Plant Growth-Promoting Potential of Endophytic Fungi (PGPEF) isolated from *Avicennia marina* in enhancing growth parameters of chili plants

K. Thushanthan[1], T. Mathiventhan[1], H. I. U. Caldera[2], N. N. Wijayawardene[3], K. G. S. U. Ariyawansa[2]

[1]*Department of Botany, Faculty of Science, Eastern University, Sri Lanka*
[2]*Department of Plant Sciences, Faculty of Science, University of Colombo, Sri Lanka*
[3]*Center for Yunnan Plateau Biological Resources Protection and Utilization, Qujing Normal University, Qujing, Yunnan Province, 655011 P.R. China*

Endophytic fungi are known to produce a wide range of bioactive secondary metabolites, including phytohormones that promote plant growth through various mechanisms. This study aimed to identify and characterize Plant Growth-Promoting Endophytic Fungi (PGPEF) associated with *Avicennia marina* and to evaluate their potential as bio inoculants for enhancing seed germination and growth performance of chili plants under greenhouse conditions. Putative fungal endophytes were isolated from tissues of *A. marina* collected from the Batticaloa Lagoon, Sri Lanka, and assessed for their production of plant growth-promoting hormones, namely indole-3-acetic acid (IAA) and gibberellic acid (GA). Based on its phytohormone production levels, a promising isolate, AVEN 01 (identified as *Fusarium sulawesiense* through ITS sequencing), was selected for cross-inoculation into chili (*Capsicum annuum*) plants under controlled pot-scale conditions to evaluate its effects on plant growth parameters. Chili seeds were surface sterilized, treated with a systemic fungicide for four hours, and then primed in a fungal mycelial suspension of *F. sulawesiense* for 12 hours before sowing. Seedlings were transplanted into sterile pots containing sterile potting mixture (T_1), pots containing sterile potting mix inoculated with *F. sulawesiense* (T_2). T_1, T_2 and control (T_3 - seeds treated with systemic fungicide and sown in sterile potting mix), were maintained under greenhouse conditions (30 °C, 70% relative humidity, 8:16 hours light/dark photoperiod). Treatments were arranged in a completely randomized design with eight replicates. One-way ANOVA revealed that T_2 showed significant results ($p<0.05$) in germination and plant growth parameters. By 12 weeks (during harvesting), T_2 exhibited the highest values for plant height (42.25 ± 1.81 cm), leaf number (116.5 ± 5.55), chlorophyll content (55.19 ± 3.82 SPAD units), stem diameter (2.20 ± 0.10 mm), number of flowers (25.87 ± 1.88), number of pods (20.75 ± 2.25), and pod length (5.75 ± 0.13 cm). T_2 showed around 1.5 times higher values on its parameters when comparing control and other treatments. These findings highlight the potential of *F. sulawesiense* as an effective PGPEF for enhancing chili growth under controlled conditions.

Keywords: *Endophytic fungi, Growth promotion, Seed priming, Gibberellic acid, Indole-3-acetic acid*