

“DESIGN & DEVELOPMENT OF SOLAR POWERED COMPOST BIN LOW COST AUTOMATION & PACKAGING”

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ABSTRACT

“Waste food has been a major concerning topic nowadays. Food that is wasted and put into garbage can be easily converted and used as compost for plants through this project. Also the decomposition of waste food which consumes large period of time is reduced and the energy used for conversion is harvested from solar system. So basically, this whole project is taking solar energy and using it to convert the organic waste in compost for better fertility of plants in less amount of time. When the waste food is inserted into the feeder, the food is been crushed into smaller pieces by the crusher. When the waste level exceeds the pre-decided level, the level detector will sense it and pass the signal to micro-controller. According to the information given by the humidity and temperature sensor the micro-controller will decide the period of time for which the heater should be ON. The heater will heat the material and make it dry. This dry material is compost ready to be used as fertilizer in plants. The gases which are produced during heating process are passed through a condenser where vapour's are condensed and converted into distilled water which can be used in batteries. The whole energy required for crushing, heating and controlling is done by the solar energy harvested from the solar panel.”

Keywords: Automation, Sensor, Solar, Microcontroller

1. INTRODUCTION

‘Swachh Bharat Abhiyaan’ is a national campaign initiated by the Government of India, which covers 4,041 cities and towns, to clean the streets, roads and infrastructure of the country. The main motto is to create a sustainable development and create awareness about the impacts of improper waste disposal. In a country, 300 to 400 grams of solid waste per person per day is generated in a town of normal size. In cities like Delhi and Mumbai, the figure is almost 500 to 800 grams per person per day. Waste management and its disposal is day by day becoming a massive and expensive problem to the authorities especially in cities where concrete jungle is increasing rapidly. In a country, organic waste constitutes almost 35% of the total waste, disposing of at least the household organic waste at source, can create a positive impact in the domain of waste disposal. If this disposal is reused efficiently, can prove to be a useful material. This project focuses mainly on improving the drawbacks of the existing scenario. Currently, problems are encountered when potential customers are shut out of the composting technologies owing to expensive, space consuming and complicated methods of composting solutions offered by large vessel capacity organic

composters as opposed to what is normally required by a domestic household.

In our daily life, there are various ways from which number of waste generates. Every year million tons of waste generates because of various types of reasons. The waste generally includes solid waste, kitchen waste and agriculture waste. So, out of these all wastes solid waste management is one of the biggest problem compare to others. And we know because of increase in volume of waste, the pollution is also increasing day by day which very badly effects on human's health. So, it is necessary to control and reduce the amount of waste. The best way we can start with is nothing but the composting process to reduce the volume of waste. The solid waste management can be done with composting in a better and proper manner. In this solid waste, an organic waste and an inorganic waste are present. The waste which can be recycled and can be made compost of it like food waste is called as an organic waste. And the waste which can be collected for garbage after segregating it, is an organic waste.

The main objective of the project is to do a comparative study of compost bins working on electricity which are mostly used at industrial levels. The original idea is to use solar energy instead of electricity and make it user friendly and cheap to enhance the interaction with composting for each person at a household levels.

In our country, amount of organic waste is greater out of the total waste. So, disposing of biodegradable that is organic waste at houses can create better impact in the domain of waste disposal.

2. LITERATURE SURVEY

Home Composter: It is a domestic use composter. Here they have used the technique of vessel composting. The design of the end product is user friendly and kitchen bin can be replaced in a productive way. Bin provides favorable conditions for compost to be formed in a rapid way. They have used the Bioculum product

[1] Converting food waste to usable energy in the urban environment through anaerobic digestion: In this paper they have used a process of anaerobic digestion in which microorganisms break down biodegradable material in the absence of oxygen. For food waste, studies show that at 35C mesophilic digestion is most stable and 55C thermophilic digestion allows faster methane extraction. This paper

helped in studying the procedure of waste food decomposition in a proper conditional way

[2] Experimental Investigation of Biogas Production from Food Waste and Analysis for the Waste Energy Recovery and Utilization from Institutions of state of Tamil Nadu in India: This paper states the experimental behaviour of the biogas which is released from kitchen waste. This gas has a great potential to be an alternative fuel. There main objective was to utilize the kitchen waste in a bio

COMPONENT	SPECIFICATION
Microcontroller	PIC18F4520
Solar panel	12v DC
Power supply board	5Vdc
Ultrasonic sensor	HC Sr 05
Temp sensor	LM35 ADC Output
Humidity Sensor	ADC Output
Transistor	BC547
Buzzer	5VDC
Resistors	1k,10k,Random
Capacitor	0.1uf,0.01uf
Regulator IC	LM 7805
Diode	1N4007-
LCD Display	16*2
Heater	230V AC
Motor	12v , 300RPM
CAPACITOR	1000uf/25v
LED	UPTO 3V 1ma
PCB	120*80MM
mechanism cost	

digester to produce biogas which will be the alternative fuel for their kitchen energy need. Through observations and experimental tests, they realized that bio gas can be used again in a productive way

[3] Ammonia Emission Control for the Management of Food Waste through Composting Model: This article developed a nitrogen model of composting combined Contis Function. The model was validated by experiments. They have used MATLAB for programming purpose .More study needs to be done on the nitrogen conversion in composting

[4] Automation of smart waste management using IoT to support “Swatch Bharat Abhiyan”: The main motto of this application is collection of dry and wet waste separately which placed in a conveyor belt on which the dry waste collected dustbins are placed left side and wet waste collected bins on right side

Microcontroller based household anaerobic food digester in IEBF conference: Vishwatma Oree et.al presented a paper on a microcontroller based household anaerobic food digester in IEBF conference. In this paper a two stage anaerobic digester is developed to manage food waste at household level. The output of digester is biogas and compost

3. BLOCK DIAGRAM

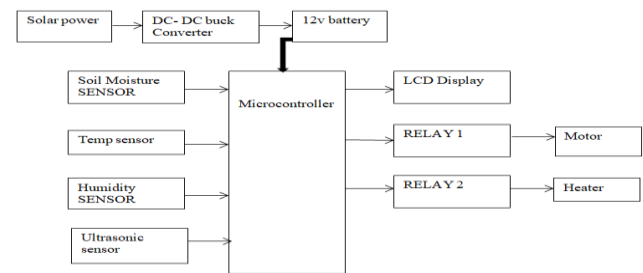


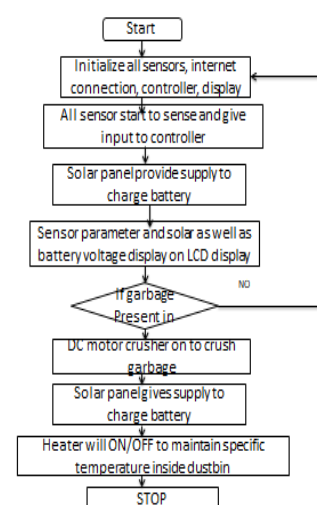
FIG. BLOCK DIAGRAM

Using solar panel we can extract the energy from sun and it gets stored in the battery. From above fig. we can see that current limiter is set in order to protect battery from back current from heater and crusher. Micro controller is the heart of the system and thus each and every process is controlled and managed by microcontroller. Humidity and temperature sensors are used to sense temperature and humidity of the material inside the chamber. Using LCD display we can watch around which process is going on. Waste collected is then crushed using a crusher and is then transferred to heating chamber where all the crushed waste is heated and the moisture from the waste is exhausted in the air.

The waste is entered through the feeder in crusher and ultrasonic sensor checks whether the waste is set for further process, if Yes then the crusher motor ON if No then crusher motor is in OFF state. Again ultrasonic sensor checks for the level required for waste collected. If Yes, then heater gets ON and if No then heater remains in OFF state. Now temperature and humidity sensor checks for the temperature and humidity of collected waste it reaches .

4.COMPONENT

5.FLOWCHART



6. APPLICATIONS

- Applicable at: Residential waste, Agriculture waste, Fruit and vegetable market

7. BENEFITS

- Improves soil health
- Automatic operation
- Recycles kitchen and yard waste
- Good for the environment

8. RESULT



Fig.EXPECTED OUTPUT

9. CONCLUSION

The proposed system for the degradable waste management as well as degradable waste disposal by using composting have shown feasibility in terms of humification and its use also. As it is easy to use and cost effective, compost bins plays an important role in solid waste management. So, it can be conclude that composting process is always best way as compared to other conventional waste disposal methods in economy point of view, an environment point of view as well as pollution point of view also. It has successfully implemented. With the help of this proposed system, the volume of waste is largely reduced.

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