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Design And Fabrication Of Organic Waste Composter: A Concept

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Abstract : *Daily Metropolitan cities cause more and more waste and this is overloading our municipal systems, systematic management of waste is big problem. The ongoing techniques of composting are tedious, dangerous for the environment due to release of gases like Methane and Carbon Dioxide, promotes death-trap for residents, 100% of wet waste is not contemplated. Insufficient aeration of wet waste leads to formation of harmful acetic acid, Transportation of wet waste require heavy duty automobile which consume considerable amount of fossil fuels. It is understandable that as we accelerate into the future, new procedure for befitting wet waste disposal is desired. This procedure should be environment friendly at root levels and should be planned considering the future needs. The aim is to overcome the previous existing composting difficulties and to design a composting machine with certain parameters such as process time, easy to use, compact, odourless, use of automation, rapid composting and power economy So, we are preparing a model which will eliminate all the current issues. This waste food recycling machine includes an elongate, vertical housing divided into three stages. In the first stage, waste food is heated and moisture gets removed. After heating, the waste food proceeds into the second stage where the waste food is cut into smaller portions and dried. In the tertiary stage, the dried waste food is cooled and assorted.*

Keywords - *Agriculture, Fertilizers, Green Technology, Rapid Composting, Recycling, Solid Waste.*

I. INTRODUCTION

Food waste is befitting a crucial worldwide issue due to the endless growth in the world population. one-third of the food induced in the globe for human utilization every year approximately 1.3 billion tons gets lost or dissipated. there is a critical need to take relevant measures to reduce food waste burden by embrace fresh combating practices. The social security for the environment and agriculture are represented in protecting the attribute of groundwater and reinstating the formation of soil after the natural area. disposing food waste into the landfill can give rise to the pesticide-free matter to react with other materials and generate toxic mixtures. Hence, reprocessed food waste to compost is favoured more. Besides, composting food waste will diminish the volume of the discarded waste and the disposal price. Furthermore, it has a substantial environmental welfare, which is the truancy of synthetic chemical fertilizers in compost. hence, with all the social security that the compost we get when recycling food waste clasp makes it healthier for human usage than the synthetic compost depleted in the market. the Designed machine is fully automatic and highly compact composting machine, as any organic waste Contains 70-80% of water contain, we achieve 70-80% volume reduction at this stage and this happen within twenty-four-hour period.

II. PROBLEM STATEMENT

A Common Compost Pit Takes too Much Time to Convert Organic Waste into Fertilizers as It Is Based on Natural Degradation of Waste. Common Problems Include Smelly Compost Bins, Slimy Ingredients That Have Become Excessively Wet, Or Compost That Has Simply Stopped Rotting Down Before It's Ready. As The Common Compost Pit Is Generally Open It Also Creates Bad Odour Around It. It Also Causes Health Hazard

Due to Pest Gathering Around It. Grass Clippings Are Often Generated in Large Batches Not Suitable for All Kind of Organic Waste. May Attract Rats, Snakes, Bugs.

III. LITERATURE REVIEW

Parveen Parihar and Susheela Sharma (2021) Composting is one of the simplest and most effective methods which produce a natural fertilizer for the growth of a plant. This method has also become essential for the proper management of wastes. Composting should be done by considering all the parameters which affect the process and the quality of compost. Temperature is one of the Important parameters because of which the whole process is divided in three stages. Further studies of distinctive composting method, type of waste used for composting and the parameters effecting the rate Can improve the quality of compost and can generalize its use with the replacement of chemical Fertilizer.

Raounak Edderkaou, Driss Khomsi, Ahmed Hamidi, Hicham Bennani Baiti, Hanane Souidi & Mohammed Aqil (2020) The motive of this study is to substantiate the technical feasibility of composting in the case of Marrakech etymology. The distinctive results showed that Marrakech waste is influence by organic constituents which authenticate the decision of composting as the most satisfactory waste restoration choice. The classification of waste per person has allowed knowing the waste generated by category in connection to every person, which will help in the virtuous plotting of waste management. In order to substantiate the practical practicability of composting, physicochemical analyses have been carried out on the compostable waste. The results showed that composting is achievable, as well as the content of metal elements within 8 the fine fraction does not exceed the recommended limits, except the copper content, which indicates that the collection and transport conditions have not influenced the quality of fermentable devastation.

Shubham Gnagwar, Suyash Singh, Shashwat Mahajan, Shashank Kumar Verma (2019) The compost machine is habituated to make composting and the amount of the compost is depends upon consideration such as temperature, time, aeration, moisture content, brown and green detritus. This machine plunging the cost appropriate for humiliation, isolation, etc. of the waste. The total volume of organic waste is minimized.

Sachin Jayaprakash, Lohit HS and Abhilash BS (2018) Compost Bins play a major role in solid waste management in India in the forthcoming by put an end to the organic waste get rid of at the source and instead only discard inorganic devastation. As the compost bin is easy to use and is cost effective, many people can buy and use it. It is easy to use and is simple.

Swapnesh H.Bhaisare,Dr.Pramod Walke,Dr.D.S.S.Ganguly,V.M.Wankar(2017) The organic compost machine helps to improve composting and decreases the cost required for degradation, segregation, and transportation etc. of the waste. The practicability is increased and the aggregate volume of organic waste is minimized. Also, the attribute of the compost is depending upon aspect such as moisture content, pH, temperature, time etc.

Santosh S More (2017) Development of Rapid composting techniques is prime need for today's Agricultural and Industrial organic solid waste management. Organic fertilizers production is necessary to diminish soil pollution due to fertilizers.

Trivedi S, Chahar O And Mehta K (2015) The present studies will serve as a classical example of solid waste management using environment friendly techniques. It is recommended that waste management strategies must include selective segregation process after collection of organic wastes wherein removal of plastics, metals and stones must be done.

E. Işıl Arslan, Ayhan Ünlü, Murat Topal (2011) The present study showed that the aeration rates used are efficient on composting of VFW and taking the C/N ratio into account which is the criterion of the indicator of the stabilization in composting, it could be said that the optimum aeration rate for forced aerobic composting of VFW was 0.62 L/min kg VS

IV. METHODOLOGY

We need to select suitable parts for the Organic Waste Composter hence below is the proposed methodology to be followed for the Design and Fabrication of Organic Waste Composter. When we first started working on this Project, we were eager to make an implantations plan, this plan helps us to meet the deadlines and rise our efficiency in gaining proper knowledge about the composting process and the development in it, it also helps with Time Management and to divide the work between group members and actually to work better as a group.

3.1 Methodology steps:

Study about Composting and its processes: At first, we studied about the process of composting and it types. We focused on the disadvantages or loop holes in the currently used composting process. We studied the chemicals required in this process, time required for the process, materials required for the process etc. and we tried thinking about creating a machine model with which we can make this process more efficient by reducing or eliminating the current drawbacks of the process.

Rough designing of Machine model: After gaining knowledge about the whole process and its problems, we started roughly thinking about the ideas of designing of the facsimile. We tried to keep the machine model as small as possible and also cost efficient and also not complicated in design. We gathered designing ideas from all members of the group and then finalized a design which we thought would fulfil all the above considered parameters.

Market Survey: After creating a design we got an idea about the required parts and their prices. We tried selecting parts which would give more contribution towards the process and those having high durability with less cost. We also had a quick survey of current machinery used for composting and we thought about how efficiently we can make a machine with a smaller number of parts so as to reduce the machine expenditure.

Presentation and Synopsis Report: After finalizing the required information we started with our Synopsis report with the help of published papers as mentioned. After creating the report with the corrections told by our guide, we finalized it and submitted the report before the deadline.

Construction of Machine Model: After submitting the report we have decided to start with the construction of the model under the guidance of our project guide and by referring the CAD facsimile. We will plan the construction properly such the equal work is distributed within the members of the group. We will make the whole model before the given time so that further changes can be made if required.

Final testing of Machine: Once we are done with the construction of the machine, we will test the working of the machine to check whether it works properly.

V. CONCLUSION

This research work has designed and developed “A Small capacity composting machine for household domestic food waste.” aim is to manifest the significance of recycling food waste and serving the environment by constructing a machine that converts food waste into compost. This food waste recycler machine is to be erect and worn at home reliably. The design methodology and the engineering solutions that will be used in this project were explained in the engineering design process.
Our main aim is achieving rapid composting of food waste within 24 hours’ time span. Furthermore, compactness, transferable, inventive design, economical is taken into consideration.

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