

Biocomposting for fertilizer

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Abstract— The most important challenge of a sufficient food production for the growing population from a cultivable land in our country that facing so, for increasing the crop production & food production from the cultivable land need to nutrient. So the organic chemical biological sources of plant nutrient to increases the crop production.

Bio Fertilizers are cheap & there sources are waste source that are household waste, industrial waste, plant waste in any type of waste source. By using biological treatment the Bio Fertilizers are formed.

Bio Fertilizers are containing viable microorganisms & which are nutritionally beneficial important component to usable form through biological process.

Index Terms—Biocomposting, Fertilizer, microorganisms

I. INTRODUCTION

- The plant requires a constant supply of nutrients for their normal and healthy growth. The plant requires a constant supply of nutrient, for their normal and healthy growth means of that for their growth are nutrient are requires potassium, along with nitrogen and phosphorous, is one of the primary nutrients considered essential for plant growth other nutrients are C, H, Ca, Mg, S, Fe, Cu Mo, Zn, B, Cl. Which are necessary for their normal growth of plant.
- The earlier source of potassium was ashes from the burning of wood and plant wastes. Most of the component are available from the soil. Soil containing the most of component which are obtaining by plants though their root system. The yield of crop depends upon the supply of nutrients from the soil and environmental factor.
 - Soil containing nutrients, this supply of nutrient to crops the yield of crops depending upon the supply of nutrients and environmental factor. The nutrient in soil gets decreased when by leaching or by surface runoff, the nutrients in soil gets decreased.
 - The soil becomes deficient for one or more nutrients when the soil containing less nutrients. It is not suitable for raising crops and it's affecting the growth of the nutrients and development and yield of crops.
 - So it becomes necessary to maintain soil fertility by adding nutrient rich material which is material to increase the amount of nutrients in order to maintain the soil fertility of soil is called soil fertilizers.
 - The major component are necessary in a fertilizers Nitrogen (N) required during early stages of plant growth to promote development of stems and leaves. Phosphorous (P) which stimulates early growth and accelerate seeding or fruit formation in later stages of growth potassium(k) essential to

- the development of the starches potatoes & grains, the sugar of fruits and vegetables, and the fibrous materials of the plants, an example supply of potassium soil sometimes helps to prevent diseases to lessen the effects of excessive nitrogen application potassium along with nitrogen and phosphorous is one of the primary nutrients considered essential for growth.

o Objectives of the Present Work

- Use of a waste material from household waste like fruit, food & vegetables cotton paper waste etc. for bio composting for fertilizers
- Study of bio fertilizers
- Advantages & disadvantages of Bio Fertilizers
- The simple biological process to perform the bio compost for fertilizers from a biodegradable was

II. PROCEDURE BIOCOMPOSTING FOR FERTILIZER

A. Temperature

The Microbes & Microbia activators optimal temperature should in a range from 20 to 40 degrees.

B. pH

The working pH for microbes & microbial activators is range from 4 to 9. The microbes & microbial activators pH is optimum at pH 5 to 7.

C. Salinity

Salinity is one of important because they affect the microbial activity. It's working salinity & optimum salinity is less that 0.8 & 1.0% field capacity.

Avoid the possible damage to the microbes by using a mixture of microbial fertilizer with liquid chemical fertilizer. The concentration of total chemical fertilizer in a liquid mixture is less than oil. This mixture of microbe 7 chemical fertilizers may be used within 2hrs.

Allowing the retention time of microbes in chemical fertilizer solution for varies the types of chemical fertilizers.

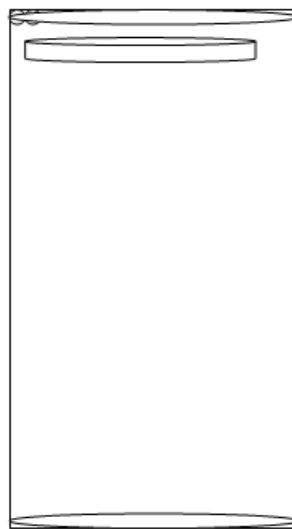


Fig. A



Fig. B

These process have two parts:

- i. Fig A
- ii. Fig B

D. Figure Analysis

- i. Dimensions 4×6 feet
- ii. Capacity 1000kg/year
- iii. Storage period 6 months
- iv. Both having oxygen receiving hole at bottom

It having opening & closing plates These are two alternative process to composting that having period to perform the complete analysis is one year and so storage is half year. Six months are required for making the reaction to make the uniform mass and during that period other fig. B are in under working condition and follow for working to make the bio compost by name practice.

Fig. A & fig. B having uniform dimensions and capacity to store the mass upto 6th months of capacity 1000kg mass only for 1 years.

These are simple & easy process to performed the biomass for fertilizer application on the home practice & which having many application to cleaning & pollution control.

If these process apply each & every unity of people then automatically control the pollution and creates the way to save the environments and take the award of pollution control board.

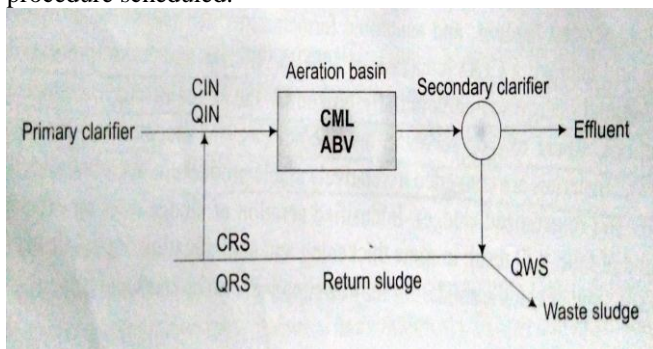
The composting including the following factors which are created from home related activities, waste and unwanted waste from food, fruits and others. These matter can creates the problem storage and handling of waste.

- a. Paper waste
- b. Cotton waste
- c. Vegetables
- d. Covering
- e. Food waste
- f. Fruit waste
- g. Others waste

These are having many application to vegetables, crops & too other fertilizers. These simple & easy process having no any side effects to pollutes environment.

It is the simple biological process having for their bio compost from biodegradable waste. Biological treatment systems such as activated sludge, aerated lagoons and anaerobic fermentation can reduce BOD by over 99% and achieve a COD reduction of 50% to 90%.

These process should be the problem of storage, handling, cleaning and safety issues. No needs of maintenance procedure scheduled.



Activated Sludge Process

This process consist of an aeration tank, solid-liquid separate and recycling sludge pumps. The microorganism culture is suspended in the waste and since it recycled, a final settling tank has to be provided. There is an optimum level solids content to be maintained in the aeration tank and consequently the rate of return of sludge from the final settling tank is controlled. Activated sludge is comprised of 95% bacteria and 5% of higher microorganisms. The bacteria decomposes resin acids, carbohydrates sugars and complex organic molecules and reduces the BOD. The bacteria forms two types of sludge, depending on the bacteria communities that have been formed. There are bacteria that forms flocs or conglomerates that sink to the bottom, forming a dense sludge and a clear effluent. There are also filamentous bacteria that develop with fungi. The most dominant type of bacteria is the filamentous Haliscomenobacter hydrolysis which are an indicator of low oxygen content. Another less common type of bacteria is the Thiothrix spp., which is a sulfur based genus. The bacteria are prey to larger microorganisms including amoeba (Sarcodina), free swimming ciliates (Ciliata), stalked ciliates (Vorticella), and Suctoria. The process flow diagram for a typical activated sludge plan is given in Fig. A.

Waste water after primary treatment enters an aeration tank where the organic matter is brought in contact with the sludge which contains microorganisms from the secondary clarifier. The effluent from the aeration tank containing the flocculent microbial biomass, known as sludge, is separated in a settling tank, sometimes called a secondary settler or a clarifier. In the settling tank the separated sludge exists without contact with the organic matter and becomes activated. A portion of activated sludge is recycled to the aeration tank as a seed and rest is wasted. In the activated sludge process volumetric loading, the flow and microorganism ratio, detention time, percentage recycle and sludge retention time is calculated as described below.

In the diagram, CIN is influent BOD₅ concentration; QIN, influent flow per day; CML, suspended solid concentration in aerobic basin; ABV, aeration basin volume; QWS, waste sludge flow per day; CRS, suspended solid concentration in return sludge; QRS, return sludge flow rate.

$$\text{Volumetric loading} = (CIN)(QIN)(CMF)/ABV$$

$$F/M \text{ ratio} = (CIN)(QIN)(CMF)/(CML)(ABV)(CMS)$$

$$\text{Detention time} = ABV/QIN$$

$$\text{Percent recycle} = (CML/CRS - CML) \times 100$$

$$\text{Sludge retention time} = (ABV)(LML)/((QRS)(CRS) - (QIN)(CIN))$$

The reaction takes place in tanks equipped with diffusers, through which blowers supply air or the tanks may be equipped with mechanical surface or turbine aerators, driven by electric motors. In diffused air aeration, the diffusers are place along one side of the tank, at or near the top or bottom, so that the release of the air imparts a rolling motion to the tank contents. This keeps the solids in suspension and permits oxygen absorption from the atmosphere. The diffusers may be of porous ceramic material, stainless steel, saran wrapped tubes, headers with nozzles or just perforated pipes. There are several types of mechanical aerators, the surface, draft tube with turbine and turbine with air injection

being most common. The surface aerator is a paddle wheel or brush, which is vertically suspended propeller, usually mounted in a vertical tube. The waste is pulled up or down in the tube, effecting mixing and aeration. A modification consists of a vertically suspended turbine equipped with a sparge ring for dispersing diffused air. Surface aerators may be of the updraft or downdraft type.

There are three modification of the activated sludge process, generally categorized as “conventional,” “extended aeration” and “contact stabilization.” In the conventional process, the aeration period is from 2 to 6 hours. In extended aeration, it is up to 24 hours. In the contact stabilization process, the sludge is aerated for an extended period of time, before it is mixed with the incoming waste. The main waste stream is aerated in the presence of the sludge for about 30 min. The process requires an aeration tank. Conventional activated sludge and contact stabilization processes are generally applied to clarified wastes, while the extended aeration process is applied to raw wastes. The extended aeration process produces very little sludge and that which is produced is organically stable. It therefore has advantages over the other two methods, which dispose of appreciable quantities of excess and unusable sludge.

III. RESULTS:

These biocompost gives the role of mixed fertilizer, it gives the direct application of biofertilizer and No any side effects. It gives the production in limiting period without any large processing and is the simple & easy process to get the fertilizer application. it is easy to handle, transportation and it is solid form of fertilizer and No any large investment . For handling of this process No any engineering problems, No any safety issues during the processing. For that processing No needs electricity, Chemical reaction and it increase the rate production to soil effectiveness.

IV. CONCLUSIONS:

From the study of Bio Fertilizer, to increase the nutrient in the soil with the help of Bio Fertilizer. Bios Fertilizers are supply of nutrients are nitrogen, phosphorous, calcium. For increasing the crop production the Bio Fertilizers are used nearly 10 to 30%. Bio Fertilizers not causes any type of a pollution. Bio Fertilizers are increasing the soil fertility. Bio Fertilizers are more beneficial than chemical by the bio-composting of fertilizer from biodegradable waste. The Bio Fertilizers stored at a room temp below 0°C & above environment friendly.

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