THE POTENTIAL OF *Bacillus* sp. AND FOBIO BIOPESTICIDE WITH MUSTARD GREEN PLANTS (*Brassica rapa* L var. parachinensis) AS BIOREMEDIATION AGENTS OF HEAVY METALS CADMIUM (Cd)

UNDERGRADUATE THESIS

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AGROTECHNOLOGY STUDY PROGRAM

FACULTY OF AGRICULTURE

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SURABAYA

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Submitted to Fulfill the Requirements for Obtaining
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The Potential of *Bacillus* sp. and FOBIO Biopesticides with Mustard Plants (*Brassica rapa* L var. parachinensis) as Bioremediation Agents for Heavy Metal Cadmium (Cd)

Potensi *Bacillus* sp. dan Biopestisida FOBIO dengan Tanaman Sawi Hijau (*Brassica rapa* L var. parachinensis) Sebagai Agen Bioremediasi Logam Berat Kadmium (Cd)

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ABSTRACT

Cadmium (Cd) contamination in agricultural land due to excessive use of fertilizers and pesticides has a detrimental impact on soil, plants, and humans. Efforts to address this issue involve bioremediation. This study aims to investigate the potential of *Bacillus* sp., the biopesticide FOBIO, and green cabbage (*Brassica rapa* L. var. parachinensis) as bioremediation agents for heavy metal Cd. The results of the study indicate that *Bacillus* sp. and FOBIO are capable of reducing cadmium levels after treatment. The FOBIO treatment at 4.57 mg/kg and the *Bacillus* sp. treatment at 2.48 mg/kg did not disrupt the growth of the mustard plants. The FOBIO treatment significantly increased the number of leaves, plant length, and fresh weight compared to the other treatments.

Keywords: Bacillus sp., biopestiside FOBIO, cadmium, bioremediation, green mustard

ABSTRAK

Pencemaran kadmium (Cd) di lahan pertanian akibat penggunaan pupuk dan pestisida berlebihan berdampak buruk pada tanah, tanaman, dan manusia. Upaya mengatasi permasalahan tersebut dengan Bioremediasi. Penelitian ini bertujuan untuk mengkaji potensi *Bacillus* sp., biopestisida FOBIO, dan tanaman sawi hijau (*Brassica rapa* L. var. parachinensis) sebagai agen bioremediasi logam berat Cd. Hasil penelitian menunjukkan bahwa *Bacillus* sp. dan FOBIO mampu menurunkan kadar kadmium setelah perlakuan. Perlakuan FOBIO sebesar 4,57 mg/kg dan perlakuan *Bacillus* sp. 2,48 mg/kg. pertumbuhan tanaman sawi tidak terganggu. Perlakuan FOBIO secara signifikan meningkatkan jumlah daun, panjang tanaman dan berat basah dibandingkan perlakuan lainnya.

Kata kunci: *Bacillus*, kadmium, FOBIO, bioremediasi, tanaman sawi.

FOREWORD

Praise be to Allah SWT for His abundant mercy and guidance, enabling the author to complete this thesis titled " The Potential of *Bacillus* sp. and FOBIO Biopesticide with Green Mustard Plants (*Brassica rapa* L var. parachinensis) as Bioremediation Agents for Heavy Metal Cadmium (Cd)"

The preparation of this thesis is an academic requirement of the Faculty of Agriculture, Universitas Pembangunan Nasional “Veteran” Jawa Timur. his process would not have been possible without the assistance of Allah SWT and the support of various parties. With sincere gratitude, I would like to express my heartfelt thanks to:

1. Mrs. Dr. Dra. Endang Triwahyu Prasetyawati, M.Si as the main supervisor as well as a substitute for parents during the thesis process. Thank you for all the time, guidance, and and direction you have provided to help me complete this thesis.
2. Mrs. Dr. Ir. Sri Wiyatiningsih, MP. As a companion supervisor, who has provided support, input, and guidance in every stage of the preparation of this thesis.
3. Mr. Dr. Ir. Tri Mujoko, MP. as the Coordinator of the Agrotechnology Study Program at the Faculty of Agriculture, Universitas Pembangunan Nasional "Veteran" Jawa Timur for providing guidance and facilitating academic needs throughout the study period.
4. Mrs. Dr. Ir. Wanti Mindari., M.P. Dean of the Faculty of Agriculture at the Universitas Pembangunan Nasional "Veteran" Jawa Timur for all forms of support and opportunities provided during the learning process at the faculty.
5. Mr. Muhammad Gufron Chakim SP. MP as a lecturer specializing in soil science greatly assisted me, particularly in the process of data analysis and laboratory work during the research.
6. My beloved family, especially my parents, siblings, and extended family, for their love, prayers, and unwavering encouragement throughout my education.

7. My fellow Agrotechnology student at Universitas Pembangunan Nasional “Veteran” Jawa Timur, especially Tri Susiyanti, Denis Fitriasari, Rafi Dwi Nugraha, and Ainur who have provided a great deal of assistance and played an important role in the research process and preparation of this thesis.

Surabaya, August 2025

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