# Lignin-degrading enzyme production by *Bjerkandera adusta*immobilized on polyurethane foam

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## Abstract

Production of the lignin-degrading enzymes lignin peroxidase (Lip), manganese peroxidase (MnP), and laccase (Lac) by the white-rot fungus *Bjerkandera adusta* was investigated experimentally using polyurethane foam (PUF) as a carrier of immobilized fungal mycelia. An immobilized cell culture with a low-nitrogen medium yielded significantly greater LiP, MnP, and Lac activities in comparison with those obtained in a liquid culture. The maximum activities of the three enzymes were 450, 370, and 100 U/ml, respectively, under the following incubation condition: glucose concentration, 20 g/*l*; temperature, 30°C; pH 4.5. The activities of MnP and Lac were significantly higher than those reported using other incubation methods. Lignin was degraded to the extent of 40% and its decolorization ratio was about 70% at an incubation time of 40 h using lignin-degrading enzymes from *B. adusta*. Six different isozymes of MnP were synthesized by *B. adusta*, two of which exhibited high MnP activity. Our preliminary finding that extracellular enzymes from *B. adusta* are capable of degrading and decoloring lignin makes these enzymes attractive for further research aimed at their large-scale application in lignin depolymerization, pulp biobleaching, and the degradation of toxic pollutants.

## Keywords

- Bjerkandera adusta;
- immobilization;
- lignin peroxidase;
- manganese peroxidase;
- laccase