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Biodegradation of plasticizers from polypropylene thermoplastic composites by halotolerant fungi

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This study investigated the capacity of two halotolerant fungal strains, which were grown in liquid-surface fermentation, to degrade plasticizers from polypropylene containers. *Paecilomyces variotii* and *Penicillium roqueforti* were grown for 12 days under hypersaline liquid-surface fermentation, with polypropylene commercial storage boxes being used as the fermenters. The biodegradation experiment was conducted in a modified KMV broth. Bis-(2-ethylhexyl)-phthalate (BEHP, 1), a common chemical additive, was identified as the only plasticizer in the culture containers used. It was observed that *P. varioti* was able to transform BEHP into diethyl- and dibutyl- phthalates, while *P. roqueforti* transformed BEHP into diethyl-, bis-(2-methylpropyl)-, dibutyl-, bis-(4-methylpentyl)-, dihexyl-, and dioctyl- phthalates. In this last case, 2-ethylhexyl-adipate (2) also was identified as byproduct. BEHP was not detected in either mycelium after the incubation period. The results suggest that *P. varioti* and *P. roqueforti* are highly efficient in degrading the BEHP plasticizer and can be used for bioremediation of polypropylene wastes. Therefore, efficient biotic degradation of polypropylene by halotolerant fungal strains could provide eco-friendly alternatives for degrading plastic additives, as well as leading to advances in the research and development of bioremediation strategies.

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