



REMTECH EXPO

L'innovazione ed il pragmatismo ambientale: l'uomo da problema a parte della soluzione

A cura di
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con le Prefazioni

del Ministro
Gilberto Pichetto Fratin
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RemTech Expo 2025
Libro degli abstract

Comitato scientifico

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Consiglio Nazionale delle Ricerche

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Piazzale Aldo Moro, 7 - 00185 Roma

www.edizioni.cnr.it

bookshop@cnr.it

ISBN: 978-88-8080-762-9 ed. stampa

ISBN: 978-88-8080-763-6 ed. digitale

@ Grafica di copertina: [Vito Felice Uricchio]

Finito di stampare nel mese di settembre 2025

*Tutti i diritti sono riservati a norma di legge e a norma delle
convenzioni internazionali*

Impact of water matrix on persulfate activation efficiency for the removal of lindane and β -endosulfan using corn cob biochar

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Abstract

This study investigated the degradation of lindane and β -endosulfan ($C_0=100\text{ }\mu\text{g/L}$) using biochar derived from corn cobs pyrolyzed at 700°C as a heterogeneous catalyst for persulfate activation (3 mM, optimal concentration). The experiments were performed in both real surface water and deionized water (DI), in duplicate, at varying contact times (0.5–4.0 h) to evaluate the effect of the matrix on process efficiency.

The results showed that β -endosulfan removal was more efficient in DI water than in surface water, whereas lindane removal was more efficient in surface water when comparing the two pesticides. This highlights the significant influence of the matrix on process efficiency. The presence of natural organic matter (NOM) in surface water generally reduced efficiency, possibly due to competition for reactive radicals generated during persulfate activation. Furthermore, the presence of nitrogen, phosphorus, and ammonia in surface water may have further decreased radical availability, leading to a reduction in oxidation efficiency.

After 4 hours, lindane removal efficiency was higher in surface water than in DI water, likely due to its increased bioavailability in the presence of organic matter. In contrast, β -endosulfan showed a lower removal rate in the presence of organic matter, likely because it interacts with NOM, reducing its availability for oxidation.

Although the presence of real matrix components generally reduces pesticide removal efficiency compared to DI, the catalytic system employed demonstrates significant potential for treating waters

contaminated with organochlorine pesticides. These findings highlight the importance of further research to elucidate the role of individual matrix components in oxidation processes, ultimately aiding in the optimization of pesticide removal strategies for various water matrices.

Keywords: Pesticides, catalytic degradation, biochar, persulfate activation, real surface water

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