

# Automated Bio-organic Fertilizer Generating Unit

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**Abstract** - Currently, the management of urban waste streams in developing countries is not optimized yet, and in many cases these wastes are disposed untreated in open dumps. This fact causes serious environmental and health problems due to contaminants and pathogens. Frequently, the use of specific low-cost strategies reduces the total amount of wastes. Separate collection and composting of specific organic waste streams, such as vegetable and fruit refuses from food markets and urban gardening activities so, more than 80% of municipal solid waste is dumped into environment due to the lack of an efficient waste management strategy. Therefore, the aim of this study was to develop a demonstration project at field scale in this region to evaluate the feasibility of implanting the composting technology not only for the management of the organic waste fluxes from food market and gardening activities to be scaled-up in other developing regions, but also to obtain an end-product with a commercial value as organic fertilizer. The results obtained indicated that all the organic fertilizers, including added value in economic terms related to nutrient contents.

**Keywords:** Bio organic fertilizers, waste management strategy

## I. INTRODUCTION

The role of essential micro nutrients such as nitrogen, phosphorous[1], potassium and other secondary elements is known for increasing the productivity of the land. Bio-fertilizers contain live cells of specific isolated strain of bacteria and fungi which is formulated in suitable carriers. These microbes upon applications to soil under suitable condition secrete metabolism and enzymes which makes deficient element available to the plant in the suitable form. Nitrogen fixing[2][5] bacteria solubilize insoluble fixed phosphorous in soluble, potassium mobilizing bacteria mobilize the immobile potassium in soil and similarly other microbes mobilize the element in soil and make it available to the plant. In this project we are going to produce manure automatically by using green waste and enzymes.

Agriculture plays a pivotal role in the growth and survival of nations; therefore, maintaining its quantity and quality is essential for feeding the population and economic exports. Over the years, agriculture has undergone various scientific innovations in order to make it more efficient. Modern agriculture involves usage of pesticides and chemical fertilizers with an essence of increasing the world's food production, as these serve as a fast food for plants causing them to grow more rapidly and efficiently. Continuous application of chemical fertilization leads to the decay of soil quality and fertility and might lead to the collection of heavy metals in plant tissues, affecting the fruit nutritional value and edibility. Hence, in the recent years, many organic fertilizers have been introduced that act as natural stimulators for plant

growth. Biological fertilization is based on the supply of organic inputs including fertilizers, organic wastes, domestic sewage, animal manure, and microorganisms[4], such as fungi and bacteria. They are used to enhance fixation of nutrients in the rhizosphere, produce plants of growth stimulants, effective in soil stability, offer biological control, biodegrade substances, recycle nutrients, support mycorrhiza symbiosis, and evolve bioremediation processes in soils contaminated with toxic, xenobiotic and recalcitrant substances.

The bio-fertilizers supply also enhance the productivity per area in a comparatively short time, consume smaller amounts of energy, reduce contamination of soil and water, increase soil fertility, and encourage antagonism and biological control of phytopathogenic organisms.

## II. LITERATURE SURVEY

### 1) David.H Hubbell .etal

The association of specific microorganisms with plant roots is an ancient observation. where the effects of the microorganism on the plant are usually plainly visible as damage to root tissue, The generalization can then be made that plants of different kinds may be affected by (interact with) specific microbes in the soil environment. The possible reasons for this specificity are incompletely known but are certainly based on the genetics of the organisms involved. [7]

### 2) VaibhavSrivastava .etal

Municipal Solid Waste (MSW) is one of the most promising and cost effective options for managing solid waste. It is helpful in solving two current burning issues viz. soil fertility and MSW management. agricultural utilization of Application of compost from MSW in agricultural land helps in ameliorating the soil's physico-chemical properties. Apart from that it also assists in improving biological response of cultivated land. Keeping the present situation in mind, soil microbial response on municipal solid waste compost application. [8]

### 3) Biederman LA .etal

The use of nitrogen and phosphorus in the agricultural field has led to a number of environmental problems and reduces the crop yields. To save the natural environment, use of organic fertilizer has become a best option and also reported as cost effective. Microalgae are considered as potential bio-fertilizers for rice cultivation as these are directly related with their nitrogen fixation ability.

III. OBJECTIVES

- i) Availability of chemical fertilizers decreased the significance of green manuring.
- ii) Where the effects of the microorganism on the plant are usually plainly visible as damage to root tissue.
- iii) Much emphasis has been paid to composting of Managing solid waste management in recent years.
- iv) The generalization can then be made that plants of different kinds may be affected by (interact with) specific microbes in the soil environment.
- v) A microbe which destroys one plant species may be without effect on a different species.
- vi) Low temperature are another factor that can lead to an accumulation of volatile organic acids.

$$\% \text{Moisture content} = \frac{\text{weight of the wet compost} - \text{weight of the dry waste}}{\text{weight of the dry waste}}$$

- iv) In our project % moisture content should be around 25 to 35% taken into consideration if this level reached down, then we can sprinkle water by using small holes. Made at the wall of the compartment. Sometimes % moisture content depends on the type of green waste.
- v) The programming for IR sensor and the soil moisture sensor is displaying in the lcd display which is interfaced with Aurdino mega.
- vi) After dumping the green waste completely, then green waste should demcomposition with some of enzymes. For fast decaying process should be allowed for 30 days for complete decaying process.
- vii) After completeing 30 days in the first compartment, the first compartment has gets opened, mechanism is made by using stepper motor and using trapezoidal rod to acces the door to be opened automatically. Stepper motor controls operation which is interms of angle of rotation. We are giving 1.8 step angle
- viii) When the door gets opened in the 1<sup>st</sup> compartment product will get down in the 2<sup>nd</sup> compartment. Then the door closed automatically.

IV. PROPOSED METHODOLOGY

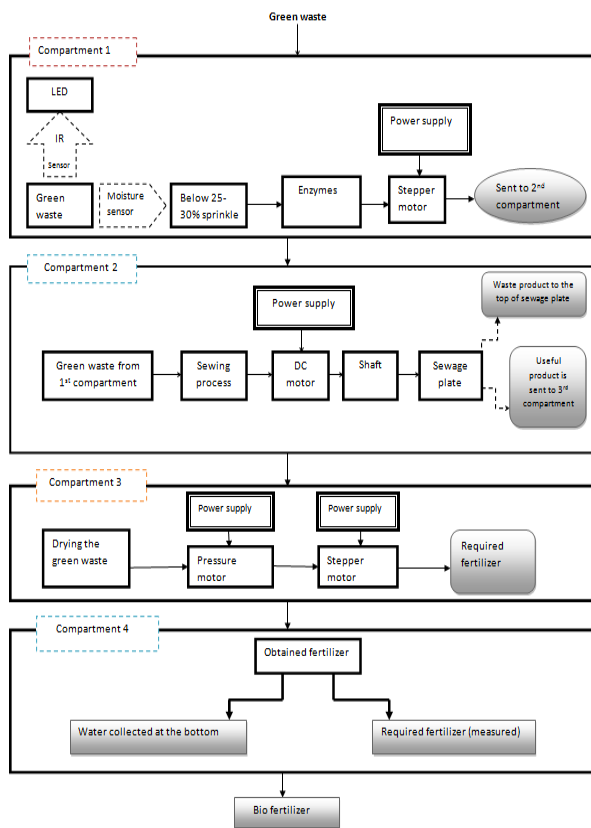


Fig 1:-Block dig of bio fertilizer unit

Compartment 1:

- i) First collect the green waste to fill the required level specified.
- ii) After collecting the green waste dump in the first compartment and verify the level of green waste dumped. This will be verified using IR sensor. IR sensor will detect the level of green waste. This process will carried out by placing IR sensor at the required level. When the level reaches to its predefined location the led will glow high, in this project we are placing the IR sensor at the level 3/4<sup>th</sup> of the compartment.
- iii) In this compartment one more sensor being used in soil moisture sensor this sensor checks the presence of moisture content present in the composition of green waste and enzymes. Where the moisture content is calculated by using the formula given below

Compartment 2:

- i) In this compartment sewing process being carried out.
- ii) This process in made up by using sewing plate and dc motor which is connected to cam shaft. in this process the usefull product and waste product gets separated.
- iii) When dc motor start running, the rotor of the dc motor conneted to cam shaft, then cam shaft is made into contact with sew plate. Hence cam shaft movement makes sew plates to move upward and down ward.
- iv) Hence the useful product is separated from this process and it will fall into the 3<sup>rd</sup> compartment.
- v) Waste product will remains at the top of the sew plates.

Compartment 3:

- i) Useful parts of the product is allowed for several minutes to remove water from by making small holes in the bases of the compartment3.
- ii) Once the water is separated the product can be taken outside of the generating unit using pressure motor. By making some big hole at the window side of the compartment.
- iii) It automatically push the required fertilizer by using stepper motor.

Compartment 4:

- i) Water collected at the bottom of the compartment.
- ii) And it can be useful for agriculture field.

## V. FLOW CHART

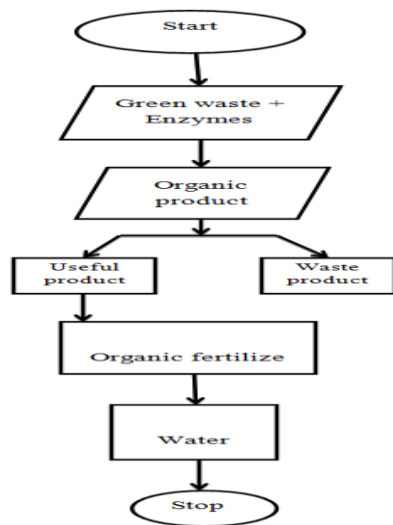


Fig2 :-flow chart

## VI. ADVANTAGES

- i) Increased soil carbon and reduced atmospheric carbon level.
- ii) Reduced soil erosion and runoff.
- iii) Reduced nitrate leaching.
- iv) Reduced energy demand for natural gas
- v) In addition to releasing nutrients, it improves soil structure.
- vi) Increases the water holding capacity.
- vii) No risk of forming toxic build up of chemicals.
- viii) Renewable, biodegradable and eco friendly.

## VII. APPLICATIONS

The application of bio-fertilizers is one of the management practices that can help to maintain or increase the content of organic matter (OM) and improve soil fertility in arable soils.

## VIII. EXPECTED RESULT

We have made the whole model by 4 compartments.

In the 1<sup>st</sup> compartment there are 2 sensor are used to measure the soil moisture and level of the green waste what we have applied. And then green waste is allowed to decomposition for the 30days Which is given in the delay program using arduino mega and it showing the result in LCD display. When the completion of 30days i.e after completing the decay process the open close door is automatically opened by stepper motor and trapezoidal rod alignment. Hence the compost is moved to the second compartment.

In the 2<sup>nd</sup> compartment there is sewing machine is used to separate the unwanted from the compost and then it goes to the 3<sup>rd</sup> compartment.

In the 3<sup>rd</sup> compartment the end product when we have obtained from the 2<sup>nd</sup> compartment is push outside

automatically and it allowed to absorbed the water content present in the compost by making small holes

In the 4<sup>th</sup> compartment the required bio-fertilizer is obtained.

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