DESIGN, CONSTRUCTION AND PERFORMANCE EVALUATION OF A PORTABLE SHREDDER WITH VERMICOMPOSTING BIN

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By

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ABSTRACT OF THE SPECIAL PAPER

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This portable shredder with vermicomposting bin was designed at the College of Engineering, Central Philippine University, Iloilo City. The machine is constructed using mainly stainless steel sheet, flat bars and angle bars and driven by a 1.5 Hp electric motor using the belt and pulley transmission. The first component is the shredder which consists of six parts, namely: frame, inlet hopper, shredding cylinder, shafting and blade, belt and pulley, and discharge hopper. The second component is the vermicomposting bin, which is mounted at the shredder. It consists of the bin cover, fermenting and vermicomposting chambers, and an air dryer.

The machine produced a throughput capacity of 49-73 kg/hr of biodegradable wastes reducing its volume after shredding to 65-73% in one pass operation.

The device can be fabricated at a cost of Php20,121.75 including labor. It consumed about 16 to 24 watts of energy for every kilogram of waste shredded. The vermibin obtained a throughput capacity of 202.5 kg of shredded substrates per load with a composting rate of 160 kg of vermicompost per month giving a recovery rate of 79%. The return of investment (ROI) using this technology is 71.56%.