Nalina Hemsanit 2011: Systemic Resistance Induction of Kale Against Disease and Insect Pest by Bacterial Antagonist, *Pseudomonas fluorescens* SP007s. Master of Science (Plant Pathology), Major Field: Plant Pathology, Department of Plant Pathology. Thesis Advisor: Associate Professor Sutruedee Prathuangwong, Ph.D. 121 pages.

Systemic resistance induction of kale against black rot (caused by *Xanthomonas campestris* pv. *campestris* : XCC) and diamondback moth (*Plutella xylostella*) by plant growth promoting rhizobacteria *Pseudomonas fluorescens* SP007s at morphological and biochemical levels was studied. Strain SP007s induced superoxide dismutase (SOD) production (33 μg^{-1}chatechol mg^{-1} protein) and increased glucosinolate accumulation (22.16 µmol/g) in the plant when applied to seed and seedling prior to XCC inoculation that resulted in deceased disease severity under greenhouse experiments. Plants treated with this SP007s strain were also affected feeding decrease and mortality of diamondback moth. To increase efficiency for commercial production, a formulation of SP007s was developed with varied carrier and supporter substrate combination. A new product named KUwin/Gap SP007s and a new medium for SP007s biomass production (named SPMP medium by soybean meal: potato = 1:0.5 g/L distilled H_2O boiled extract) were developed with supporter ratio of kaolin : lactose : alkylamine ethoxylate : SiO_2 : $CaSO_3$: CMC : $FeSO_4$ = 70: 14: 8: 5:1:1:1 w/w then mixed with 20 ml ($3x10^{13}$ cfu/ml SP007s)/kg supporter.

The efficiency of a new product named KUwin/Gap SP007s (kaolin-based formulation of *P. fluorescens* SP007s antagonist) with 6-month–shelflife in a plastic wrap storage at room temperature (29±3 °C) in protecting kale against diseases and insect pests was demonstrated at Angthong farm production. The SP007s in a new product induced plant resistance when applied with seed treatment ($1x10^6$ cfu/ml) with 1 g/ 1 kg seed and 3-foliar sprays ($1x10^8$ cfu/ml) at 14, 21, and 28-day-old plants, that was correlatively associated with potentiated superoxide dismustase (SOD) production (greenhouse; and field experiments for disease and insect with 1.8 and 1.7; and 2 fold increase respectively) and upregulation of glucosinolate deposition (3.5 and 3.1; and 3.6 fold increase respectively) against diseases (89 and 96 % reduction of black rot in greenhouse and field respectively; and other field epidemic diseases including *Alternaria brassicicola* caused leaf spot, *Erwinia carotovora* subsp. *carotovora* –soft rot, and *Peronospora parasitica* – downy mildew with 96, 99, and 93% reduction of AUDPC respectively) and insect pests (60% mortality of diamondback moth in greenhouse ; and reduction in number of diamondback moth, common cutworm -*Spodoptera litura*, and flea beetle-*Phyllotreta sinuata* under field experiment = 66, 45 and 55% respectively). The bioproduct developed, and antimicrobial and insecticidal activities, including upregulation of SOD and glucosinolate deposition in this study are the first report for *P. fluorescens* SP007s.

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