

**BIOCONTROL POTENTIAL OF FLUORESCENT *Pseudomonas* spp. IN
CONTROLLING RHIZOCTONIA BASAL STEM ROT DISEASE CAUSED
BY *Rhizoctonia solani* AND PROMOTING PLANT GROWTH ON CHILLI**

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**Thesis Submitted in Fulfillment of the Requirement for the
Degree of Master of Science in the School of Food Science and Technology
Universiti Malaysia Terengganu**

2017

DEDICATION

A bouquet of flowers to:

~ MOHD FAIZOL MOHD ~

for standing by me ever after, the supports and loves

~ DINAH & DURRANI ~

for your cute coquettish and all the cherished moments we have

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfillment of the requirements for the degree of Master of Science

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Jun 2017

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The biocontrol potential of fluorescent *Pseudomonas* spp. isolated from rhizosphere soil of healthy chilli was evaluated against *Rhizoctonia solani* in causing basal stem rot disease on chilli. A total of 50 isolates out of 115 potential fluorescent *Pseudomonas* spp. were selected based on its percentage inhibition radial growth (PIRG) for more than 65% from dual culture assay. All 50 isolates were further screened for production of volatile organic compound, hydrogen cyanide, phosphate solubilization and indole acetic acid. Thirty-three isolates were identified as *Pseudomonas* spp. using 16s ribosomal RNA sequencing. A total of 13 most potential *Pseudomonas* spp. were further tested for seedlings vigour index. *Pseudomonas putida* B5C1, *Pseudomonas aeruginosa* B3C56 and *Pseudomonas putida* B5C7 were selected with the most prominent in promoting plumule and radicle growth and significantly ($P \leq 0.05$) higher than the control. The bio-efficacy of these fluorescent *Pseudomonas* spp. was evaluated in glasshouse for the suppression of *R. solani* and enhancing plant growth of chilli seedlings. At 35 days after *R. solani* inoculation, *R. solani* inoculated chilli plants treated with *Pseudomonas putida* B5C1 (T3), *Pseudomonas putida* B5C7 (T4) and *Pseudomonas*

aeruginosa B3C56 (T5) were found to have lower disease severity index (DSI) compared to control (T2: *R. solani* only). *Pseudomonas putida* B5C1 (T3) significantly ($P \leq 0.05$) reduced *R. solani* infection on chilli plants by 17.86% compared to control (T2). Chilli plants treated with *Pseudomonas putida* B5C1 (T3) also were significantly ($P \leq 0.05$) improved in plant height and total dry biomass by 8.96% and 62.84% comparatively to control (T2). Generally, chilli plants inoculated with *R. solani* alone showed higher activity of peroxidase (PO), polyphenol oxidase (PPO) and phenylalanine ammonia-lyase (PAL) as the result of pathogenic attack of *R. solani*. Soil drenched with *Pseudomonas putida* B5C1 (T3) demonstrated the highest total microbial activity through the activity of fluorescein diacetate hydrolysis (FDA) with 1.59 $\mu\text{g/g/0.5 h}$ compared to control (T2) with 0.46% $\mu\text{g/g/0.5 h}$. The study suggested that *Pseudomonas putida* B5C1 from fluorescent *Pseudomonas* group could be the new potential in leading the biological control against Rhizoctonia basal stem rot disease caused by *Rhizoctonia solani* and plant growth-promoting of chilli.