

**THE POTENTIAL OF RED SPINACH (*Amaranthus tricolor* L.) AND
Bacillus spp. ISOLATES BTH22, A10, AND D28 AS HALOTOLERANT
BACTERIA FOR SOIL SALINITY BIOREMEDIATION IN THE
LAPINDO MUD FLOW AREA OF SIDOARJO**

THESIS



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SURABAYA
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Submitted To The Agrotechnology Departement

To Earn A Bachelor's Degree In Agriculture



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APPROVAL SHEET

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FOREWORD

Praise and thanks be to Allah SWT, who has bestowed His mercy and blessings so that the author could complete this thesis titled “The Potential of Red Amaranth (*Amaranthus tricolor* L.) and *Bacillus* spp. Isolates Bth22, A10, and D28 as Halotolerant Bacteria for Soil Salinity Bioremediation in the Lapindo Mudflow Area of Sidoarjo.”

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The author welcomes criticism and suggestions as input for evaluating and improving future theses. It is the author’s sincere hope that this thesis will receive positive feedback from the thesis advisor and examiners, and that it will be beneficial to readers, broadening the knowledge and providing information to others who may need it.

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The Author

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Abstract

Saline soil is one of the major factors limiting plant growth because high salt concentrations can interfere with water and nutrient uptake. Soil affected by the Lapindo mudflow in Sidoarjo has high salinity levels, requiring environmentally friendly approaches for its management. This study aimed to evaluate the ability of *Bacillus* spp. isolates to reduce soil salinity and to assess the growth response of red spinach (*Amaranthus tricolor* L.) in saline soil following the application of *Bacillus* spp. suspensions. The study consisted of eight treatments (P0–P7). Treatments P0–P4 were used to evaluate the growth response of red spinach, whereas P5–P7 were used to evaluate the ability of individual *Bacillus* spp. isolates to reduce soil salinity. The observed parameters included soil electrical conductivity (EC), plant height, number of leaves, and fresh weight. The results showed that all treatments reduced soil salinity. Among the treatments without plants, *Bacillus* spp. isolate A-10 (P6) produced the greatest absolute reduction in EC, decreasing it by 3.490 dS/m, from 4.08 to 0.590 dS/m. In the in vivo test, the combination of *Bacillus* spp. isolates Bth-22, A-10, and D-28 (P4) produced the highest growth response, with a plant height of 30.30 cm, 11.07 leaves, and a fresh weight of 19.64 mg at the end of the observation period. These findings indicate that *Bacillus* spp. isolate A-10 has potential for reducing soil salinity, while the combination of Bth-22, A-10, and D-28 has potential for supporting the growth of red spinach under saline soil conditions.

Keywords : *Bacillus* spp, Red Spinach, Bioremediation, Soil Salinity