Design and Development of Fertilizer Manufacturing Machine

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Abstract— The problems of waste generation and management has become a serious issue concern to many scholars in environmental study. Pro-environmental activities, such as waste products (vegetables, bakery product, paper, except plastic etc.) are consider as inconveniencing, higher the inconveniencing the more difficult to participate public in that. This study defines waste sorting and management. This situation could be attributed to low level and low budget technology. We are trying to make machines which create fertilizer from garbage within 36 hours. In market already machines are available which made fertilizer, but the cost of machine is very high, Also this technique used in foreign countries, so we are tried to make it in India, with low budget. The application of this machine in private sector, commercial area, societies, etc.

Key words: Pro-Environmental, Waste Generation, Organic Fertilizer, Organic Wastes

I. INTRODUCTION

The traditional methods of using chemical fertilizers are not sufficient and not satisfactory for increasing productivity of crop and to maintain the fertility of soil. Whereas the chemical fertilizers are available in market but, it very costly, so it becomes difficult to purchase it. Organic fertilizer manufacturing machine solves these problems. The raw material is introduced in tumbler and further it is mixed with the help of blade. When this mixture is completely decomposed further through filtration fertilizer is separated. In this way, this machine prepares fertilizer within 36 hours. A fertilizer manufacturing machine serves for various problems like moving from one place to another place, requires less space and it is less bulky as compared to the existing bulky machines. It also helps the people to start small business thereby making them self-dependent. Chemical and hygienic waste disposal is a serious concern in developing countries, especially in urban areas, where the population density is high and the availability of land for waste processing and disposal is limited. Our project is to design and manufacturing a machine which will be used for producing organic fertilizer. Parts used for manufacturing such as machine are tumbler, shaft, blades, motor, heater, bearing etc. This is mostly applicable for societies, hotels etc.

II. PROBLEM IDENTIFICATION

Solid waste is one of the major environmental harms of Indian cities. Pro- environmental activities, such as unused waste products (vegetables, bakery product, paper, fruit, except plastic etc.) are consider as inconveniencing. Now a day's most of that are using chemical and hygienic waste disposal for their making fertilizer and crops. Due to this the productivity of crops as well as the fertility of soil is decreasing day by day. Also, the prices of these chemical Fertilizers are more to purchase. Thus, it brings to our knowledge that the traditional methods are not sufficient and satisfactory for agriculture and for making fertilizers. Due to these, some major problems are identified & to over-come these problems some idea or concepts are developed and adopted.

Following are the problems -

- There is no more scope for make fertilizer by traditional methods.
- The machines available for preparing organic fertilizer are costly which cannot afford to buy.
- Available machines are very bulky.
- Due to bulky shape of machine it is not applicable in cities for utilization of garbage waste.
- More space required and difficult to use

III. PROBLEM FORMULATION

The aim is to design and develop a low cost organic fertilizer preparing machine which will help urban areas to fertilize their solid waste by their self-prepared organic fertilizer i.e. compost instead of buying costly and harmful chemical fertilizers which decrease the nutritive value of soil. We are going to design and fabricate such a machine that will eliminate most of the problems such as high cost of machine, more floor space requirement, Also human effort of manually cutting the stems is taken into consideration while designing and developing the machine. Machine will be designed and developed to reduce the human effort by introducing proper mechanism.

IV. OBJECTIVE

The Main Objectives Behind this project is –

1) To prepare organic fertilizer to people at lowest rates.
2) To make the machine portable so as to be easily movable at any place.
3) To reduce the power consumption.
4) To make the machine in such a way that it can be used with solar panel also.
5) To reduce the floor space required.
6) To make available the machine at low cost so as to make it affordable.
7) To make sustainable use of agricultural and urban Waste.
8) To increase the efficiency.
9) So the machine will be designed & developed to reduce the human effort by introducing proper mechanism, to make use with electricity or manually thereby helping to earn more profit.
10) And also we tried to make fertilizer within 24 hours.
11) Encourage people to avoid waste, and to reuse and recycle more.

V. RESEARCH METHODOLOGY

The main research of any scientific investigation is to draw useful conclusion in light of objective of study. In order to get the meaningful conclusion, it is essential for investigator to adopt appropriate method and procedure, keeping this in view, to explain the methodology adopted, and to fulfill the objective of Study. This chapter gives the detail report of the project. As seen earlier, some projects are automatically operated based. Existing project will be modified by making it as paddle operated (manual).Another problem is that for paddling more efforts are required for humans who become difficult for them. This problem will be removed by using the proper gearing mechanism wherever required to reduce human effort. Issues like heavy weight, power consumption, floor space, cost, etc. in the existing machines will be satisfied to a great extent by reducing the weight of machine, reduced power consumption, less floor space, curtailment in cost, etc. As paddling (manual) Operation is opted, human especially who lives in rural areas where there is problem of electricity can use this machine. The approach will be synthesis, design, development &testing of the machine. By keeping these points in our Mind, we think of making such a machine, which is reliable to every human and is easy in its maintenance. The new and small scale business man can start their business as well as be self-dependent for their everlasting need of fertilizers instead of totally depending on the chemical fertilizers which not sufficient the fertility of soil and also the productivity. Research methodology deals with Design & fabrication of all components which are to be used in the machine with required modification. Firstly synthesis of all the problems which are related with project is to be done. After that, the design of complete machine & then regarding development.

VI. WORKING PRINCIPLE

The schematic diagram of machine shown in fig 1and 2 firstly the input i.e. the organic waste, crop, etc. are fed into the circular cutting tumbler. In the circular tumbler mixture of cow dung, east, saw dust, culture. Mixing or cutting blades provides for the shear force to cut organic waste. When the organic waste comes in contact with these the shearing action takes place. The shaft is rotated through electric motor by mean of pulley and is supported by means bearing (pedestal) which are mounted on the, machine frames. In tumbler the whole mixture is kept for 36 hours for decomposition. The lower of tumbler consists of rectangle opening for which the organic fertilizer are comes out of the machine. In this way "Design and Development of Fertilizer Manufacturing Machine Works"

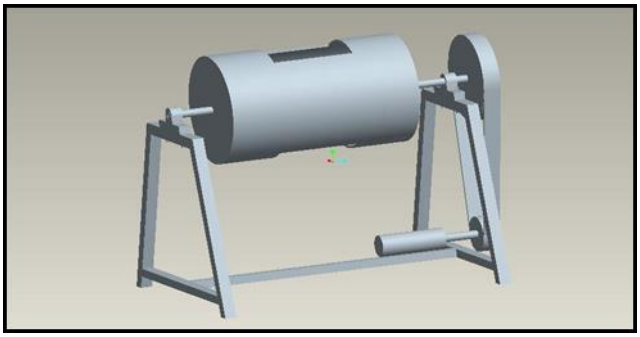

Fig. 1: 3D View of Machine

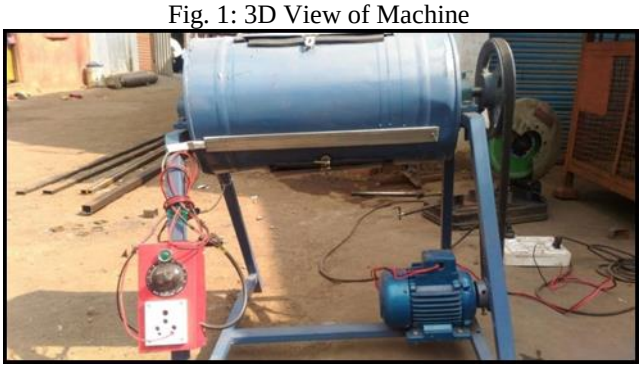

Fig. 2: Actual View of Machine

VII. RESULT

Upon testing the machine under different conditions such as sample, its temperature level, C-N ratio, different types of food and other condition. Observation we come to notice some factor that's affects of machine and its efficiency. Hence Above observation the temperature range is 40-50^{o}C and time required to prepare the fertilizer is approx. 36hrs.

VIII. CONCLUSION

Proper evaluation of the design is performed and created something even better. Finally we conclude that fertilizer preparing machine is better option to use by the societies and hotels as its cost is low as compared to other machines. The machine is designed taking into consideration the various demands of farmers &other customers. Since this machine is made for small businessman or for societies and hotels, therefore the work carried out by this machine is less. The capital required for purchasing the bigger size fertilizer preparing machine is very high & also the substitute way of using chemical fertilizers is also very costly. Also as this machine operates with solar panel its cost gets reduced and becomes more reliable to urban area.

IX. FUTURE SCOPE

Future scope of work is what is required to be delivered. It is importuned that future scope statement is clear unambiguous and easily to understand. It should also include details leaving the reader in no doubt what is being delivered as part of project

By increasing size of chamber more amount of fertilizer we can make. Thus ultimately a movable bigger size, weight more productive and well efficient machine can be added to the future scope.

Machine can be movable in the surface by providing wheels of tire which can more freely without any problem.

Installing more powerful heater to raises the temperature faster.

By increasing the cutting speed the efficiency can be increased. Also by using more number of cutter blades the output efficiency & productivity can be increased.

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