Design and Development of an Engine-Powered Organic Slurry Maker and a Pump

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Abstract
Excessive usage of chemical fertilizer has become a global problem and a cause for various issues of humans and nature. Organic fertilizers are basically derived from vegetable matters, animal manure or human excreta which is the best solution to solve this issue. Organic farming methods are appropriate and adaptable to many types of land use in any part of Sri Lanka. It could support paddy, vegetable, fruits and some other tree crops. Distribution of organic material in the soil near to the plant is a major task. Due to high variability of physical characteristics of organic materials, several technical problems can be observed during its handling and application under field conditions. Use of manpower for the application of organic materials is uneconomical due to high labor cost. Therefore, small engine operated fertilizer distributor with organic slurry maker and direct drive slurry pump were designed and constructed. This machine was not only useful to chop and mix solid organic materials to prepare slurry, but also useful to distribute the mixed organic materials. The machine consists of an engine, power transmission unit with the friction belt system, slurry making unit and pumping unit. Discharge rate (kg $s^{-1)}$, chopping rate (kg $s^{-1)}$ and mixing rate (kg s^{-1}) were considered as criteria in the performance evaluation. The test results showed that the maximum volume of the machine per batch was 0.04 m^3 and the slurry pumping head, Pump discharge rate, leaf chopping rate, mixing rate were 2.09 m, 4.4 $x10^{-4}$ m^3 s^{-1}, 112 kg s^{-1}, 6 kg s^{-1}, respectively. The cost of production of the machine is 30,000 Rs.

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