DESIGN AND FABRICATION OF PORTABLE LEAF SHREDDING MACHINE FOR COMPOST PRODUCTION

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ABSTRACT

CORPUZ, KATHRYN JOY and **TRINIDAD, ALYANNA JANELLA P.**, Department of Agricultural and Biosystem Engineering, College of Engineering, **JUNE 2023, DESIGN AND FABRICATION OF PORTABLE LEAF SHREDDING MACHINE**

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The study aims to develop a leaf shredder to reduce the size of biomass prior for compost. The objective of the study was to design, fabricate and evaluate a portable leaf shredding machine for compost production, the proposed leaf shredder in terms of its capacity, efficiency, particle size distribution and cost of ownership and use.

Response Surface Methodology using Box and Behnken was employed in fractional factorial to evaluate the parameters affecting the machine performance such as blade rpm (3 levels), blade design (3 levels), and screen size (3 levels).

Analysis showed fast rotation of the blade and the use of combination blades and large screen size resulted to highest attainable capacity of 40 kg/hr. Efficiency across all tests resulted to a mean of 96.99% (SD=2.10, CV=2.16%). Particle size distribution of the shredded samples fall within 6 mm < x < 12 mm.

The overall cost of the implement Php 29,780.58 per year can be incurred for an annual capacity of 7.28 tons of materials to be shredded. Operating cost was found to be 4.09 Php/kg of material.

Keywords:

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