

The Effect of Endophytic Bacteria LKM2 & LKM3 on The Growth of Chili Seedlings

Nur Farhanim Ahmad Fauzi^a, Ernie Eileen Rizlan Ross^{a*}

Structured Abstract

Background: The current agriculture industry is facing issues regarding the use and the effect of chemical pesticides and fertilizer in large-scale agricultural production on both human health and the environment. To avoid this issue, the use of endophytic bacteria as a biofertilizer has emerged as a possible alternative. These bacteria are able to benefit the host plant by producing important metabolites and enhancing the nutrient cycle while maintaining the symbiotic relationship with the host plant. This study explored the effect of dual culture endophytic bacteria LKM2 and LKM3 isolated from *Theobroma cacao* L., on the growth of chili seedlings (*Capsicum frutescens* and *Capsicum annuum*) and determined the indole-3-acetic acid, IAA production by dual culture LKM2 and LKM3.

Methods: The dual culture assay was performed to understand the antagonistic effect between LKM2 and LKM3 on nutrient agar. The IAA production and quantification was performed by growing bacteria in different tryptophan concentration that act as precursor, while optimization was performed in different pH culture, incubated for 7 days. In this study, simultaneous field experimental was performed by growing chili seedlings inoculated and treated with bacteria inoculum, LKM2 and LKM3.

Results: This study shows that dual culture assay of LKM2 and LKM3 showed no significant antagonistic effects between both bacteria, indicating their compatibility. In IAA production, dual culture LKM2 and LKM3 capable of producing IAA, with highest production of 13.58 µg/mL in medium with 500 µg/mL tryptophan. The optimal pH for IAA production was found to be pH 6. However, despite being revealed as IAA-producing bacteria, field trial showed that inoculation of dual culture LKM2 and LKM3 on *C. frutescens* and *C. annuum* did not significantly enhanced the growth of chili seedlings. *C. annuum* revealed to have no significant increase while *C. frutescens* showed a significant decreased in height and number of leaves.

Conclusion: In conclusion, current study suggested that the negative effect of endophytic bacteria on chili growth may be due to host specificity. Further study on the effect of endophytic bacteria LKM2 and LKM3 on plant growth is recommended by using a variety of host plants to identify the beneficial effect of endophytic bacteria.

Keywords: Endophytic Bacteria, Dual Culture Assay, IAA production, Chili Seedlings

*Correspondence: ernie974@uitm.edu.my

^a School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia