

Isolation and Identification of Plant Growth Promoting Rhizobacteria from Sago Palm (*Metroxylon sagu*, Rottb.)

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Running head: PGPR Strain from Sago Palm Rhizosphere

Abstract. Plant growth promoting rhizobacteria (PGPR) are strains of naturally occurring soil bacteria that live in close vicinity to the plant's rhizosphere region which possess the capability to augment host growth. This study was conducted to isolate and identify potential PGPR isolates indigenous to *Metroxylon sagu*, Rottb. rhizosphere. These potential isolates were characterized based on their beneficial PGP properties and identified by molecular analysis via 16S rDNA sequencing. A total of 18 isolates were successfully isolated, out of which five isolates were tested, and designated as (S1A, S2B, S3A, S3C, and S42). Among the five isolates, two isolates (S2B and S3C) were found to produce high levels of indole-3-acetic acid (2.96 $\mu\text{g ml}^{-1}$ and 10.31 $\mu\text{g ml}^{-1}$), able to fix nitrogen and show significant activity in phosphate solubilization. The analysis of their sequences via NCBI suggested their close identity towards *Lysinibacillus sphaericus* and *Bacillus thuringiensis*. It can be concluded that the isolated PGPR possesses beneficial PGP attributes. It can be implied that the isolated PGPR are potential to be used as inoculant bio fertilizers, beneficial for *Metroxylon sagu*, Rottb. growth. Hence, further studies need to be done to evaluate the effectiveness of the beneficial microbes towards sago seedlings growth, under pot experiment.

Keywords: Plant Growth Promoting Rhizobacteria, *Metroxylon sagu*, Rottb., IAA, Phosphate Solubilization, Bio fertilizer

Abstrak. *Plant Growth Promoting Rhizobacteria* (PGPR) adalah sejenis bakteria tanah yang hidup berdekatan rizosfera tumbuhan dan mempunyai impak berfaedah ke atas pertumbuhan tanaman. Kajian ini telah dijalankan untuk melakukan pengasingan dan pengecaman PGPR, daripada rizosfera *Metroxylon sagu*, Rottb. Bakteria endofit diasing berdasarkan ciri-ciri penggalak tumbuhan yang kemudiannya dipilih untuk pengenalpastian secara biologi molekul melalui *16S rDNA sequencing*. Sebanyak 18 bakteria berjaya diasingkan, dan 5 jenis bakteria dipilih berdasarkan ciri-ciri penggalak tumbuhan dan dilabelkan sebagai S1A, S2B, S3A, S3C dan S42. Antara kelima-lima bakteria tersebut, 2 bakteria (S2B dan S3C) dijumpai mempunyai kemampuan untuk menghasilkan kadar *indole-3-acetic acid* (IAA) yang tinggi (2.96 $\mu\text{g ml}^{-1}$ and 10.31 $\mu\text{g ml}^{-1}$), mempunyai kemampuan mengikat gas nitrogen serta menunjukkan aktiviti