AN EXTRACELLULAR ANTIFUNGAL CHITINASE FROM LECANICILLIUM LECANII: PURIFICATION, PROPERTIES AND APPLICATION IN BIOCONTROL AGAINST PLANT PATHOGENIC FUNGI

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TÓM TẮT:

An extracellular antifungal chitinase from L. lecanii strain 43H was purified by ammonium sulfate precipitation and DEAESephadex A-50 ion exchange chromatography; it showed a molecular mass of approximately 33 kDa with a specific activity of 167.5 U/ mg protein and purification factor of 2.5. Optimum temperature and pH were observed at 40 °C and pH 6.0, respectively. This enzyme was stable at up to 40 °C and at pH 5.0–6.0. The kinetic constants Km and Vmax determined for the chitinase with colloidal chitin as substrate was 0.82 mg/mL and 4.51 U/mg, respectively. The presence of 5–15 mM tested metal ions led to activation of the chitinase activity with an increase of up to 126% except for Al3+, Ag+, and Hg2+. Tween 80 (0.5%), Tween 20 (1%–2%), and Triton X-100 (1%) increased the enzyme activity by up to 25%, whereas higher concentration of 2% SDS completely inhibited the enzyme. The chitinase exhibited high resistance to organic solvents (methanol, acetone) and retained 89%–95% of its initial activity. The chitinase was found to inhibit the conidial germination and mycelial growth of plant pathogenic fungi. These results suggest that chitinase might be used in enzymatic reactions and as a potential fungicide against pathogens.