

Selection of Acid Tolerant Purple Nonsulfur Bacteria for Application in Agriculture

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<https://doi.org/10.12982/CMUJNS.2020.0049>

Received: August 8, 2019

Revised: November 22, 2019

Accepted: December 18, 2019

ABSTRACT

*To screen acid tolerant purple nonsulfur bacteria (PNSB) isolated from peat swamp forests for their abilities to produce plant growth promoting substances (aminolevulinic acid: ALA, siderophores, indole-3-acetic acid: IAA) and also release ammonium from N₂ fixation. Among 10 PNSB isolates grown in basic isolation medium (BIM), pH 4.5 found that strain KKSSR91 was the most effective to release ALA and siderophores under microaerobic light conditions; while strain KTPWG11 exhibited highest production of siderophores under aerobic dark conditions. Based on ALA production in medium containing 60 mM glycine, 4 PNSB isolates were selected for further studies and found that strain KTSSR92 produced highest IAA at 36.9 mg/L. All of them were able to release NH₄⁺, but no activity to solubilize phosphate. In addition, maximal ALA production in the medium supplemented with glycine by strain KKSSR91 was 2.89 mg/L at 4000 lux light intensity. Seed germination index (GI) of kidney bean (*Phasecolus vulgaris* L.) test using strain KKSSR91 at 1 g fresh biomass/L, pH 4.5 was 68.81% compared with a control in distilled water as only 58.68%. Strain KKSSR91 was identified using 16S rRNA sequencing and found that it showed 99% similarity with *Rhodopseudomonas palustris*.*

Keywords: 5-aminolevulinic acid, Germination index, Indole-3-acetic acid, Plant growth promoter, *Rhodopseudomonas palustris*, Siderophores