permitis*, and 11.38 days of treatment. A zero-order kinetic model described the elimination of phenol. The metabolism mechanism supposed to biodegrade the phenolic compound in this experiment is that *N. permitis* may employ PHase. The metabolism of phenol included the ortho-pathway. *N. permitis* generated biomass while degrading phenol, making it a good choice for ecological remediation.

Keywords: phenolic compounds, wastewater, *Navicula permitis*, enzymes, biodegradation.