

“Isolation and Characterization of Bacterial Root Endophytes From Rice Plant with Potential to enhance Plant Growth”

Ms. Rashidah Binti Abd Halim

Dr. Nor'Aishah Hasan

Faculty of Applied Sciences

Universiti Teknologi MARA

Endophytic bacteria are bacteria that have intimate relationship with their host without inducing any pathogenic symptom. It has an ability to protect their host against phytopathogens and promote plant growth. Present study was designed to isolate and characterize bacterial endophytes from root and stem of rice plant for their potential as biocontrol agents against rice bacterial leaf blight disease (*Xanthomonas oryzae pv Oryzae* (Xoo)) and plant growth promoting (PGP) traits. A total of two hundred and twelve endophytic bacteria were successfully isolated from surface sterilized healthy rice samples collected from different rice cultivation fields across Peninsular Malaysia. Seventeen isolates (7.3%) were found to inhibit the growth of Xoo by using disc diffusion assay. *In vitro* test demonstrated the ability of 19 (8.15%) strain to produce indole-3-acetic acid (IAA), 9 (3.86%) fixed nitrogen, 30 (12.86%) to produce phosphate solubilization and 16 (6.87%) to produce siderophores. Molecular identification by 16S rRNA amplification successfully identified the potential endophytic bacteria as *Enterobacter sp.*, *Geobacillus thermoparaffinivorans*, *Gamma proteobacterium*, *Pseudomonas fluorescent*, *Bacillus subtilis* and *Bacillus cereus*. Under greenhouse conditions, high root and shoot length were recorded in rice inoculated with *Bacillus subtilis* with 69.87 ± 3.56 cm and 29.73 ± 1.55 cm respectively. *Geobacillus thermoparaffinivorans* exhibited the highest disease suppressing activity against Xoo and grain yield per panicle (34.23 ± 7.79 g) on rice. In the light of these findings, *Geobacillus thermoparaffinivorans* may be considered as a source of biocontrol agent and plant growth promoter to boost rice productivity.

Keyword. *Antagonistic activity; bacterial leaf blight; disc diffusion method; endophytic bacteria; Xanthomonas oryzae pv. oryzae*

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