Nichakorn Saetang 2010: Screening of Antagonistic Bacteria for Increasing Yield and Reducing Dirty Panicle of Rice. Master of Science (Agriculture), Major Field: Plant Pathology, Department of Plant Pathology. Thesis Advisor: Associate Professor Chiradej Chamswarng, Ph.D. 79 pages.

Dirty panicle is the important disease of rice which causes the reduction of rice yield and quality. At least six plant pathogenic fungi were detected from dirty panicle infected rice seeds. This study was aimed at the isolation, screening and selection of antagonistic bacteria which effectively increased yield and reduced dirty panicle disease of rice. Rice seeds of Chainat 1 variety were soaked in liquid compost, rice field natural water, a water-mix of compost and a water-mix of dried bamboo leaf compost, obtained from Khao Khawn foundation in Suphan Buri, and incubated for 7 days on moisten blotter paper. Forty-nine isolates of root colonizing bacteria (RCB) were isolated from the roots of germinating rice seeds on potato dextrose agar (PDA). All RCB isolates and six bacterial isolates obtained from other sources were tested *in vitro* for the efficacy to inhibit mycelial growth of *Helminthosporium oryzae*, *Trichoconis padwickii* and *Curvularia lunata*, the causal agents of rice dirty panicle on PDA. Result showed that eight bacterial isolates inhibited mycelial growth of three pathogens of rice. Some isolates promoted shoot and root growth of rice seedlings and controlled dirty panicle disease under field condition. Five selected bacterial isolates were developed for resistance to 100 ppm rifampicin antibiotic. Mutant bacterial isolates with remained antagonistic activity against three dirty panicle pathogens and wild type strains were developed as powder formulations and then were tested for the control of dirty panicle disease under field condition. Rice seeds were soaked in the suspension prepared from powder formulation compared with bacterial cell suspension before sowing and followed by two spraying applications on rice panicles. The results revealed that powder formulation of mutant isolate SBn07-M4 and cell suspension of *Bacillus amyloliquefaciens* strian BB165 provided higher yield with 100.34 and 97.68 g/hill, respectively, which were significantly higher than the yield from pathogens inoculated control (77.55 g/hill). The treatments using powder formulation of mutants of *B. amyloliquefaciens* isolates CG06-M6 and BB165-M3 significantly increased the percentages of fertile seeds, while reduced the dirty panicle seeds when compared with the pathogens inoculated control. The efficacies of these isolates were comparable to the use of propiconazole+difenoconazole 30% EC (Armure). The dirty panicle seeds derived from the treatment of mutant bacterial isolate SBn07-M4 provided the seed germination, seedling height and root lengths better than the use of dirty panicle seeds obtained from the pathogens inoculated and non-inoculated control. Moreover, quality of dirty panicle seeds from this mutant isolate was comparable to the fertile seeds derived from non-pathogen inoculated control.

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