Thesis Title
Characterization and Control of Carbendazim-resistant *Colletotrichum* spp. in Chili

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Abstract

One hundred isolates of *Colletotrichum* spp. causing anthracnose on chili were collected from Sansai and Mae Rim district and from markets in Chiag Mai. The isolates consisted of 73 isolates of *C. gloeosporioides* and 27 isolates of *C. capsici*, respectively. The preliminary test on the potato dextrose agar (PDA) medium amended with carbendazim at 0.1, 10, 50, 100, 500 and 1,000 μg/ml concentrations showed highly resistant (HR), moderately resistant (MR), weakly resistant (WR) and sensitive (S) of 43, 5, 3 and 49 isolates respectively. Nucleotide sequence analysis of beta-tubulin gene of HR, MR, WR and S compared with partial *TUB2* gene from *C. gloeosporioides* f. sp. *aeschynomene* (accession no. U14138). All HR phenotype showed a mutation point with substitution of glutamic acid (GAG) to alanine (GCG) at codon 198, MR phenotype showed a mutation point with substitution of methionine (GCA) to valine (GCG) at codon 162 but no mutation point of amino acid was found in the WR and S phenotype.

The efficiency of culture medium (NF) and culture filtrate medium (F) of actinomyces from 6 isolates such as OMA60-1, OMA60-7, SEA60-34, SEA120-4, SEA120-28 and SEA120-38, were tested for inhibitory growth of *Colletotrichum* spp. causing anthracnose on chili strains Cg24 (S), Cg49 (WR), Cc11 (MR), Cc53 (HR) and Cg60 (HS). Results showed three isolates of actinomyces including SEA60-34, OMA60-7 and SEA120-28 respectively inhibited of *Colletotrichum* spp.. The SEA60-34 (NF) showed the percentages of growth inhibition of the pathogen range 53.3-75.0%, OMA60-7 (NF) and SEA120-28 (NF) showed the percentages of
growth inhibition of the pathogen range 60.0-66.7% and 43.3-58.3% respectively. While, the culture filtrate medium of actinomycetes resulted to be lower officiate in inhibit of pathogen compared with culture medium of actinomycetes all isolates. The actinomycetes isolates OMA60-1, OMA60-7, SEA60-34, SEA120-4, SEA120-28 and SEA120-38 were identified by 16S rDNA. The results revealed that all actinomycetes were Streptomyces sp.

The culture medium of actinomycetes type NF and F from 3 isolates of actinomycetes including OMA60-7, SEA60-34 and SEA120-28 were tested for seed germination. The green chili including native seed and commercial seed were treated by NF and F. The resulted showed seed both were treated with NF and F had percentage of germination rang 91-99%. Then, the seed both were cultivated. When, forty-five day-old of seedling were inoculation with sporsuspension of Colletotrichum sp. Cg60 (HR). The resulted showed commercial seedling treated with NF and F had disease of rang 63.9-75.0% and 82.7-87.5% respectively, whereas commercial seedling treated with distill water had disease range 86.1%. While, native seed treated with NF and F had disease range 76.7-83.6% and 86.9-88.1% respectively, whereas native seedling treated with distill water had disease range 90.6%, were high disease than commercial seed treated with NF and F.

When sprayed with NF and F from three isolates of actinomycetes on chili seedling of commercial green chili before and after inoculated with spore suspension of Cg60 (HR). It was found that the seedling were sprayed with NF and F before inoculated with Cg60 (HR) showed disease of range 38.64-46.00% and 55-61.33% respectively. Chili seedling were inoculated with spore suspension of Cg60 (HR) before sprayed with NF and F showed disease of range 41.0-46.0% and 58.3-61.3% respectively. While, the control were sprayed with EPM before inoculated with spore suspension of Cg60 (HR) showed disease of range 91.0 and 89.7% respectively. Three actinomycetes isolates with high efficiency, NF and F were treated on seedling. The result showed actinomycetes non-pathogenicity in chili.