DEVELOPMENT OF WINDROW COMPOST PILE MIXER

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX TABLES

LIST OF APPENDIX FIGURES

ABSTRACT

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This study was carried out to design, fabricate and evaluate the testing performance of compost mixer in mixing the windrow compost pile. The specific goal of this study was to determine the appropriate mixing speed to facilitate its mixing performance and perform simple cost analysis on the machine.

The compost mixer was designed and drawn based on the physical characteristics of the windrow compost pile. The machine was fabricated based on design plans and specifications. The components of the compost mixer include engine, power transmission system, counterweight, frame, wheel, flywheel and mixing arm. The mixing arm was designed with steel shafting solid round bar covered by a flat steel bar with a length of 0.67m and an angle bar welded to the shaft (0.002m x0.02m) by which its spacing varies from 5 inches and its clearance from the ground is 3 inches. These gaps were sized up based on the actual size of the windrow compost pile.

Three different mixing speeds of the mixing arm (150 rpm, 200 rpm, and 250 rpm) were evaluated. Nine (9) windrow compost pile with the dimensions of (L: 2.5 m x W: 0.70 m x H: 0.75 m) were used in the treatment at three (3) replications. Results showed that the appropriate mixing speed was at 250 rpm giving an actual mixing time of 1.85 minute, and fuel consumption of 25 ml. Likewise, the distances of debris on both length and width are closely aligned and do not appear to have a noticeable impact.

The overall cost of the machine excluding the engine was Php21,174.50. The machine was calculated to operate with fixed annual cost of Php 23, 027.27/yr and a variable cost of Php 123.41/hr.

Keywords: compost; compost mixer; windrow compost pile

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