

Waste Food to Fertilizer Converter

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Abstract: Organic waste and especially Food waste is a world wide Problem, it cost to be disposed and nothing gain from it, on the country, it causes the emission of harmful gases such as methane. In India many garbage is a food waste. One of the major problem that faces nowadays that there are no serious moves towards solving the food waste issue. One of their target is to focus on the pollution and causes of it. Composting has proven to be a valid solution of this problem but not entirely explored. The objectives of this project are to design a composting machine with certain parameters for the design, process time, easy to use. The designed food Waste decomposition system is designed for rapid composting performance. It can used households, restaurants, hotels, schools, apartment buildings, communities, office and cafeterias depending on the capacity of the machine. The system employs high temperature, microorganisms to decompose food waste and organic matter.

I. INTRODUCTION

The Basic occupation of about 90% of population in India is agriculture. A variety of crops are cultivated in India. But after harvesting them the crop residues are either burnt out or thrown as waste without taking into consideration their nutritive value. With the increase in society our obsession is to stabilize agricultural production. Extreme use over years of agro-chemicals like pesticides and fertilizers may affect the soil health and lead to decrease of crop yields and quality of products. Hence, a natural balance needs to be maintained at all cost for existence of life and property. The obvious choice would be judicious use of agro-chemicals and more and more use of naturally occurring material in farming systems. Natural farming is a system, which ignore the use of unnatural inputs (such as fertilizers, pesticides, hormones, feed additives etc.) and to the maximum extent feasible lean upon crop rotations, crop residues, animal manures, off-farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection. It helps in maintaining environment health by decrease the level of pollution. It decrease human and animal health hazards by decreasing the level of residues in the product. It helps in keeping agricultural production at a higher level and makes it feasible. It decreases the cost of agricultural production and also improves the soil health. It ensures favourable condition of natural resources for short-term benefit and helps in preserve them for next generation. It not only saves energy for both animal and machine, but also decreases risk of crop failure. It improves the soil physical properties such as crystallisation, and good tilt, good aeration, easy root osmosis and improves water-holding capacity. It improves the soil's chemical properties such as supply and regain of soil nutrients, and promotes agreeable chemical reactions.

II. LITERATURE REVIEW

Project Background

Composting is known as natural process, it occurs by using microorganism under specific condition, which leads to the decomposition of organic waste. As we know, food waste is one of the biggest problem that faces the world nowadays, it could be at home, school, restaurant and any food service sector. One of the recent statistics said that 1.4 billion tons of food is wasted at every year [3].

We all know that the waste of food unavoidable, so the best way to makes this food waste useful is by composting the organic waste and returning the nutrient back into the soil to make the cycle of life to continuo to which help protecting environment [4].

Previous Work

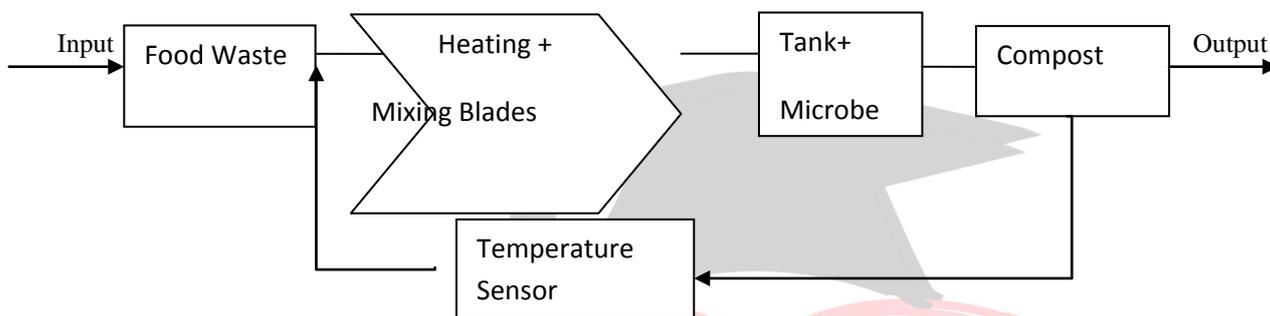
- Aparna Menon et al.[1] worked on 'Why clog the landfills when you now convert organic waste into compost in just 24 hours' their work was based on Bioneer is a revolutionary machine that can create compost from organic waste in just 24 hours.
- Oladapo T. Okareh, Samuel A. Oyewole, L. B. Taiwo et al. [2] Presented Conversion of food wastage to organic fertilizer: A strategy for Promoting food security and institutional Waste Management in Nigeria, their worked on Composting converts organic waste stream generated into very rich organic fertilizer that is useful for crops growth.

PROJECT OBJECTIVES

1. Increase public awareness on food waste and handle it.
2. Study the effect of bacteria on composting process.
3. Study the different factor within the the composting process.
4. Learn how to make the machine as energy efficient as possible.
5. Learn about control system and sensor.

III. METHODOLOGY

Figure shows the block diagram of our designed composting machine, It shows how the machine works.



IV. WORKING

The designed machine is a partly-automatic and designed to be small in size and economical in operation composting machine, which uses special microorganisms to reduce to pieces or fragments and decompose all kinds of organic waste into compost within 48 hours with a volume reduction of 60-80%. The overall process is a natural and biological. The microorganisms we use to grow or developed vigorously in high temperature and are effective even in high acidic or salty conditions. The machine has a circular shaped composting tank, with a temperature sensor, electric motor, heating coils, mixing blades and an exhaust system.

When organic waste is added to it, then the electric motor ON and the blades are rotates, the blades mix the organic waste. Also the heating coils are ON. But after some time the electric motor will be stop. The heating coils heats the organic waste. Because of that, the H₂O content in the organic food waste is evaporated and it goes out to outside the atmosphere as water vapour goes through the exhaust system. As many organic food waste contains 60-80% water content, we achieve 60-80% volume reduction at this stage itself.

At that time, our selected special microorganisms then decompose the food waste into compost and this happens within 48 hours. The process is noiseless as there is no crushing or grinding involved. The blades are just for evenly mixing the food waste.



Fig1. Photograph of actual setup

ADVANTAGES

- One person can handle whole process.
- Pay –back period should be short.
- Cost of model should be very less s compare to other process.
- Minimum 48 hrs. should require to compost waste food.
- Machine is semi-automatic

APPLICATIONS

1. This machine provides food waste solution for a variety of commercial uses, from restaurants to large-scale institutions.
2. Reduce garbage volume and disposal costs.
3. Houses, Hotels, Restaurants, Municipalities, Canteen/Cafeterias, shopping centres, food processing sides.

FUTURE SCOPE

- We are use the electricity from solar panel.
- Machine we made fully automatic.
- Using wheels in the bottom of the machine to make machine easier to move.
- Trying to use boiler instead of electric heater and adding nano fluid to it to increase the efficiency of the heating process.
- Adding a safety future as a switch door sensor that stops the blade when the machine door is open to prevent any accident.
- Attaching a grinder into the machine to able to handle large bones and such to be composted.
- Installing more powerful heater to raise the temperature faster

CONCLUSION

At the start of the project we set our objectives and goals into finding a solution for food waste disposal problem, those objective were that the solution should be eco-friendly and it should help the decreasing the garbage volume and disposal cost, it also should be sustainable and social responsible. Those objectives were all met choosing composting to deal with the food waste disposal problem. When trying to design the composting machine, objectives we are that reduce the processing time as much as possible which was not more than 48 hrs in most of our experiments.

REFERENCE

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