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Identification and formation pathway of laccase-mediated oxidation products formed from hydroxy-phenylureas



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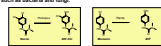


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Phenylureas and their hydroxylated metabolites

Phenylureas are clearly and as herbicides for the control of plant growth and for the translocation of fluids of xylem. Their control of xylem processes is biocidal and/or protective against xylem infection.

Their degradation in the environment is governed by abiotic (pH, temperature, light) and the presence of micro-organisms such as bacteria and fungi.



Hydroxylation is one of the functionalization routes for phenylureas in environmental degradation conditions.

Are fungal laccases involved in the transformation of hydroxy-phenylureas?

Laccase from the white rot fungus *T. versicolor*

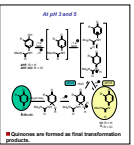


Laccases are the multicomponent oxidase that oxidize the substrate of a wide range of phenols and aliphatic amines. These enzymes are involved in the biodegradation.

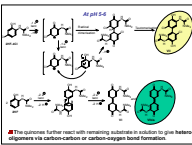


Results

The pH of the reaction has a strong influence on both the kinetics of the reaction and the nature of the transformation products, whose structures have been characterized.



Dimers are formed as final transformation products.



The laccase further reacts with remaining substrate to reduce to give stable oligomers via carbon-carbon or carbon-oxygen bond formation.

Conclusion

These results demonstrate that fungal laccases exhibit a preferential to assist the transformation of hydroxy-phenylureas.

Structure of laccase: Sorward et al., Biochemistry 2002;41: 7255-7257.
Application: Mough et al., Environ. Chem. Lett. (2003) 1: 145-148.
Publication: Jolyalt et al., Ann. Microbiol. Biotechnol. (2005) 15: 403-406.
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