

Waste Food Recycling Machine

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Abstract— The main purpose of this project is to utilize the food waste which is generated by college/ school canteen, hostels, hotels, restaurants residential areas like colony, apartments, bungalows, buildings etc. Almost 4000 tons of waste garbage are generated on daily basis in our city. The waste management teams face more problems and difficulties of how to manage such a huge amount of waste generated. And it is difficult to separate the wet garbage and dry garbage. In this garbage also add electronic garbage. This is all garbage are stored in dumping stations. And it harmful to the human being to survive. So our machine helps to manage of waste in proper way. By using our machine or by mechanical system we create valuable fertilizer at home without harming of nature. And here no methane gas create so its helps to decrease pollution. And save environment.

Key words: Chemical Free Fertilizer, Waste Food, Rotor, Blade, Pulley, Belt Drive, Bearings, Motor

I. INTRODUCTION

A variety of mechanisms are used for conversion of waste into some useful product rather than dumping it somewhere else and polluting that area. Therefore there are many reasons why we should use the various mechanisms to turn waste into something useful. In its simple construction, the rotor shreds the wet and dry biodegradable garbage into fine particles and we can use these particles to produce fertilizer for the crops. When the wet garbage is put inside the machine through the hopper it is shredded with the help of rotor with blades on it. The rotation of the rotor is made possible by using bearings on both the ends of the shaft. The rotor is given drive with the help of pulley and belt drive connected to single phase induction motor of 1hp.

The shredded residual is then collected inside a storage container where it mixes with soil present in it. As the garbage or waste is shredded or broken down into small pieces the soil absorbs the moisture quickly and the decaying action takes place quickly and in about only 2 days i.e. 48 hours we get quality fertilizer which is totally chemical free and completely eco-friendly. The machine does not let the bad odor of the shredded waste escape the storage container which helps the surrounding area clean, dry, and infection free. If this type of system is implemented it will not only reduce the waste in the garbage dumps but also produce quality natural fertilizer.

This way of conversion of waste into something useful if implemented in the garbage dumps as well as the city dustbins which contain the biodegradable waste, the reduction of garbage will increase as well as the usage of chemical free fertilizer will increase which will ultimately lead to the production of healthy and organic farm products.

II. MOTIVATION

Motivation of this system is to,

- Conversion of wet and dry biodegradable waste into fertilizer.

- This waste food recycler is not only useful for conversion of waste into fertilizer but also in reduction of the garbage in the city dumps.
- This utilizes energy only in little amount but is more affordable than to purchase fertilizers from the market.
- This way of conversion of waste food into fertilizers can be implemented in school canteens, hotels, farms, housing societies, agricultural institutes etc .

III. OBJECTIVE

Objective of this system is to:-

- Convert waste food into fertilizer by shredding it into small pieces to be utilized wherever needed.
- Pollution free garbage management.
- Simple mechanism.
- Easy for installation.
- Works only when someone turns on the power supply.
- Thus intermittent fertilizer generation.
- This compost fertilizer can be used in the farms to obtain healthy and organic products.

IV. LITERATURE SURVEY

- 1) According to the research done on the internet and the information obtained from Wikipedia there is a huge need of waste management which includes the biodegradable waste also. This type of waste can be used for making quality fertilizer for soil for production of various crops.
- 2) This could be applicable anywhere from the city dustbins to the dump yard. It can also be used in the huge farms as well as the agricultural institutes. This concept is originally based on the concept of absorption of moisture by the soil
- 3) The concept of absorption of moisture is being used in this machine this type of machine was first implemented by zera food recycling machine. But the construction is lot more complicated and cost is more as well.
- 4) This paper is all about conversion of waste food products into useful and quality fertilizer for soil. This machine boosts the process of fertilizer formation and the output is obtained quickly.
- 5) According to Wikipedia the formation of fertilizer from waste food generally takes 2-6 months if we put the products as whole products in the soil. The decomposing process starts but slowly as the soil is not fully in contact with the inner parts of the waste products. The breaking down of the waste products helps the soil access more surface contact with the waste products. This boosts the process of fertilizer formation.

V. ARCHITECTURAL DIAGRAM

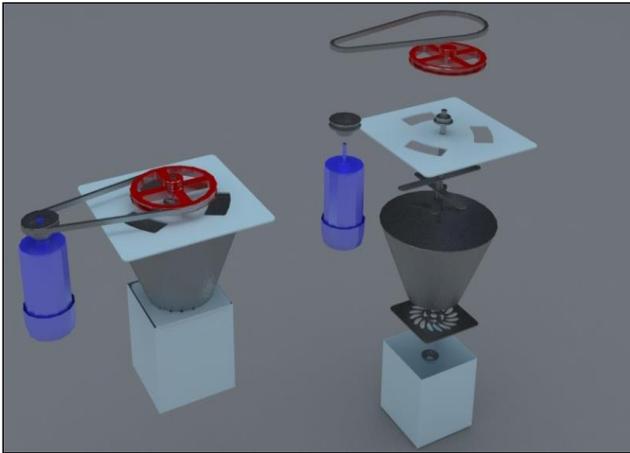


Fig. 1: Assembly and details

VI. MATERIALS TO BE USED

- Mild steel Rod
- Mild steel cone
- Bearings
- Belt
- Pulleys
- Rotor with blades
- Motor
- Nut & Bolts
- Screws
- Washers etc.

VII. OVERALL DESCRIPTION

A. Product Perspective

Convert the waste food products wet and dry into useful and quality chemical free fertilizers which reduces the garbage and pollution as well as the bi product is ecofriendly as there is no chemical used in it.

B. Product Function

When the waste food products are added into the cone or rotar casing through the hopper and the power supply is turned on then the motor starts rotating with which the driven pulley starts rotating as well, which In turn rotates the rotor with baldes on it. This rotor breaks down the waste food particles into fine particles and force them down inside the container. The container contains soil I which the particles are mixed. Then the soil absorbs the moisture contents quickly and then the formation of fertilizer takes place. This process generally requires 2-6 months but with this machine this process is made possible in just 2 days. In this machine the motor is mounted with the help of supports and neilock nuts. On the motor a pulley of 3 inches is used which is the drive pulley and the driven pulley is mounted on the rotor which is of 12 inches. The top flange covers the rotor and cone casing assembly which aslo contains a hopper for input of waste food products. Below the cone there is bottom flange fixed which contains grid which is cut according to direction of rotation of the rotor. The grid only allows the fine particles to fall inside the storage container located just below the bottom flange. The rotor has total 8 blades and the last two blades are

mounted such that they break down the particles stuck in the grid. The top flange is provided with two small windows covered with acrylic sheet which allows us to see the whole operation being performed inside the cone.

VIII. TECHNIQUES USED

A. Shaft

Shaft is a common and important machine element. It is a rotating member, in general, has a circular cross-section and is used to transmit power. The shaft may be hollow or solid. The shaft is supported on bearings and it rotates a set of gears or pulleys for the purpose of power transmission. The ferrous, non-ferrous materials and nonmetals are used as shaft material depending on the application.



Fig. 2: Shaft

B. Chopper blade and Support

1) Blade:

Chopper blade is perform main function of machine and this chopper blade is made up of high chromium steel. Which are non-corrosive in nature and also high in strength. Which helps to cut the garbage in proper grain size. There are 8 blades are used in machine.

2) Chopper blade support:

Chopper blade is placed on the blade support which is made up of cast iton. Chopper blade support is welded with rotating shaft .blade support having high strength. Blades are mounted on blade support by using nut and bolt.

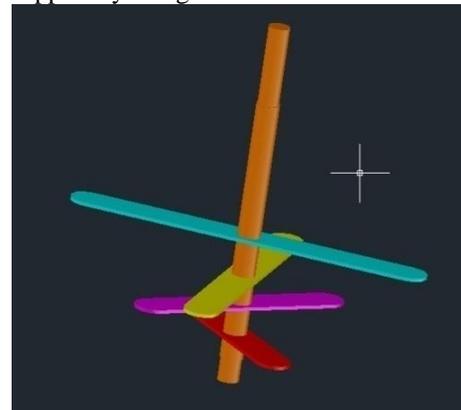


Fig. 3: Blade Support

3) Bearings:

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. The design of the bearing may, for example, provide for free linear movement of the moving part

or for free rotation around a fixed axis; or, it may prevent a motion by controlling the vectors of normal forces that bear on the moving parts. Most bearings facilitate the desired motion by minimizing friction. Bearings are classified broadly according to the type of operation, the motions allowed, or to the directions of the loads (forces) applied to the parts. Specification of Ball Bearing:



Fig. 4: Bearing

4) V-belt Pulleys:

In mechanical or automotive engineering, a pulley is a device which is used to transmit motion from one source to another when direct contact of both the sources are not possible. This particular type of pulley is used to transmit power between axles by the use of a v- belt, it is basically a mechanical linkage with a trapezoidal cross section. Together these devices offer a high speed power transmission solution that is resistant to slipping and misalignment.

5) Belt drive:

A belt drive is a device which helps to increase the torque, here two pulleys having 4:1 ratio [4 rotation of input converted to 1 rotations of output] is used as to increase the torque transmitted by the smaller pulley and the increased torque is further transmitted to the larger pulley. The bigger pulley transmit power to the rotor with blades mounted on it which is further used for shredding the waste food products.



Fig. 5: Pulley with belt drive

C. Actual machine



Fig. 6: Actual Image

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