

Screen of antagonistic bacteria *Bacillus* spp. on control of bacterial soft rot disease caused by *Pectobacterium carotovorum* subsp. *Carotovorum*¹

Wei-An Tsai² Pin-Jui Chiu³ Yu-Shen Shih³

Abstract

Plant pathogenic bacteria *Pectobacterium carotovorum* subsp. *carotovorum*, causing soft rot in a broad range hosts, was a serious threat for agricultural production. Since soft rot disease could not be controlled by chemical pesticide effectively, antagonistic bacteria *Bacillus* spp. was screened to be a soft rot disease bio-control agent. To select representative soft rot bacteria as targets, various *P. carotovorum* subsp. *carotovorum* isolates originating from cabbage and Calla lily were assessed. Invariably, isolate originating from cabbage exhibited higher virulence towards cabbage plant than isolate originating from calla lily. In our study, 807 rhizosphere soil samples were collected from Yilan and Hualien counties. After soil dilution plating, antagonism on selected soft rot disease, iron-chelating activity testing and bioassay of controlling soft rot disease, the most prospective antagonistic bacteria *Bacillus methylotrophicus* HL_B01 was selected. The PCR products of *ituC*, *ituD*, *sfp* and *fenD* genes were amplified and indicated that iturin, surfactin and fengycin may produce by HL_B01. Furthermore, the application of HL_B01 significantly reduced soft rot disease severity by 33.3% and 32.0% respectively in calla lily and cabbage greenhouse experiment. And it was also effective when HL_B01 used to control calla lily soft rot disease in field. HL_B01 was expected to be a potential bio-control agent of soft rot disease.

Keywords: soft rot disease, bio-control, antagonistic bacteria, *Bacillus methylotrophicus*

1. Research article No.292 of the Hualien District Agricultural Research and Extension Station.

2. Assistant researcher, Division of Crop Environment, Hualien DARES.

3. Contract-based assistant, Division of Crop Environment, Hualien DARES.