COMAPARITIVE STUDY OF DIFFERENT COMPOSTING METHODS

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Abstract : This study has been undertaken to investigate the various properties of compost, such as their PH content, moisture content, NPK content etc. Usually the normal composting takes more time to decompose the organic waste as compared to the hot composting, the hot composting takes around 18 to 21 days to decompose the organic waste whereas the normal composting takes around 4 months to decompose the the organic waste. The composting methodology adopted is aerobic composting in which the oxygen is required to decompose the organic waste. The outcome is to get the fertilizer in minimum time and which should have all the nutrients such as nitrogen, carbon and potassium etc. which are required for the healthy growth of crop and to increase the yield of crop.

Key words **- Normal composting, Hot composting, PH content, NPK content, Yield of crop**

I. INTRODUCTION

1.1 Need Of Solid Waste Management

Municipal Solid Waste Management refers to the collection, transfer, treatment, recycling or resource recovery and disposal of solid waste in urban area. A simple definition of solid waste management is supervising municipal solid waste from the source of generation through collection or street sweeping, recover or by treatment process of disposal.

1.2 Various Techniques In India

Generally, in India storage of solid waste is adopted and for storage of solid waste keep the community bins or litter bins in the area of city and collected by various method like One JCB and one Truck, waste is carried by labour and divert in to truck or dumper, waste is collected by take the storage waste by community bin to truck and keep empty bin at storage site. A simple definition of solid waste management is supervising municipal solid waste from the source.

1.3 Composting and Need of Composting

In composting solid waste is converted into humus like material which is manure by decomposition of solid waste under aerobic conditions. This humus has demand as fertilizer for forms once rubber, plastic, metal etc. are separated from solid waste. The organic materials are subjected to composition. It produces manure which is useful for increasing yield of crop. Method is easy for disposal of solid waste. Improves soil aeration. Prevents erosion of soil. Bio-methanation plant: This plant is based on segregated organic municipal solid waste by decentralized.

1.4 Bio-Methanation

Methane fermentation or anaerobic digestion is usually used to indicate “Bio-methanation”. It is complex microbial process in which organic compounds are degraded into methane and carbon dioxide by variety of anaerobes. Solapur is one of the urban centers in India. The management disposal of solid waste is not scientific and it creates serious environmental problems. Insanitary method of waste disposal is also serious health concern, particularly in rainy season. Leachate and high humid condition increases the risk of health problem the combined effect of uncollected waste, poor handling and inadequate disposal safe guards for municipal waste have implication for public health leading to the chances of transmission of diseases, the spread of epidemics and loss of health urban and amenable environment. The non-segregated waste contains almost 78% of organic waste, and if dumped unscientifically will create the situation like in Deonar (Mumbai). Like in Deonar dumping ground due to release of methane gas on anaerobic decomposition of organic matter, may pose the fire hazards creating heavy air pollution and health hazards. Insanitary method of waste disposal is also serious health concern, particularly in rainy season.

1.5 Proposed Future Plan of Solid Waste Management in Solapur City

The health department of SMC is responsible for solid waste management (SWM) services along with other key health related services like cleaning of drains, operations and maintenance of SMC run health facilities, registrations of births and deaths, food safety concerns, etc.as shown in fig 1. The health department is headed by the medical officer of health (MOH), who is assisted by the assistant medical officers, ward officers, sanitary supervisors, sanitary inspectors, and sanitation workers. Following section presents detailed assessment of the existing SWM system which includes waste generation.

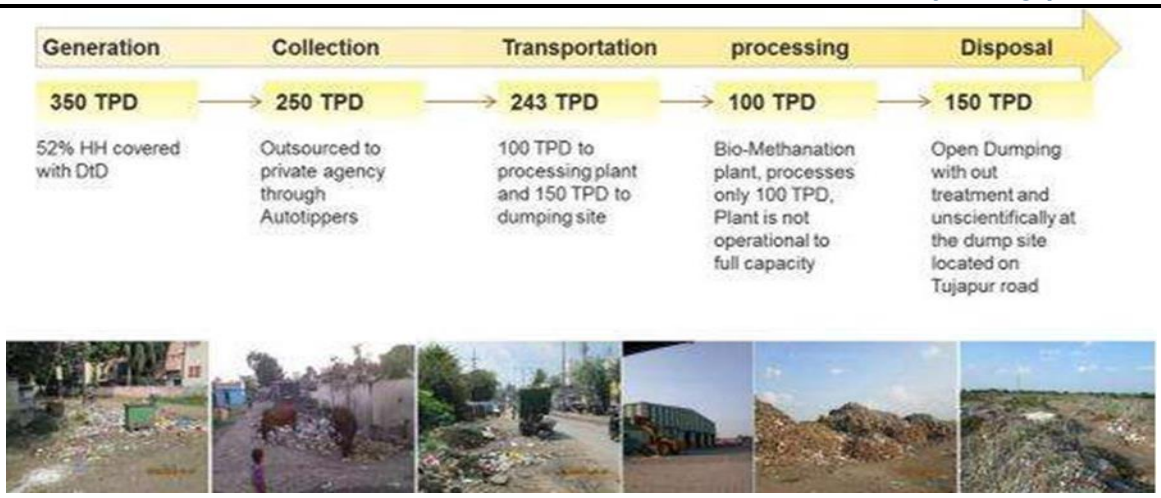

Figure no. 1 Process Of Generation To Disposal

1.6 Existing Situation

Total waste generated in the city is approximately 350 to 400 tons per day (TPD) considering the population of 9.51 lakh (census 2011). The Health department of SMC is managing municipal solid waste from source to its final disposal through private contractors as well as in house team of sweepers for street sweeping, under the supervision of medical officer of health (MOH). Door to door collection of waste in Solapur has been outsourced to the private operator.

Waste collected from the door to door collection is transported to the transfer station and further to the disposal yard by private agencies. About 70% of the total waste generated in the city is collected from various points and transferred to the disposal yard. The transportation of unattended waste from open plots and slums is done manually and/or mechanically through variety of vehicles as these areas are not covered while street sweeping. In 2004, SMC entered into an agreement with CICON Environment Technologies Pvt. Ltd (CETL) for processing the waste generated in the city on build, own, operate and Transfer (BOOT) basis under which CETL set up a special purpose vehicle (SPV) named Solapur Bio-Energy Systems private limited (SBESPL) for setting up a waste processing plant. The by-products of the process are bio-gas, and compost.

The SPV has already constructed a processing plant near Tuljapur disposal facility which processing approximately 100 TPD of waste in to the Bio-Methanation plant and the rest of the waste is dumped directly into the disposal site on Tuljapur road and Bhogaon Khat Depot.

1.7 Waste Generation

Municipal solid waste can be broadly divided into four major categories as per the source of generation: domestic waste, commercial waste, institutional waste, and industrial waste. Most of the case, industrial waste is not considered as a part of municipal waste, but in most of the Indian cities. The transportation of unattended waste from open plots and slums is done manually and/or mechanically through variety of vehicles as these areas are not covered while street sweeping. Door to door collection of waste in Solapur has been outsourced to the private operator. The transportation of unattended waste from open plots and slums is done manually and/or mechanically through variety of vehicles as these areas are not covered while street. As shown in Table no. 1

Table 1 Source-Wise Quantity Of Solid Waste Generated In Solapur

Sr. no.	Source category	Quantity of waste generated (tons/day)	% contribution
1.	Domestic waste	175.00	50%
2.	Street sweeping	82.00	23%
3.	Commercial	35.00	10%
4.	Hotel and restaurant	7.00	2%
5.	Market waste	11.00	3%
6.	Other	40.00	11%
	Total	350.00	

1.8 Collection and Transportation

In Solapur the collection and transportation of the waste is outsourced to the private agency. The collection activity to be undertaken by the private player includes the primary as well as secondary waste collection from all sources except sweeping of streets. As shown in fig no 2 & 3

Street sweeping is undertaken by the municipal employees of the SMC. As per the information from the SMC, currently only 52% of the households are covered with the door to door collection. For secondary collection of waste, SMC has placed 1033 bins in the city with an average storage capacity of 1.5 tons as shown in Table No 2

Fig. 2 Solid Waste Management Facilities In Solapur

Fig. 3 Solid Waste Management Facilities In Solapur

Table 2 Solid Waste Management System

Sr.no.	Indicator	Unit	Value
1.	Total waste generation	TPD	350
2.	Per capita waste generation (2013)	Grams/day	331
3.	Collection of waste	TPD	250
4.	No. of dust bins	Numbers	1033
5.	Total capacity of dustbins	m3	1549.5
6.	Avg. spacing of dustbins	M	1890
7.	No. of vehicles	Numbers	30
8.	Frequency of collection	trips/day	1
9.	No. of disposal sites	Numbers	2
10	Distance of disposal point	km	6

1.9 Processing and Disposal

Solapur Munciple Coopoation has entered an agreement with CETL to develop and operate an integrated waste processing facility on BOOT basis. Presently, approximately 100 TPD of waste is processed on daily basis. The plant currently produces electricity for its captive consumption and is in process of procuring preferential tariff for the power generated from the Bio-Methanation plant to be able to process 100% of waste received at the processing plant. Currently, the plant is processing only 100 TPD of waste (of 250 TPD waste collected. Going forward the plant will process 100% of the waste received at the processing plant and generated electricity to be distributed in to the local power grid. SMC has not developed any scientific landfill facility for disposal of the un-processed Waste. Waste which is not processed into this plant is disposed at the land around the Processing plant located at the Tuljapur road. It shall also be noted that the waste collected from slaughter houses is also directly disposed on to the disposal ground near the processing plant. There are agriculture fields in the vicinity of this site which are subject high environmental hazard due to percolation of the leachate generated in the disposal facility impacting the soil as well as the ground water conditions. The SMC should be give highest priority to develop a scientific landfill facility to address the environmental hazard situation at this site as shown in fig no 4

Fig. 4 Disposal Ground and Processing Plant at Solapur-Tuljapur Road

2. SOLID WASTE MANAGEMENT

The following table presents existing service levels of sewerage services in SMC as per the

Table 3 Service Levels Solid Waste Management

Solid Waste Management	Value	SLB
Household level coverage	51.00	100.00
Efficiency of collection (MSW)	71.00	100.00
Extent of segregation (MSW)	-	100.00
Extent of recovery (MSW)	-	**80.00**

Solid Waste Management	Value	SLB
Scientific disposal (MSW)	-	100.00
Complaints Redressal	48.00	80.00
Extent of cost recovery	-	100.00
Efficiency in collection (SWM charges)	-	90.00
House hold level coverage of solid waste	-	100.00
Management services in Slums		

2.1 Future Generation

For the purpose of SWM projection, the waste generated per capita for the current year (2014) has been considered as 354 grams per capita per day. Accordingly the average per day waste generation has been estimated as 364 TPD and annual waste general as 1.33 lakh tons. The norm of per capita waste generation has been projected at 1.33% to assess the future waste generation in the city. Accordingly, the annual solid waste generation has been calculated till 2041. Based on the solid waste generation estimates, the infrastructure requirement for primary and secondary collection, transportation, landfill, and treatment capacity has been estimated and the same has been discussed in the sector plans.

Table 4 Future solid waste generation in SMC

Year	Projected population (lakhs)	Per Capita Waste Generation (Gm/ Capita)	Average waste (tons) per day generation	Annual SW (tons)
2014	10.27	354.00	363.58	132705.49
2021	12.27	389.00	486.50	177572.99

2.2 SWM Sector Post- 1st Generation CDP – Status Review

The 1st generation CDP was prepared in 2005-06.

Table 5 Waste Generation In Solapur City

Waste Generation	The waste generation was about 380 metric tons (MT)
Collection	The Door to door collection in SMC covered approximately 25% of the area. Major collection happened through secondary collection points. Waste treatment There were two dump sites reported in the previous CDP. One at Tuljapur (55 acres) and another at Bhogaon (18 Acres).
Waste treatment	Waste received at Bhogaon site was processed through composting, No scientific landfill facility available with SMC. Cost recovery. Information on the user charges and corresponding cost recovery
Cost recovery	was not discussed in the CDP.

The box below provides an overview of solid waste management at the time of preparation of the 1st generation CDP. The discussion with various stakeholders identified the following challenges:

i. low coverage (25%) of door to door waste collection from the city.
ii. Efficiency of the waste collection was low (75%).
iii. absence of the waste treatment facility.
iv. in the city Administration.

The 1st generation CDP had assessed the waste generation by 2031 to be 717 MT considering 350 grams per capita norm of waste generation. To improve the SWM system, an investment of Rs.80.55 Crores was envisaged covering the following aspects.

i. Garbage Compactors.
ii. Collection and Disposal.
iii. Landfill Site (Remediation).
iv. Landfill Site (New)

However, the SMC has not taken up any projects for improvement of the municipal waste collection and transportation Infrastructure in the city as shown in Table No 5

2.3 Impact on Service Levels post previous CDP

Table 6 Situation of SWM

Indicator	Status at the time 1st generation CDP (2006-07)	Currentsituation (2019)
HH level coverage of SWM services (%)	25%	51%
Collection of municipal solid waste (%)	72%	70%
Extent of segregation of municipal solid waste (%)	0%	0%
Extent of municipal solid waste recovered (%)	0%	0%
Extent of scientific disposal of solid waste (%)	0%	0%
Extent of processing of solid waste (%)	0%	0%
Extent of cost recovery in SWM services (%)	0%	0%
Efficiency in redressal of complaints (%)	ND	43%
Efficiency in collection of user charges (%)	66%	24%

The processing facility at Tuljapur road has been developed on a public private partnership basis (PPP). The Processing facility is expected to process the organic waste through bio-methanation and generate the electricity. The processing facility is not running at the full capacity and not able to process the 100% of the waste collected from the city.As shown in Table No 6.
From the above table it is evident that, there has been no substantial improvement in the solid waste management sector in the Solapur city. While visiting the city the issue of managing the municipal solid waste was very much evident. The current situation of the solid waste management in Solapur is presented in the subsequent sections.

2.4 Institutional ramework for SWM

Solid waste management in Solapur is managed at two levels i.e. at the central level at the head office and another at the ward / zone level. All the policy decisions and capital asset augmentation works related to the waste treatment facility are taken care at the head office level. The ward and zone offices manage the day to day operations of the solid waste services through the sanitary inspectors and sanitation supervisors.

2.8 KEY ISSUES

i. The service level indicators revels that the, performance of SMC in terms of household level coverage and collection efficiency of the MSW are poor as only 52% of the households are covered under door to door collection.
ii. In terms of segregation of waste, as in the case of most of the Indian cities, SMC is also not been able to segregate and collect the waste in segregated manner.
iii. The performance indicators that need urgent attention are scientific disposal of solid waste, collection efficiency of waste, and recovery of the operation and maintenance expenditure, which is high due to huge establishment expenditure.
iv. Coverage of door to door collection is only 52% in the city
v. Insufficient secondary storage capacity leading to spillage of waste on roads
vi. Unplanned secondary storage leading to open dumping of waste in city areas

3. DESIGN OF COMPOSTING

3.1 Disadvantages of Present System of Solid Waste Management
The burning of solid waste on open ground is creating air pollution affecting badly to all students, staff in the institution. It give bad view After burning the waste, the ash blown away by wind which affect working in the institution. The soil in that premises gets converted in non cultivable area. The temperature surrounding get rise, affecting the trees, birds and human also. Burning of chlorinated plastic material create poisonous carcinogenic compounds in air affecting human and animals badly.

3.2. Procedure
Aerobic composting is the process by which organic wastes are converted into compost or manure in presence of air. In this process, aerobic microorganisms break down organic matter and produce carbon dioxide, ammonia, water, heat and humus, the relatively stable organic end-product. Although aerobic composting may produce intermediate compounds such as organic acids, aerobic microorganisms decompose them further. The resultant compost, with its relatively unstable form of organic matter, has little risk of phytotoxicity. The heat generated accelerates the breakdown of proteins, fats and complex carbohydrates such as cellulose and hemicellulose. Hence, the processing time is shorter. Moreover, this process destroys many micro-organisms that are human or plant pathogens, as well as weed seeds, provided it undergoes sufficiently high temperature. Although more nutrients are lost from the materials by aerobic

composting, it is considered more efficient and useful than anaerobic composting for agricultural production. As shown in Table No 7.

There are a variety of methods for aerobic composting, the most common being the Heap Method, where organic matter needs to be divided into three different types and to be placed in a heap one over the other, covered by a thin layer of soil or dry leaves. This heap needs to be mixed every week, and it takes about three weeks for conversion to take place. The process is same in the Pit Method, but carried out in specially constructed pits. Mixing has to be done every 15 days, and there is no fixed time in which the compost may be ready. Berkley Method uses a labour-intensive technique and has precise requirements of the material to be composted.

Table 7 Content Of NPK

Result after Days	PH	Nitrogen	Phosphorus	Potassium
15 days	10.5	6	7.2	9.3
30 days	8.3	7.8	8.7	10.4
45 days	7.2	8.7	9.8	11.3

3.3. HOT COMPOSTING

3.3.1 How Do I Hot Compost?

Hot composting works well in a 2 or 3-bin system (see photo). Simply gather your carbon and nitrogen-rich materials and alternately layer them in your bin. Stick a com-post thermometer into the middle of the pile once fin-ished. Check the temperature of your pile daily and when it reaches 55-60o C it is time to flip it into the second bin. The pile will heat up again, monitor the temperature to determine when to flip it a second time. After the second flip, allow it to cure for at least another 6 weeks. Read on for more detailed instructions.

3.3.2. Why Hot Compost?

Produces a microbe-rich, full-spectrum nutrient source for you garden Creates compost quickly. Hot compost piles can be finished in as little as 3 months. Kills weeds and seeds. If managed properly, the high temperature of a hot compost pile can effectively kill most weeds and seeds. Composts larger amounts of material than in a pas-save compost system (such as the Earth Machine). For example, yard and garden waste from a small farm or large backyard can be handled by a 3-bin system. Creates a larger amount of finished compost than that produced in a passive compost system. This can then be used to build soil more quickly in a new garden space .It should be properly taken according to content.

3.3.3. Types Of Bins

The most common bin used for hot composting is made from re-purposed pallets, but a 3-bin can be made from any other materials that work.

The elements of an effective hot composting bin system include:

i. Removable front slats for easy access.
ii. Inside lined with 1/4” mesh to keep out rodents.
iii. 2-3 compartments for turning piles.
iv. Volume of each compartment = at least one cubic metre.
v. A lid to keep out rodents and rain.
vi. Wood treated with organic preservative (optional).

3.3.4. A Note on Volume/Critical Mass

A hot compost pile should be no smaller than one cubic meter in order to reach and maintain temperatures for hot composting (55 ^{o}C). This size of pile, or larger, en-sures that there is enough insulation on the outside of the pile to keep the inside hot. The outside 6-10” of the pile is mostly for insulation.

3.3.5. Creating Your Hot Compost Pile

Types Size and Diversity of Materials Once you have built your bin, it is time to gather materials to make your hot compost pile. The types of materials you use have a direct relation to the amount of heat generated in the pile, the size of the materials influences how fast the pile will decompose and the diversity of materials influences the quality of the finished product.

a) Carbon (Browns) and Nitrogen (Greens)

All organic materials contain both carbon and nitrogen. However, materials have different proportions of these two elements. Materials that are high in carbon are called “browns” and materials that are high in nitrogen are called “greens”.

In the summer, nitrogen materials are plentiful and brown materials can be hard to find. Therefore, it is a good idea to collect and stockpile leaves in the fall and winter as the fall from the trees. These can be stored in a homemade hoop bin and accessed as needed.

b) Surface Area

Material that is smaller in size will break down much quick-er than large pieces. Finely chopping or chipping organic material breaks up any tough protective layers and creates more spaces where microorganisms can do the work of digesting and breaking down that material. You can cut up materials using a variety of methods, including using a leaf shredder or chipper, hand pruners, running over leaves with a lawnmower or putting leaves in a large plastic garbage can and whipper snipping them (remember to use proper eye protection!).

c) Diversity

Using a diversity of materials will yield compost with rich nutrient qualities. Some plants, called *dynamic accumulators*, contain specific micronutrients and minerals that aren't commonly found in your typical garden waste. These can be added to your compost to enrich its nutrient content.

3.3.6. Common Dynamic Accumulators: Layering Materials

To start the hot compost pile, use rough material like twigs, straw, or coarse plant material like sunflower stalks. This allows air to access to the bottom of the pile (see section 4. Air and Ventilation)
As a general rule, when layering your hot compost up, you should use alternating brown and green layers of equal thickness (4-6"). Keep in mind that some materials are *very high* in nitrogen (grass clippings and chicken manure) or Carbon (sawdust and wood chips) so you will need to Adjust your mix accordingly. You can mix each carbon/nitrogen layer to ensure that the materials will interact as much as possible with each other.
Add water to the pile as you build it - you're shooting for moisture content similar to that of a wrung out sponge. Rainwater is the best water source as it doesn't contain chemicals that will harm the microorganisms you are trying to breed.
It is a good idea to always finish your hot compost with a layer of browns. This helps to minimize potential odour and flies. Pop your compost thermometer in and close the lid of your bin to prevent it from becoming water logged in the wet months and from drying out too much in the summer.

	Greens		Browns
1.	Fruit and veggie scraps	1.	Fallen leaves Straw
2.	Fresh grass clippings	2.	Chipped woody debris
3.	Fresh weeds and plants	3.	Shredded newspaper
4.	Fresh animal manure (horse, chicken, cow) Eggshells	4.	Sawdust
		5.	Dry grass clippings

Moisture is important in a compost pile for two reasons:
1. It helps soften organic materials
2. It provides microorganisms with a healthy living environment

Microorganisms produce the heat in your pile by creating chemical reactions while they decompose organic matter. Many of them breathe through their skins and require a moist environment in order to not dry out and die (like our lungs are kept in a moist environment inside our bodies). On the other hand, if the pile is too wet, the microorganism is just as susceptible to drowning. Therefore, you need to make sure your pile is as wet as a wrung out sponge so these little guys can do their work and make the pile heat up properly!

3.3.6.1 Air and Ventilation

i. Air provides microorganisms in your compost pile with the oxygen necessary for aerobic decomposition.
ii. To ensure your pile has adequate air flow. Don't use thick layers of material that is prone to mat-ting down easily, such as grass clippings.
iii. Use some rough materials in your compost pile, like sunflower stalks and small twigs.
iv. Put a floor of rough materials at the bottom of your compost pile.
v. Mix each carbon/nitrogen layer as you build your pile.

3.3.7. Monitoring and Turning Your Compost Pile

Once you have finished building your compost pile the de-composition process will begin. Check your thermometer at least once a day to make sure your pile is heating up and not surpassing the 55oC mark. If the pile gets too hot, beneficial microorganisms are at risk of dying. Therefore, once your pile hits 55oC, it is time to flip.
Using a garden fork, transfer the materials into the neighboring bin. As you transfer the pile, try to get the materials from the outside of the first pile into the inside of the new pile. This will ensure the less decomposed materials are subjected to the higher temperatures at the centre of the pile that can kill weed seeds. Place your thermometer in the pile again. Once you have turned the material into the second bin, it will heat up again, though it may not get as hot as in the beginning. Monitor the temperature, looking for the pile either reaching 55oC or peaking and then cooling down. When one of these things happens, it is time to flip the pile a last time. Now it is time to let your pile "cure" for at least another 4 weeks. During this phase, the chemical reactions in the pile will stabilize; it will attract more microbial life and be-come richer in nutrients.

3.3.8. Harvesting Your Compost

The range of time hot compost can take from beginning to end can be very wide anywhere from 8 weeks to 6 months. How long it takes depends on how well-managed it is and the time of year. The heat of the summer sun can definitely

speed up microbial activity, resulting in a faster process. If you follow what has been out-lined in this factsheet, your hot compost should be finished in 8 weeks to 2 months, depending on the time of year.
Some other finished compost cues include:
Visual Cues:

i. Majority of material is dark brown to black with no discernible materials.
ii. Material has reduced to 60% of original size.

Smell Cues:

i. Pile has no trace of food scrap odours.
ii. Material smells very earthy.

Other Cues:

i. Compost does not heat up anymore
ii. Material feels loose and crumbly

3.3.9. Screening

Finished compost is dark, crumbly and earthy smelling. It may have varying degrees of moisture, but should feel as wet as a wrung out sponge. There may be a few bits that have not completely decomposed, these can be screened out before your apply your compost to your garden soil. Screen your compost using 1/4" to 1/2" wire mesh (available at local hardware stores). A simple screen can be constructed by stapling the wire mesh to a frame built with 2x4's screwed together.
Two ways to use this screen are:

3.3.9.1. Wheelbarrow method

i. Place screen on top of wheelbarrow
ii. Put 2-3 shovelfuls of compost onto screen
iii. Sift the compost through the screen by swishing your hands back and forth across the screen

3.3.9.2. Stand-up method

Spread a tarp out Place the screen at a steep angle, either against a wall or us-ing supporting legs, on top of the tarp Toss the compost through the screen. The small bits will fall through and the large bits will slide down to the bottom of the screen. The "screenings", or larger bits, can be added to your next compost pile or can be used as mulch under your ornamental plants.

3.3.10. Flame Photometer

The Determination of Available Potassium in soils Introduction Soil is a complex mixture of mineral particles, organic matter, water and air. The mineral particles come from the breakdown of rocks. As rocks break down into the particles of sand, silt and clay that make up soil, potassium and other elements are released and may become available to plants. It is important to assess the quantity of potassium in the soil solution and the readily available pool to ascertain whether or not to apply potassium fertilizer.
Potassium is extracted from air-dried soil samples by shaking with 0.5M ammonium acetate/acetic acid solution for 30 minutes. This effectively displaces the potentially available K+ ions. The potassium content of the filtered extract is then determined using a Jenway PFP7 Flame Photometer.
Materials required Ammonium Acetate/Acetic Acid • Aqueous solution: 0.5M with respect to both reagents (38.55g ammonium acetate and 29ml of glacial acetic acid, diluted to 1 liter with deionized water).
Standard Potassium Solution: 2000ppm • Accurately weigh 1.907g of potassium chloride previously dried for 2 hours at 105°C. Dissolve in about 50ml of the ammonium acetate/acetic acid solution. Transfer to a 500ml volumetric flask and dilute to 500ml with the ammonium acetate/acetic acid solution.
Other equipment Balance 100ml polyethylene bottles measuring cylinder Shaker Funnel Whitman No. 2 filter paper

Method

i. Pass the sample of air-dried soil through a 2mm sieve. Using a scoop, measure out 10ml of the sieved soil without tapping to avoid compacting. Transfer to a 100ml polyethylene bottle, together with 50ml of the ammonium acetate/acetic acid solution.
ii. Stopper the bottle, transfer to a shaker and shake for 30 minutes (275 strokes per min, 25mm travel).
iii. Remove from the shaker; allow standing for several minutes and then decanting the supernatant liquid through a dry Whitman No. 2 filter paper.
iv. Prepare potassium standard solutions to cover the range 0 to 100 ppm potassium
v. Set the Flame Photometer at 100 using the 100ppm potassium solution.
vi. Successively aspirate the 20, 40, 60 and 80 ppm potassium standard solutions and prepare a calibration graph. Determine the potassium content of the soil extract by aspirating the solution, diluting as necessary in ammonium acetate/acetic acid solution. Calculate the concentration by reference to the calibration graph, taking into account any dilution factors.
vii. Preparation of potassium standard dilutions 1. Transfer 25ml of the 2000ppm potassium standard solution to a 100ml volumetric flask and dilute to 100ml with the ammonium acetate/acetic acid solution. This solution contains 500ppm potassium.

viii. Transfer 10ml, 20ml, 30ml, 40ml and 50ml aliquots of the 500 ppm potassium solution to 250ml volumetric flasks. Dilute to 250ml with the ammonium acetate/acetic acid solution and mix well. These solutions contain 20, 40, 60, 80 and 100 ppm potassium respectively.

ix. Results:- Normally the results are reported as ppm potassium in the extract. These can be classified in a descriptive scale

4. PHOTOS GALLERY

Drum For Composting

Preparation for Compost

Collection f Leachat Of Compost

Determinaion Of PH Of Compost

Determination of PH of Compost

Prepatation of Hot Composting

Normal Compost

Growth of Crop

5. CONCLUSION

This work deals with the Comparative Study of Different Composting Method in which we check the various properties of compost, such as their PH content, moisture content, NPK content etc. Usually the normal composting takes more time to decompose the organic waste as compared to the hot composting, the hot composting takes around 18 to 21 days to decompose the organic waste whereas the normal composting takes around 4 months to decompose the organic waste. The composting methodology adopted is aerobic composting in which the oxygen is required to decompose the organic waste. In hot composting the ratio of nitrogen to carbon should be proportioned as 1:30 And the temperature of around 55ºc to 60ºc should be maintained for effective breakdown of organic matters. Carbon, nitrogen and activators are the three essential parameters which affect the efficiency of hot compost; hence it is necessary to maintain the content of nitrogen to carbon ratio as 1:30.

The outcome of this work is to get the fertilizer in minimum time and which should have all the nutrients such as nitrogen, carbon and potassium etc. which are required for the healthy growth of crop and to increase the yield of crop.

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