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KITCHEN & GARDEN COMPOSTING IN AN SITU BIODEGRADABLE WASTE MANAGEMENT TECHNIQUE.

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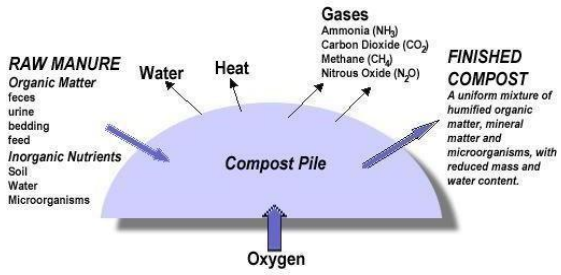
Abstract - *Squander administration is all approximately how to arrange the things you don't need on the ground or inkitchen. Composting is feasible squander administration hone that changes over any volume of collected organic waste into a usable item. When natural squanders are broken down by microorganisms in ahead-generatingenvironment, squander volume is diminished, numerous destructive life forms are devastated, and a valuable, potentiallymarketable, item is delivered .Natural squanders may incorporate fertilizer from animals operations, creature bedding, yard squanders, such as takes off and grass clippings, and indeed kitchen scraps Composting may be a normal handle ofrecycling natural squander fabric into a nutrient-rich soil revision that can be utilized in cultivating andagriculture. Kitchen squander, such as natural product and vegetable scraps, coffee grounds, and eggshells, speaks to asignificant parcel of family squander that can be composted. Composting kitchen squander not as it were decreases the amount of squander sent to landfills but moreover makes a profitable asset for cultivating and cultivatin.*

***Key Words*: squander, organic waste, nutrient-rich soil, Bedding, diminished.**

1. INTRODUCTION

Composting is a natural process of recycling the organic waste material into a nutrient-rich soil amendment that can beused in gardening and agriculture. Kitchen waste, such as organic waste and vegetable scraps, coffee grounds, and eggshells ,represents a significant portion of household waste that can be composted. Composting kitchen waste not only reduces the amount of waste sent to landfills but also creates a valuable resource for gardening and farming. While composting is an eco-friendly method of waste management, the process also generates various gases, in particular, is a potentgreen house gas that has a global warming potential 26 times greater than carbon dioxide. Therefore, it is essential to study the gas emissions during the composting process and to develop methods that minimize greenhouse gas emissions.



1.1 Bio-fertilizers and its Advantages

Bio-fertilizer is a material or a substance that contains living micro-organisms. It is applied tosoil or to the plant surfaces to increase the supply of nutrients to the plants and thus enhancing their growth. Bio-fertilizers increases the nutrient content of the soil using general process of nitrogen-fixation and solubilized the phosphorus content as well. The micro-organisms present in the soil restore the nutrient cycle and subsequently build organic matter. Bio-fertilizers can be used to grow healthy plants simultaneously enhancing soil health and soil sustainability. Such micro-organisms are preferably known as PGPR (Plant growth promoting rhizobacteria) and hence do not contain any chemical which are harmful to the soil. Bio-fertilizers are eco-friendly and more cheap and effective than chemical fertilizers and hence many of them are used since long time

ago e.g. Azotobacter, blue green algae etc. These act like green manure and contain efficient strains of special micro-organisms which increases the availability of nitrogen and phosphorus content. They can also associate with the plant roots (e.g. leguminous plants) and convert complex organic materials into simple compound that causes change in color and texture of the soil. They can enhance the crop yield by 25%-30% and provide stability to soil against drought and other soil-borne diseases.

1.2 Compost

Composting the process of decomposition and reuse of the complex bio-degradable compounds into small ones resulting in the production of dark matter known as humus. It takes hundreds of years for the nature to build 1 inch of the layer of humus rich soil. However using the same process the organic waste generated inside a home/ hostel can be used as bio fertilizer for the plants. This process can be performed in a pit formed by digging a ground or even in specially designed compost- bins. The decomposition process can be made more efficient if this factors are taken into consideration before the process. Some of these factors are Carbon content, Nitrogen content, air and water. Also it must be noted that Carbon: Nitrogen ratio plays a major role in the composting process.

2. FACTOR AFFECTING COMPOSTING PROCESS

CARBON: NITROGEN RATIO: This ratio is the basic key for a composting process. All living organisms have a fixed Carbon: Nitrogen ratio in their tissues. It is this ratio that actually decides the path of a decomposition process by micro-organisms. All micro-organisms require carbon as in contains high energy and hence it forms basic thing of life. On the other hand, nitrogen is quintessential for the synthesis of proteins, genetic material and cell structure. Hence there needs to be a proper balance between carbonaceous materials (often termed as brown materials as they are dry) and nitrogen rich materials (often termed as green as they are fresh and moist).For a fast production of compost, C:Nratio needs to be between 25-35:1(Rynk,1992). If the ratios too high having high carbon content, process of decomposition slows down. Alternatively if the amount of nitrogen exceeds and the ratio is too high, it gives a stinky smell.

Table -1: Conditions For Composting

Condition	Ideal	Acceptable
C:N Ratio	25-35:1	20-40:1
Ph	6.5-8.5	5.5-9.0
Temperature	54-60,,C	43-66"C
Moisture Content	45-60% w/w	40-65%

• To produce and assess parameters of compost made in a bin using kitchen waste of GNIT Campus.

• To study and measure gases produce from compost.

• The objective of biodegradation of solid waste using biotechnology is to use microorganisms, such as bacteria and fungi, to break down organic waste materials into simpler, harmless substances.

• The goal of biodegradation of solid waste using biotechnology is to provide a sustainable and environmentally friendly solution for managing and reducing the amount of waste produced by human activities.

- **Colour**

The colour of the compost matter was set up to be changed and on the 60th day it showed a large palish content showing the conformation of guck . The variation in the colour at a regular interval of 15 days is mentioned in the following table.

- **Texture**

The colour of the soil was also set up to be changed in the due course of process as covered at an interval of every 15 days. The variation in the color of the soil is mentioned in the table below.

- **Odor**

Odor of the pile/ compost was covered which on monitoring, showed variation as mentioned in the table below.

Fig -1: Compost

Chart -1: Compost after 60 Days

No. of days	Variation in pH	Range
0th	7.71	6.0-8.0
15th	7.69	6.0-8.0
30th	7.63	6.0-8.0
45th	7.42	6.0-8.0
60th	7.19	6.0-8.0

From the below compliances it was set up that the texture, colour and odor of the pile varied from the 1st day to 60th caching corruption process is in progress. During the original phase there was no smell from the pile but after 15th day smell of the pile gradationally came funky that increased till 30th day. The smell changed to tolerable on 45th day and dissolved fully by 60th day. The sources of smell were raw material and ammonium released from nitrogen rich accoutrements . This shows that the ammonia increases first and also diminishments. The soil softened causing breaking of large lumps of soil and the colour changed to dark brown showing increased quantum of guck that is rich in nature

A slight drop in the pH value was observed which showed the exertion of microorganisms and the conformation of humic acid. The carbon content was set up to drop and hence the CN rate, making the composting process effective. The reduction in Carbon is in the form of CO2 causing reduction in total dry mass. Acceptable CN rate acts as a balanced diet formicro-organisms which on the 60th day came down to25.8960 from on 1st day. This happed because carbon is used as a source of energy bymicro-organisms. Nitrogen principally exists in two forms. One is nitrate nitrogen(NO3- N) and the other bone is ammonia nitrogen(NH4- N). The rising trend line in the nitrogen content shows significant increase in the nitrate content Netoetal. 1997. still a small quantum of nitrogen loss also occurs in the form of ammonia because of which the smell of the pile was set up to drop gradationally. The smell so educated increases from the day 1st and also sluggishly vanishes while reaching the day 60th. This loss of nitrogen was comparatively lower as compared to the loss of carbon. The quantum of loss of nitrogen in the form of ammonia is equally commensurable to the CN rate giving a funky pile and hence maintaining ammonia attention is important to avoid nitrogen loss and precluding bad odor.

3. CONCLUSIONS

- Clearly! If a council lot were to conduct biodegradation composting, there could be several positive results. Then are a many reduced waste
- Composting can divert asignificant quantum of organic waste, similar as food scraps and yard waste, from the tip.
- This can help reduce the quantumof waste that the council generates and shoot to the tip, which is better for the terrain. Advanced soil health Composting can produce nutrient-rich soil emendations that canbe used to ameliorate soil health on lot.
- This can lead to healthier shops and better yields for lot auditoriums and landscaping. Reduced hothouse gas emigrations When organic waste is transferred to the tip, it can induce methane, a potent hothouse gas. By composting organic waste, sodalities can help reduce the quantum of methane that is released into the atmosphere.
- Educational openings; Conducting composting on lot can also give educational openings for scholars, staff, and faculty. This can help raise mindfulness about the benefits of composting and other sustainable practices.
- Overall, biodegradation composting can be a great way for councilpremises to reduce waste, ameliorate soil health, and promote sustainability.

The project aims at the production of compostmatter from kitchen waste and its use for the microorganism for the growth of plants. The compost was preparedfrom the kitchen waste of the GNIT CAMPUSand the physical and chemical characterizationof the compost was done. Parameters like C: Nratio (%) and pH were found to be decreasing with respect to time. Variation in otherparameters like nitrogen and carbon (%) werealso studied. The moisture content was keptbetween 55-50%. It was found that during thecomposting process the carbon content andC:N ratios decrease with time. Duringcomposting 50% of the organic matter is foundto be fully mineralized producing carbon dioxide and water. In this way we assessedvarious parameters of a compost as a biofertilizer and then studied the comparativegrowth of sunflower plant. The plant grown in sample containing compost and soil in theratio of 2:1 was found to have the bestshowing maximum growth among allothersamples.

It was also found that the combination of micro-organisms with the compost makes it good bio- fertilizer that improves plant growth and enhances soil fertility. Some of the advantages and disadvantages of composting process are:

ADVANTAGES: It destroys pathogens as a result of variation in many parameters, decreasesbulk of raw inputs (there is decrease as much as 50% in the final volume),stabilizes nutrients as organic compounds and the stable organic nutrients are released more slowly providing plants with a more sustained source of nutrients for growth. It is a cost-effective process.

DISADVANTAGES: Emission of carbon dioxide, ammonia and other gases in the initial phases and run-off from the piles must be controlled to prevent movement of nutrients in the ground and aeration and moisture have to be managed throughout the process. However the advantages associated with the composting process are much more than the disadvantages particularly because of its cost-effective nature.

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