

**KAJIAN ISOLAT JAMUR KHITINOLITIK SEBAGAI  
AGENSIPENGENDALI HAYATI NEMATODA SISTA KENTANG  
(*Globodera rostochiensis*): Isolasi dan Purifikasi Khitinase**

**INTISARI**

Nematoda Sista Kentang/NSK (*Globodera rostochiensis*) merupakan hama yang ditemukan pertama kali pada tahun 2003 dan menyebabkan kerugian secara ekonomis pada pertanian kentang di Indonesia hingga 70%. Pengendalian NSK dengan nematisida kimiawi banyak menimbulkan masalah di lingkungan, oleh karena itu pengendalian hayati menggunakan agensia biologi (khususnya jamur) merupakan alternatif yang lebih ramah lingkungan.

Tujuan penelitian ini adalah untuk mendapatkan isolat jamur khitinolitik dari berbagai sumber dan mempurifikasi khitinasenya. Penelitian dilakukan secara bertahap, meliputi: (1) Isolasi dan seleksi jamur khitinolitik; (2) Karakterisasi isolat unggul; (3) Optimalisasi kondisi pertumbuhan isolat unggul; (4) Purifikasi dan karakterisasi enzim khitinase.

Sebanyak 80 isolat jamur khitinolitik berhasil diisolasi dari limbah berkhitin dan dari rhizosfer tanaman Solanaceae, kemudian diseleksi secara kualitatif diperoleh 18 isolat memiliki daya hidrolisis  $\geq 2$ . Hasil seleksi diuji secara kuantitatif dengan mengukur aktivitas enzim spesifik diperoleh 5 isolat terpilih untuk dilakukan *bioassay* terhadap telur NSK. Hasil *bioassay* didapatkan bahwa isolat LCUK 1 yang unggul. Isolat LCUK 1 diidentifikasi dan mengarah pada genus *Aspergillus* sp.. Hasil optimasi menggunakan kerapatan spora inokulum  $1 \times 10^7$  ml medium produksi dengan pH 5 dan konsentrasi khitin 0,2%, agitasi 150 rpm dengan suhu 30°C.

Purifikasi khitinase *Aspergillus* sp. LCUK 1 dengan kromatografi penukar ion (*DEAE cellulose*) meningkatkan aktivitas spesifik hingga 3369,267 U/mg dan kemurnian enzim 10,84 kali. Berdasarkan atas hasil karakterisasi dengan *SDS-PAGE* 10%, diketahui bahwa khitinase *Aspergillus* sp. LCUK 1 memiliki berat molekul 75 kDa. Analisis kinetika enzim menunjukkan bahwa nilai  $K_m$  2,93 mg/ml dan  $V_{maks}$  4,27  $\mu$ g/jam dengan aktivitas optimal khitinase pada suhu 30°C dan pada pH 5.

**Kata kunci : jamur khitinolitik, pengendalian hayati NSK, purifikasi khitinase**

**STUDY OF CHITINOLYTIC FUNGI AS BIOLOGICAL CONTROL  
AGENTS OF GOLDEN CYST NEMATODE (*Globodera rostochiensis*):  
Isolation and Purification of Chitinase**

**ABSTRACT**

Potato Cyst Nematodes (*Globodera rostochiensis*)/GCN found in Indonesia since 2003 and it was estimated to cause 70% of economic lost of potato farming in some parts of Indonesia. Chemically control of nematode has environmental problems, thus alternative with the biological control (special with fungi) is a great importance which more friendly for environmental.

The aim of research was to find chitinolytic fungi from environmental containing of chitin and used as biological control agents of NSK. The research was divided in to several steps: (1) Isolation and selection of chitinolytic fungi; (2) Characterization of selected isolate; (3) Optimization the growth of selected isolate, and (4) Purification and characterization of chitinase.

As much as 80 isolates have been screened and had the hydrolytic activity in minimal medium contain 0,2% colloidal chitin. Among of them, there were 18 isolates which had hydrolytic activity  $\geq 2$ . These 5 isolates also had high specific activity of chitinases and high percentage of eggs damage during bioassay towards GCN eggs. Isolate LCUK 1 was chosen as selected fungi. The selected isolate was identified as *Aspergillus* sp. LCUK 1. Optimization used spore suspension  $1 \times 10^7$  ml in medium contain 0,2% colloidal chitin, with 150 rpm, pH of 5 and 30<sup>0</sup>C.

Chitinase of *Aspergillus* sp. LCUK 1 was purified with DEAE cellulose and could increase its specific activity up 461,2207U/mg, and the degree of purity 10,84 times compared to the crude enzyme. Characterization of molecular weight with SDS-PAGE 10% was found that chitinase of *Aspergillus* sp. LCUK 1 had molecular weight 75 kDa. This chitinase optimally active at pH of 5 and 30<sup>0</sup>C. The Km value and Vmax value towards colloidal chitin was 2,93 mg/ml, and 4,27  $\mu$ g/h, respectively.

**Keywords: chitinolytic fungi, biological control of PCN, chitinase purification**