

Development of a coconut coir dryer machine using the rotary drying method and biomass heating

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Abstract

Coconut coir is one of the main exports in Sri Lanka. Drying is an important step in the coconut coir process, which affects the quality. At present, coconut coir drying is mainly done using sunlight. However, it is difficult to continue this process during days of heavy clouds and in rainy seasons. In addition, during these times, employer has to pay salaries for the workers even if they cannot work. This project focused on reducing energy consumption, drying time and the cost of existing coir drying methods by designing and fabricating a novel coir drying machine using biomass heating energy. This machine uses a novel combined rotational rotary technique and a biomass heating method for its operation. The machine consists of three major parts; the heating chamber, outer cylinder, and the inner cylinder. The heating chamber generates heat, distributes uniformly, and the inner cylinder carries out the drying process. The outer cylinder prevents the wall from slipping away. In addition, various measures are taken to maintain the proper functioning of the machine, such as the overload protection, high temperature protection, pulsed width modulation (PWM) to control the motor speed and easy maintenance of the temperature. After the completion of the project, the energy consumption was less than 0.034KWh and the drying time was about 20 minutes for 1 kg of coir. It is important that the process can be carried out at any time of the day without relying on sunlight. Also, other types of grains such as paddy are capable of being dried using this machine.

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