

# Design and Fabrication of Compost Machine: Proposal Model

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**Abstract** This research paper aims to develop compost machine. Organic waste is a global problem, it cost too much for the disposal and we obtain nothing from it, it causes emissions of harmful gases such as methane. In India about 40% of the garbage is a food waste. Composting of waste has proven to be a solution to this problem but not fully explored. The objective of this project are is to design a composting machine with certain parameters for the design, process time, easy to use, odorless and less power consuming. The food waste decomposition system is designed for fast composting performance. It has application in places like households, motels, hotels, schools, buildings, community halls, offices, depends on the capacity of the machine.

**Keywords** — Manure, Solid Waste, Organic Waste, Shredding.

## I. INTRODUCTION

The design machine is a fully automatic and compact composting machine, uses microbe sawdust to break down and decompose all kinds of organic waste into compost within a day with a volume reduction of 85-90%. The entire process is natural and biological. Microorganism. we use thrives in high temperature and are effect even in acidic condition or salty condition. The machine has a U shape composting tank, with humidity and temperature sensor, heater, Mixing blades, and an exhaust.

The Composting is useful in soil fertilization is incremented, benefiting the environment, decreasing the global warming, enhancing the development in the waste management of cities etc. The composting technique reduces the decrement the volume of organic waste and kills the bacteria. Also organic composting decomposes the ammonia waste to useful nitrogen rich product. It is use as fertilizers when used in soil increases its fertility. For natural organic composting with the help of microorganisms, near about 30 to 40 days are required. The proper care is required for natural organic composting but the desirable conditions obtain for microorganisms to decompose the waste then time required will be less for producing organic compost.

The organic compost machine is used to decompose the organic waste like food and garden waste to nitrogen rich organic fertilizer. The temperature and moisture required for degradation of waste with the help of microbes is about 75°C and 70% respectively. In this machine the organic waste volume is lowered with the help of break down which pulverizes it. The proper management of moisture content

and temperature decreases the time required for composting. Due to which the landfills and segregation is restricted.

Help of braking down and pulverizes it. The proper arrangement of temperature and moisture content reduce the time period required for composting. Due to which the segregation and unexpected landfilling is restricted.

## II. LITERATURE REVIEW

1. Mr. J. C. Hargraves has worked on recycling of Solid Waste by using composting is more efficient. The compost can be used for agriculture purpose but it has to be nutrient rich and less metal content. For good compost the waste has to be separated at early as possible. The metal content can be more if sewage sludge is added into the compost.
2. Mr. K. R. Atalia has done research on management of solid waste can be increased by developing techniques to improve technology to convert waste into useful resource. The biodegradable waste can be converted to be good for environment. The organic compost increases soil fertility, decreases environmental hazards and reduces cost. The excess use of chemical fertilizers is hazardous to environment and soil and it causes water and air pollution. The composting is advantageous as it reduces unnecessary landfilling, reduces water pollution due to contamination, minimizes the cost required for transportation etc. The composting is sustainable and wealth can be generating by this method.
3. Mr. Tom. L. Richard has worked on efficient way to produce compost is by separating the waste, reducing

the area required and proper mixing. The step by step process must be done to make good system of composting. Following factors has to be taken under consideration such as cost of operational, maintenance and capital required, demand of the compost, flexibility etc.

4. Mr. Sutripta Sarkar has done survey and research in many cities for the proper management of waste. Proper management of waste is major problem. The organic fertilizing process is better way to handle the waste. The heating is generated by action of micro-organisms, which produces good fertilizer, biogas etc. The degradation process can be incremented by the thermophilic phase. The moisture has to be about 55% and the temperature is about 75°C-77°C.
5. Mr. Mohd Sahaid Kalil has worked on landfilling and its effect on environment. The landfilling is major problem for environment but it uses for manage of waste. It is problem because of the green-house gases emitted in atmosphere. The organic waste should be composted to increase the quality and fertility of the soil.
6. Mr. Ajinkya Hande has worked on organic waste by using the break down the organic waste can be chopped to small particles so that proper aeration is done. Due to which the fertilizer is formed in less time and the farmer will get good quality fertilizer for crops at low cost.
7. Mr. El-Sayed. G. Khater has worked on The properties of manure made from the organic waste is studied. The properties such as porosity, water carrying capacity, pH, Carbon and Nitrogen ratio, etc. are taken under consideration. The fertilizer obtain has quality is depending upon the proportion of physical existence.

### III. PROPOSED METHODOLOGY

The methodology for project are as followings.

- 1) Market Study and Literature review:
- 2) The different materials available in the market are taken and studied in this period for the fabrication and manufacturing of the machine. The most optimal materials are chosen. This also involves studying the research done and current system for such applications
- 3) Fabrication of the various machine parts.
- 4) Purchase of other parts available in market.
- 5) Assembly all the parts and testing: This is the final step of the project and involves the final assembly and testing of the project.

### IV. CONCEPTUAL DIAGRAM:

The approach we are going to use to complete this project are as follows:

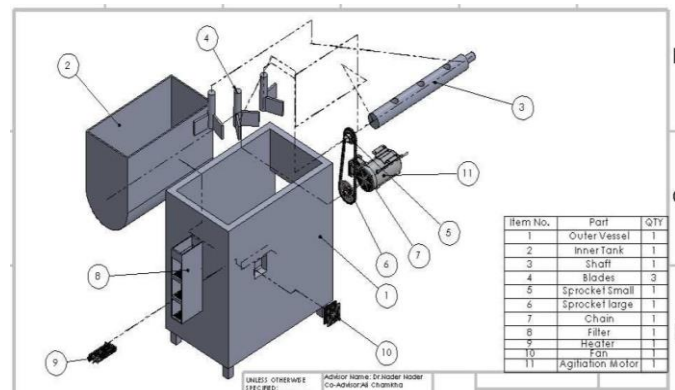


Figure: Conceptual design of compost machine.

1. Composting Development: Composting processes and systems, researching composting development.
2. Machine design and requirement: Finding an optimum machine design, Parts and work shop.
3. Machine construction: Building the machine, configuring the control system.
4. Testing and analysis: operating the machine, checking the performance and result.

### V. OBJECTIVE OF THE PROJECT

1. Increase awareness on waste management and how to take proper manage it.
2. Study the different factors with in the composting process.
3. Study the effects of bacteria on the composting process.
4. Study how to make the machine more efficient as possible.

### VI. STANDARD COMPONENTS

An earlier mentioned shows the main component of the machine we used. We choose the specifications based on our calculations and the availability of the component in the market.

1. Agitation Motor: Mixes the microbes sawdust and the food with 36 W rated power.
2. Exhaust Fan (Type: Blower Fan): Expel gases (primarily CO<sub>2</sub> and water vapor) from the unit with 9.5 W rated power.
3. Heater: Controls temperature inside the composting tank with 200 W rated power.
4. Temperature Sensor: Control temperature of the heater.
5. Humidity Sensor: Senses humidity in the composting tank.
6. Main PCB (Printed Circuit Board): Control overall operational of the unit.
7. Nano Filtration System: Filter all the gases produced from the composting processes.

## VII. CONCLUSION

By designing and fabricating this machine we are going to solve the problem of organic waste, Organic fertilizer will be obtained from this process.

This can be useful for agriculture, gardening.

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