

Penpak Saowapak 2009: Efficacy of Root Colonizing Bacteria for the Control of Root Rot on Hydroponically Grown Lettuce Caused by *Pythium aphanidermatum*. Master of Science (Agriculture), Major Field: Plant Pathology, Department of Plant Pathology. Thesis Advisor: Associate Professor Chiradej Chamswarn, Ph.D. 122 pages.

Ninety-eight isolates of root colonizing bacteria (RCB) were isolated from roots of five lettuce varieties grown in hydroponic system with Nutrient Film Technique (NFT) by using tissue transplanting technique on Nutrient Glucose Agar (NGA), King's Medium B (KB) and Thornton's Standardized Agar (TSA). Forty-six RCB isolates were gram positive and were tested for the inhibition of mycelial growth of *Pythium aphanidermatum*, a causal agent of root rot on hydroponically grown lettuce. The result showed that 11 RCB isolates effectively inhibited mycelial growth of a pathogen by 13.0 – 64.7 %. Five selected RCB isolates with ability of endospores producing were developed for resistance to 100 ppm rifampicin antibiotic without losing mycelial growth inhibition efficacy and ability to reduce *P. aphanidermatum* colonization on seedling roots. They were tested in hydroponic culture using NFT grown. It was found that all five isolates could reduce percentage of root rot on NFT grown Green Cos lettuce at 42 days after planting. The rifampicin resistant isolates RO15 and BH15 of RCB promoted growth of lettuce grown in pathogen-non inoculated control.

Efficacy test for the control of root rot on NFT grown Green Cos lettuce by using cell suspension of antagonistic bacteria and spore suspension of *Trichoderma harzianum* strain CB-Pin-01 both individually or in combination at the rate 100 ml culture/200 L nutrient solution. The results revealed that antagonistic bacteria effectively control lettuce root rot but the efficacy was lower when compared to *T. harzianum* strain CB-Pin-01. The rifampicin resistant antagonistic bacteria were developed as starch and soil powder formulations and then were tested for the control of root rot on NFT grown lettuce at the rate 30 g /200 L nutrient solution. The starch powder formulation of isolate FL17 no. 1 and soil powder formulation of isolate BH15 no. 2 promoted growth of lettuce by which they significantly increased fresh weight when compared with the pathogen inoculated control. Surviving populations of antagonistic bacteria were recovered from nutrient solution, seedling substrate, root surface and inside lettuce root. The study results suggested that RCB effectively controlled lettuce root rot caused by *P. aphanidermatum* and promoted growth of NFT grown Green Cos lettuce.

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Thesis Advisor's signature

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