

## DESIGN OF A TWO-WHEEL TRACTOR COUPLED FODDER CHOPPING MACHINE

U.K.T.S. Udukumbura, E.J. Kosgollegedara\*, K.K.J. Udeshika#,  
G.V.T.V. Weerasooriya, P.D. Kahandage, and S. Karthigayani

Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura,  
Sri Lanka

\*Correspondence E-mail: eranda@agri.rjt.ac.lk, Phone: +94719488183

#Presenting Author

**Abstract:** *Gliricidia* (*Gliricidia sepium*) and Mexican sunflower (*Tithonia diversifolia*) are readily available fodder sources in Sri Lanka. They are used to enhance the nitrogen and phosphorus content in compost by incorporating tender leaves and stem cuttings into the compost feedstock. However, farmers are unwilling to use tender stems due to mixing difficulties and the slow decomposition rate. Thus, there was a necessity to reduce the size of tender stems before adding them to the feedstock. Consequently, this study aimed to design a two-wheel tractor coupled fodder chopping machine that enhances the efficiency of the composting process and is a feasible method for small and medium-scale composters in Sri Lanka. The machine comprises a feeding tray, chopping chamber, chopping assembly, power transmission system, and outlet. Size and the shape of the machine components were designed according to the physical properties of *Gliricidia* and Mexican Sunflower. The feeding tray was designed as a shortened rectangular-based pyramid with a slant angle of 38°, enabling the simultaneous feeding of a minimum of five *Gliricidia* tender stems. The chopper assembly was composed of two blades with a flywheel which was mounted on a shaft. Power was designed to be transferred from the tractor's flywheel (4.85 kW) to the chopper assembly shaft by means of a belt and pulley system. Blades at 900 rpm were designed to achieve a maximum mean cutting length of 19 mm. Furthermore, the theoretical capacities of the machine were designed as 40.12 kg h<sup>-1</sup> and 29.72 kg h<sup>-1</sup> for *Gliricidia* and Mexican sunflower, respectively. Therefore, the potential exists for this machine to evolve into a two-wheel tractor-coupled fodder-chopping machine.

**Keywords:** Compost; Fodder chopper; *Gliricidia*; Mexican sunflower; Tender stems