

Harit Nimraksa 2008: Using Antagonistic Bacteria to Control Potato Early Blight Disease Caused by *Alternaria solani* Sorauer. Doctor of Philosophy (Plant Pathology), Major Field: Plant Pathology, Department of Plant Pathology. Thesis Advisor: Associate Professor Ampaiwan Paradornuwat, Ph.D. 100 pages.

Isolation and efficacy test of antagonistic bacteria for biological control of potato early blight disease were carried. From potato leaves surface and planted soil, 509 isolates of bacteria were investigated. Efficacy test was studied on growth inhibition of *Alternaria solani* and twenty two isolates were reported with antagonistic properties. Among those isolates, CMs026 and PAOs044 isolates were shown the antagonistic properties with inhibition growth percentage of 73.67 and 70.65, respectively. The antifungal secondary metabolites activities produced by the 22 isolates on artificial media, Sabouraud's glucose broth (SGB), were also studied. Compared with benomyl, supernatant from the centrifuged and sterile cultured media were observed. The CMs026 isolate shown the most effective activity with 78.45% inhibition growth and PAOs044 isolate gave inhibition growth activity with 72.78%. Bacterial enzyme activities were also investigated on decomposition of protein, phosphate and fat. The PAOs044 isolate gave good result in protein and phosphate decomposition activities while CMs026 isolate noticed as a good isolate for fat decomposition activities. Four carriers including dolomite, talcum powder, hyflo supercell and diatomaceous earth were determined for biological products formulation. Starting with concentration of 10^{16} CFU/ml, dolomite was reported as the suitable carrier for biological product development.

Biocontrol activities of CMs026 and PAOs044 isolates in formulations of cell suspensions, secondary metabolites and biological products were examined *in vivo*. Efficacy tests on tomato early blight in greenhouse conditions and potato early blight in field trial conditions were carried and compared with benomyl. Both in greenhouse and field trials, benomyl at recommendation rate gave the best results for disease control with disease destroying index of 11.67 % and 10.00 %, respectively. While the CMs026 isolate in formulation of cell suspension reported with destroying index of 23.33 % in greenhouse and 10.83 % in field trial.

In addition, the CMs026 isolate was *Bacillus subtilis* and the PAOs044 isolate was *Bacillus* sp., identified by Thailand Institute of Scientific and Technological Research (TISTR)

Student's signature

Thesis Advisor's signature

