

domain (amino acid residues 551 to 580). Recombinant *E. coli* Top10' harboring the cloned chitinase gene (pCHI-N1 and pCHI-1) showed chitinase activity on media containing colloidal chitin. Among two chitinases, N1 chitinase was overexpressed driven by T7lac promoter in *E. coli* BL21 by pET42-a vector. The reconstruction of biocontrol agent *B. amyloliquefaciens* A-2 to improve biocontrol efficacy is in progress by introducing the cloned chitinase gene into the strain A-2.

**D-49 Antifungal activity of *Bacillus* sp. against various plant pathogens.** Hui-Seon Jeong<sup>1</sup>, Sang-Pyo Lee<sup>1</sup>, Kwon-Jong Kim<sup>1</sup>, Jong-Sang Cheong<sup>2</sup>, Sun-Ju Moon<sup>2</sup>, Kwang-Ho Cha<sup>2</sup>, Hyun-gon kang<sup>1</sup>, Min-Seob Yeo<sup>1</sup>, Hyun-Sik Lim<sup>1</sup>, Sang-Woo Kim<sup>1</sup> and Youn Su Lee<sup>1</sup> <sup>1</sup>College of Agriculture and Life Sciences, Kangwon National University, Chuncheon 200-701, Korea; <sup>2</sup>B.I.G Co., Ltd, Taejeon 306-230 Korea,

We conducted in vitro tests with *Bacillus* sp. to show the inhibition of growth of various plant pathogenic fungi. A wide range of antifungal activity of *Bacillus* sp. was found against the plant pathogenic fungi. Pathogenic fungi tested included *Alternaria solani*, *Colletotrichum gloeosporioides*, *Fusarium oxysporum*, *Phytophthora capsici*, and *Rizoctonia solani*. *Bacillus* sp. was the most effective to inhibit the growth of *Colletotrichum gloeosporioides*, *Alternaria solani*, and *Rizoctonia solani*. As a result, *Bacillus* sp. was proved to be a potential biocontrol agent for tested plant pathogens. In addition, diluted *Bacillus* sp. broth was also suppressed the mycelial growth of nearly all test fungi. *Bacillus* sp. was the most effective for the control of the mycelial growth of *Alternaria solani*.

**D-50 Screening of a antagonistic actinomycetes against *Plasmodiophora brassicae* causing clubroot disease of Chinese cabbage.** Chang-Guk Kim, Shun-Shan Shen and Chang-Seuk Park. Division of Plant Resources and Environment, Gyeongsang National University, Jinju 660-701, Korea.

Total of 681 actinomycetes isolates were collected from rhizosphere soils of various plant species growing in high mountain, forest fire area, or reclaim land. The isolates were proliferated in liquid media then mixed into pot mixer prior to inoculated in resting spores of *Plasmodiophora brassicae*. Chinese cabbage were planted in pathogen inoculated soil and evaluated the disease suppression of each isolate. In preliminary screening trials, 32 isolates showed significant disease reduction compare to