

Improved carbon fertilizer pelletization machine to be used in small and medium-scale enterprises

G.G.H.M. Ganewaththa & H.L. Subasinghe*

Department of Engineering Technology, University of Ruhuna, Sri Lanka

**Corresponding author: laknath@fot.ruh.ac.lk*

Abstract

One of the environmentally friendly solutions for the management of handling organic waste is composting. Bulky nature of loose compost is a challenge in agriculture. However, it can be overcome by pelletizing compost. The most appropriate conditions in die and extruder pelletizer, automated moisture controlling, and mixture systems were studied to produce pellets with desirable qualities. With compost particles of suitable mesh sizes, varying moisture contents, types of binding agents such as rock phosphate, bulk density, pellet length, and disintegration capability were studied. Compost that had been pelletized had a greater percentage of long pellets with high compressive strength and density, with raw particle sizes of about 5 mm and a moisture level of 35%. The density of pellets with binder agent is $1496.1320 \text{ kgm}^{-3}$ and density of the pellets without binder agent is $1208.1875 \text{ kgm}^{-3}$. The effectiveness of the machinery and the output increased as compost particle size increased and it was reduced as compost moisture increased. However, the machine's efficiency was decreased for compost that had more binding agents. This study demonstrates that compost pelletization, both with and without binding agents, improved the qualities of compost needed for use in agriculture as well as for transportation and storage. The study mainly focused on the small and medium-scale compost production sector.

Keywords: *particle size, moisture content, compressive strength, binding agents, compost*