Lignin Peroxidase Production by Phanerochaete chrysosporium Immobilized on Polyurethane Foam

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Abstract

Production of lignin peroxidase by a white-rot basidiomycete, *Phanerochaete chrysosporium*, was investigated experimentally using polyurethane foam as a carrier of immobilized fungal mycelia. The immobilized cell culture using polyurethane foam as a carrier of mycelia yielded significantly greater lignin peroxidase activity than the conventional stationary liquid culture. The effects of operational conditions, such as the kind and number of polyurethane foam cubes, glucose concentration and temperature, on the lignin peroxidase production were examined. Addition of 0.05% Tween 80, 1 mM veratryl alcohol and 1 mM $FeSO_4 \cdot 7H_2O$ greatly improved the production of lignin peroxidase up to 2,700 units/ml culture medium. The lignin peroxidase activity in this culture was about three times larger than that obtained from the culture cultivated in the absence of these additives. Step change incubation lowering the temperature from 37°C to 30°C over an incubation time of three days was carried out for the large scale production of lignin peroxidase, and this incubation gave the highest lignin peroxidase activity 3,800 units/ml culture medium.