



## Research Article

Fate of five bisphenol derivatives in *Chlamydomonas mexicana*: Toxicity, removal, biotransformation and microalgal metabolism

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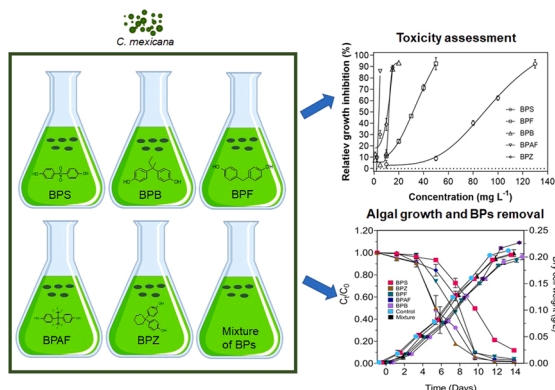
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## HIGHLIGHTS

- Bisphenol-AF exhibited the highest toxicity to *C. mexicana*.
- *C. mexicana* effectively removed 99–61% of 1 mg L<sup>-1</sup> bisphenols in 14 days.
- Biotransformed products of bisphenols in *C. mexicana* were analyzed.
- Palmitic acid in *C. mexicana* increased significantly after bisphenols exposure.

## GRAPHICAL ABSTRACT



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## ABSTRACT

Bisphenols (BPs) are recognized as emerging contaminants because of their estrogenic properties and frequent occurrence in environmental matrices. Here, we evaluated the toxic effects of five common BPs on freshwater microalga *Chlamydomonas mexicana* and removal of the BPs by the alga. Bisphenols -AF (BPAF), -B (BPB), and -Z (BPZ) (96 h, EC<sub>50</sub> 1.78–12.09 mg·L<sup>-1</sup>) exhibited higher toxicity to *C. mexicana* compared to bisphenol -S (BPS) and -F (BPF) (96 h, EC<sub>50</sub> 30.53–85.48 mg·L<sup>-1</sup>). In contrast, the mixture of BPs exhibited acute toxicity (96 h, EC<sub>50</sub> 8.07 mg·L<sup>-1</sup>). After 14 days, *C. mexicana* had effectively removed 61%, 99%, 55%, 87%, and 89% of BPS, BPF,

**Abbreviations:** BPs, bisphenols; BPA, Bisphenol-A; BPS, Bisphenol-S; BPB, Bisphenol-B; BPF, Bisphenol-F; BPAF, Bisphenol-AF; BPZ, Bisphenol-Z; CW, constructed wetland; ECs, endocrine disruptors; WWTPs, wastewater treatment plants; HPLC, high-performance liquid chromatography; LC50/ EC50, acute toxicity value; ChV, chronic toxicity value; TP, transformed products; ECOSAR, Ecological Structure Activity Relationships program; NIST, National Institute of Standards and Technology.

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