0273–2289/84/0600–0385$02.00

Cellulase Production and Regulation by *Agaricus bisporus*

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ABSTRACT

Cellulose is degraded during the growth of the cultivated mushroom *A. bisporus* on composted straw. At the time of sporophore enlargement, a marked increase in extracellular endocellulase activity occurs. A high level of enzyme activity is maintained during subsequent cropping cycles.

Some of the factors affecting growth and production of extracellular endocellulase activity by *A. bisporus* cultured in simple defined liquid media have been examined. Endocellulase production by the fungus closely paralleled mycelial growth in cultures containing microcrystalline cellulose. The enzyme was induced by various celluloses and cellobiose. In the presence of a cellulose inducer, glucose and cellobiose repressed enzyme production.

Endocellulase activity in culture filtrates was inversely related to cellulose concentration in the culture. Although the activity of free enzyme was low, in high concentrations of cellulose more cellulose was degraded. Evidence was obtained for the existence of two forms of endocellulase activity. One form adsorbed strongly to cellulose and was predominant in cultures low in cellulose. In cultures with a high cellulose content, a nonadsorbable form of the enzyme was more abundant.

It is suggested that the pattern of cellulase activities produced when *A. bisporus* is grown on different concentrations of cellulose is partly accounted for by its adsorption to the cellulose.

REFERENCES

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