ECO-ENZYME APPLICATION STUDY ON TEXTILE INDUSTRY WASTE-ACTIVATED SLUDGE IN pH, MLSS, MLVSS, AND ORGANIC CONTENT PERCENTAGE (STUDY CASE: WWTP-1 JABABEKA)

UNDERGRADUATE THESIS

Submitted as one of the requirements to obtain
Sarjana Teknik

By:

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FACULTY OF ENGINEERING
ENVIRONMENTAL ENGINEERING STUDY PROGRAM
CIKARANG
MARCH 2025

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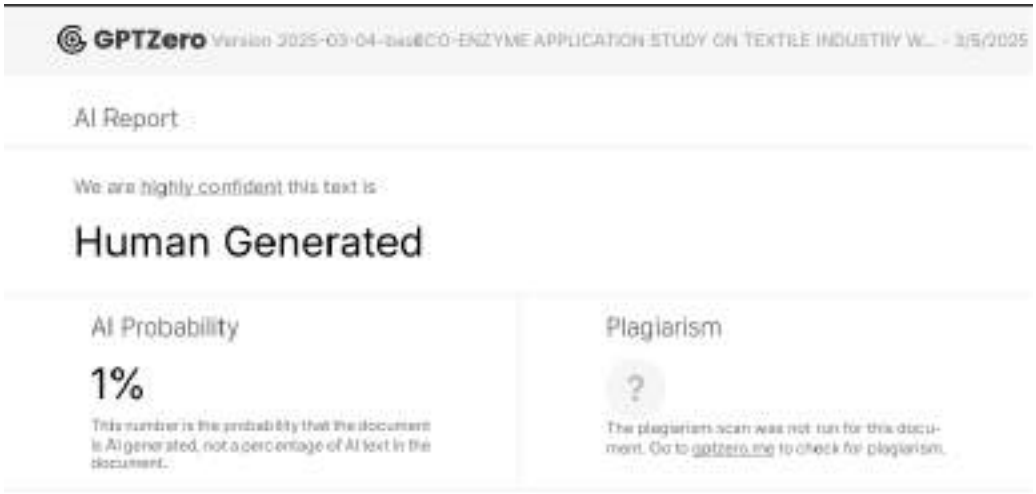

ECO-ENZYME APPLICATION STUDY ON TEXTILE INDUSTRY WASTE-ACTIVATED SLUDGE IN pH, MLSS, MLVSS, AND ORGA - 3/5/2025

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PANEL OF EXAMINER APPROVAL

ABSTRACT

The textile industry significantly contributes to wastewater pollution, generating toxic effluent with dyes and organic matter. Biological treatment using activated sludge produces waste-activated sludge (WAS), which contains moisture, organic contaminants, heavy metals, and pathogens, posing environmental risks. This study investigates the potential of eco-enzymes—fermented organic liquids from organic waste—as a sustainable solution for managing WAS. It evaluated changes in pH, mixed-liquor suspended solids (MLSS), mixed-liquor volatile suspended solids (MLVSS), and organic matter content after adding 10% eco-enzymes made from orange, pineapple peel, and mixed organic matter to WAS from a textile wastewater treatment plant in an anaerobic system over 8 days. Results showed that eco-enzymes significantly reduced the pH of the sludge from 8.13 to 5.15, compared to a control that decreased to 7.45. The pineapple peel eco-enzyme reduced MLSS by 32% and MLVSS by 35%, while mixed-organic matter eco-enzyme led to reductions of 29% for MLSS and 31% for MLVSS. The orange eco-enzyme showed the highest reduction, with decreases of 35% for MLSS and 38% for MLVSS. However, the control sludge samples exhibited a higher reduction in organic content (12.12%) compared to those with eco-enzymes (5.6%). While eco-enzymes significantly lowered pH and contributed to reductions in MLSS and MLVSS, variations in statistical significance were noted. Pineapple peel and mixed-organic waste enzymes showed no effect on MLSS reduction on day 4, and mixed-organic waste enzymes were insignificant for MLVSS reduction on day 8. Overall, eco-enzymes effectively aided in the degradation of textile sludge, necessitating careful monitoring of pH levels.

Keywords: *Waste-Activated Sludge, Eco-Enzyme, pH, MLSS, MLVSS*

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