



**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
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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*

TABLE OF CONTENTS

PANEL OF EXAMINER APPROVAL	ii
STATEMENT OF ORIGINALITY	iii
THESIS APPROVAL	iv
SCIENTIFIC PUBLICATION APPROVAL FOR ACADEMIC INTEREST ...	v
ADVISOR'S APPROVAL FOR PUBLICATION	vi
COPYRIGHT TRANSFER AGREEMENT	vii
TURNITIN TEST RESULT	viii
GPTZERO TEST RESULT	ix
ABSTRACT	x
ACKNOWLEDGMENT	xi
TABLE OF CONTENTS	xii
LIST OF FIGURES	xv
LIST OF TABLES	xvi
1 INTRODUCTION	1
1.1 Background	1
1.2 Problem Statement	2
1.3 Objectives	3
1.4 Scope and Limitations	3
1.4.1 Scope	3
1.4.2 Limitations	3
2 LITERATURE REVIEW	4
2.1 Textile Wastewater	4
2.2 Biological Wastewater Treatment	5
2.3 Waste-Activated Sludge	6
2.4 Characteristics of Textile Wastewater	7
2.5 Eco-Enzyme	7
2.6 pH	8
2.7 Mixed-Liquor Suspended Solids (MLSS)	9

2.8 Mixed-Liquor Volatile Suspended Solids (MLVSS).....	10
2.9 Organic Content	11
3 RESEARCH METHOD.....	12
3.1 Research Framework.....	12
3.2 Research Materials and Tools	12
3.2.1 <i>Materials</i>	12
3.2.2 <i>Tools</i>	12
3.3 Research Variables.....	13
3.3.1 <i>Independent Variable</i>	13
3.3.2 <i>Dependent Variable</i>	13
3.3.3 <i>Control Variable</i>	13
3.4 Data Collection Method	13
3.4.1 <i>Sampling Method</i>	13
3.4.2 <i>Population and Sample</i>	14
3.4.3 <i>Primary Data Collection</i>	14
3.4.4 <i>Experimental Method</i>	14
3.4.4.1 <i>Experimental Framework</i>	14
3.4.4.2 <i>Sample Preparation</i>	15
3.5 Parameter Testing	17
3.5.1 <i>pH Measurement</i>	17
3.5.2 <i>Mixed-Liquor Suspended Solids (MLSS) Measurement</i>	17
3.5.3 <i>Mixed-Liquor Volatile Suspended Solids (MLVSS) Measurement</i>	18
3.6 Data Analysis	18
3.6.1 <i>t-Test Analysis</i>	19
4 RESULTS AND DISCUSSIONS	19
4.1 Characterization of Eco-Enzymes and Batik Waste-Activated Sludge	19
4.1.1 <i>Characteristics of Eco-Enzyme</i>	19
4.1.2 <i>Characterization of Batik Waste-Activated Sludge</i>	20
4.2 The Impact of Applying Eco-Enzymes on pH.....	21
4.3 The Impact of Applying Eco-Enzymes on MLSS	23
4.4 The Impact of Applying Eco-Enzymes on MLVSS	26

4.5 The Impact of Applying Eco-Enzymes on Organic Content	28
4.6 Recommendation for Eco-Enzymes Application.....	31
5 CONCLUSIONS AND RECOMMENDATIONS	32
5.1 Conclusions.....	32
5.2 Recommendations.....	32
REFERENCES.....	34
APPENDIX A – ENVIRONMENTAL DATA RESULTS.....	38
APPENDIX B – ENVIRONMENTAL DOCUMENTATION	51
1. Materials and Tools.....	51
2. Characterization of Eco-Enzymes and Sludge.....	52
3. Anaerobic Process.....	52
APPENDIX C – SOFTWARE OUTPUT	54
1. t-Test for pH Analysis.....	54
2. t-Test for MLSS Analysis	57
3. t-Test for MLVSS Analysis	61
4. t-Test for Organic Content Analysis	64

LIST OF FIGURES

Figure 1. Research Framework	12
Figure 2. WWTP-1 Jababeka by Google Earth.....	14
Figure 3. WWTP-1 Jababeka by Google Earth (Zoomed-in Version).....	14
Figure 4. Flowchart of WWTP-1 Jababeka (Sampling Point)	14
Figure 5. Experimental Framework	15
Figure 6. The Impact of Eco-Enzymes Application on pH.....	22
Figure 7. The Impact of Eco-Enzymes Application on MLSS	25
Figure 8. The Impact of Eco-Enzymes Application on MLVSS	27
Figure 9. The Impact of Eco-Enzymes Application on Organic Content	30

LIST OF TABLES

Table 1. Laboratory Analysis Method.....	17
Table 2. The Characteristics of Eco-Enzymes	20
Table 3. The Characteristics of Batik Waste-Activated Sludge	20
Table 4. Data of pH Measurement	21
Table 5. t-Test Result Between Control and Treatments on pH	23
Table 6. Data of MLSS Measurement.....	23
Table 7. t-Test Result Between Control and Treatments on MLSS	26
Table 8. Data of MLVSS Measurement	26
Table 9. t-Test Result Between Control and Treatments on MLVSS	28
Table 10. Data of Organic Content (%) Measurement.....	29
Table 11. t-Test Result Between Control and Treatments on Organic Content (%)	30