

**PERFORMANCE EVALUATION OF BIOMASS SHREDDER FOR
ORGANIC FERTILIZER PRODUCTION**

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**BACHELOR OF SCIENCE IN AGRICULTURAL AND BIOSYSTEMS
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(AB MACHINERY AND POWER ENGINEERING)**

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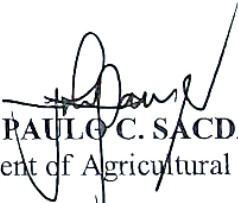
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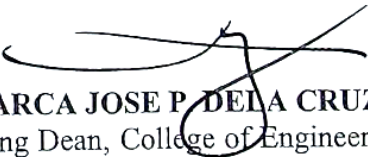
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BIOGRAPHICAL SKETCH

The author, Harris Andrei R. Villanueva was born on the 6th of January 2000 in Cabanatuan City, Nueva Ecija. He is the eldest son of Mr. Adonis Voltaire M. Villanueva and Mrs. Adriana R. Villanueva. He was raised together with his two siblings namely Donna Adrienne R. Villanueva and Fetster Don Adrian R. Villanueva. His father's occupation is a Professor and his mother's occupation is a housewife.

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The author is confident in his ability to complete the course due to the strong inspiration provided by his family. He expresses immense gratitude for his family's unwavering support, sacrifices, and dedication toward his success and future career. Additionally, the author expresses deep gratitude to God, their Creator, for blessing him with wonderful and supportive parents. He is attributing his achievements and the opportunities he has received to the guidance and blessings bestowed upon him by a higher power. The author recognizes the importance of faith and acknowledges the role it has played in shaping their life and educational journey.

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TABLE OF CONTENTS

	PAGES
LIST OF FIGURES	vii
LIST OF TABLE	viii
LIST OF APPENDICES	x
LIST OF APPENDIX TABLES	xi
LIST OF APPENDIX FIGURES	xii
ABSTRACT	xiii
INTRODUCTION	1
Background of the Study	1
Statement of the Problem	2
Objective of the Study	3
Significance of the Study	3
Scope and Limitations of the Study	5
Time and Place of the Study	5
REVIEW OF LITERATURE	6
Agricultural Waste	6
Municipal Solid Waste	7
Municipal Solid Waste as an Organic Fertilizer	8
Agricultural Utilization of Municipal Solid Waste	9
Biomass	10
Compost	10
Composting	11
Shredding	11
Concept of Shredding Machine	12
Advantage of Shredding	13
Shredder's Role in Waste Management	13
Particle Size Reduction using Shredder of Solid Waste for Composting	14

	PAGES
METHODOLOGY	15
Conceptualization of the Study	15
Flowchart of Working Method	16
The Biomass Shredder	18
Parts of Biomass Shredder	19
Performance Testing	23
Data Gathering and Analysis	24
Performance Parameters	24
Unshredded Leaves	24
Shredding Capacity	25
Shredding Efficiency	25
Particle Size Distribution	26
Input Capacity	26
Statistical Analysis	27
Cost Analysis	27
Fixed Cost	27
Variable Cost	30
Operating Cost	31
Payback Period	32
Break-even Point	32
RESULTS AND DISCUSSION	33
Specifications of the Biomass Shredder	33
Performance Evaluation of the Biomass Shredder	34
Dry Leaves Shredding Performance	34
Performance Parameter for Dry Leaves	34
Shredding Capacity for Dry Leaves	35
Normality Test	36
Homogeinity Test	36
ANOVA	37
ANCOVA	37
Particle Size Distribution	38
Shredding Efficiency	39
Post-hoc Test	39

	PAGES
Fresh Leaves Shredding Performance	39
Performance Parameter for Fresh Leaves	39
Shredding Capacity for Fresh Leaves	41
Normality Test	41
Homogeneity Test	42
ANOVA	42
ANCOVA	43
Particle Size Distribution	43
Shredding Efficiency	44
Post-hoc Test	44
Cost Analysis	44
Fixed Cost	46
Variable Cost	46
Operating Cost	46
Payback Period	46
Break-even Point	46
SUMMARY, CONCLUSION AND RECOMMENDATION	47
REFERENCES	52

LIST OF FIGURES

FIGURES		PAGES
1	Flowchart of Working Method	17
2	The Biomass Shredder	18
3	Biomass Shredder's Hopper	19
4	Biomass Shredder's Discharge Chute	19
5	Biomass Shredder's Shredding Chamber	20
6	Biomass Shredder's Structural Frame	20
7	Biomass Shredder's Cross Cutting Feeder	21
8	Biomass Shredder's Power Transmission	21
9	Biomass Shredder's Pulley	22
10	Biomass Shredder's Electric Motor	22

LIST OF TABLES

TABLES		PAGES
1	Conceptual Framework of the Study	16
2	Equipment and Instruments	23
3	Specifications of the Biomass Shredder	33
4	Performance parameters for dry leaves	34
5	Shredding Capacity for Dry Leaves	36
6	Performance parameters for fresh leaves	40
7	Shredding Capacity for Fresh Leaves	41
8	Summary of Cost Analysis	46

LIST OF APPENDICES

APPENDIX		PAGES
1	APPENDIX TABLES	57
2	APPENDIX FIGURES	68

LIST OF APPENDIX TABLES

APPENDIX TABLES	PAGES
1 Test for normality for dry leaves	57
2 Test for homogeneity of variances for dry leaves	57
3 Test for independence of the covariate (weight before) and factor (rpm)	57
4 Test for independence of the covariate (weight after) and factor (rpm)	58
5 ANCOVA (dry leaves) weight of shredded biomass material	58
6 ANOVA (dry leaves shredding capacity)	58
7 ANCOVA (dry leaves 1 inch)	58
8 ANCOVA (dry leaves 1/2 inch)	59
9 ANCOVA (dry leaves 1/4 inch)	59
10 Post-hoc test (dry leaves shredding capacity)	59
11 Post-hoc test (dry leaves ¼ inch)	59
12 Test for normality for fresh leaves	60
13 Test for homogeneity of variances for fresh leaves	60
14 Test for independence of the covariate (weight before) and factor (rpm)	60
15 Test for independence of the covariate (weight after) and factor (rpm)	61
16 ANCOVA (fresh leaves) weight of biomass material	61
17 ANOVA (fresh leaves shredding capacity)	61
18 ANCOVA (fresh leaves 1 inch)	61
19 ANCOVA (fresh leaves 1/2 inch)	61
20 ANCOVA (fresh leaves 1/4 inch)	62
21 ANCOVA (fresh leaves unshredded)	62
22 ANOVA (fresh leaves shredding efficiency)	62
23 Post-hoc test (fresh leaves shredding capacity)	62
24 Post-hoc test (fresh leaves shredding efficiency)	63
25 Cost analysis	63

APPENDIX TABLES

PAGES

26	Raw Data for Dry Leaves	64
27	Raw Data for Fresh Leaves	65
28	Fineness Modulus	66

LIST OF APPENDIX FIGURES

APPENDIX FIGURES	PAGES
1 Biomass shredder	68
2 Dry leaves	69
3 Fresh leaves	69
4 Shredded dry leaves	70
5 Shredded fresh leaves	70
6 Pulley set	71
7 Shredder Blades	72
8 Sieving Equipment	72

ABSTRACT

VILLANUEVA, HARRIS ANDREI R., Department of Agricultural and Biosystems Engineering, College of Engineering, **June 2024, PERFORMANCE EVALUATION OF BIOMASS SHREDDER FOR ORGANIC FERTILIZER PRODUCTION**

Adviser: **RUEL G. PENEYRA, M.Sc.**

The Philippines is an agriculture-dependent nation and generates a lot of organic wastes, which causes serious disposal issues. These organic leftovers contribute significantly to issues like air pollution, soil erosion, incineration, landfills, foul odors, and rising atmospheric carbon dioxide levels. Organic waste can be transformed into a valuable resource, like compost that is beneficial to crop cultivation. Smaller particles have a greater surface area per unit volume, and more of the food can be more easily accessed by microorganisms. By chipping or shredding coarse materials such as twigs and stems, it will break down more quickly. Biomass shredders offer aggressive shredding capabilities and increase adaptability by quickly processing a range of biomass materials such as leaves and reducing their size into more manageable chunks.

The global demand for organic products rises and environmental concerns escalate, the efficient conversion of biomass into high-quality organic fertilizer becomes imperative. This study aimed to evaluate the biomass shredder based on machine's shredding capacity, shredding efficiency, particle size distribution, and input capacity by the use of three different pulley sets, thereby resulting to three different speeds of rotation. The different rpm speeds for shredding biomass materials such as fresh and dried leaves had a considerable impact on shredding capacity of the biomass shredder. Regarding the shredding efficiency, there is a statistically significant variation in shredding efficiency

among the different RPM values for shredding biomass materials. The outcome of this study could significantly benefit farmers, agricultural industries, and environmentalists by promoting the adoption of eco-friendly practices and fostering the creation of nutrient-rich organic fertilizers, ultimately contributing to the advancement of a more sustainable and environmentally conscious agricultural sector.

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