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UTILIZING DERILICT CONVERTED LOAM SOIL BY WASTE MANAGEMENT IN GREEN BELT ZONE AND ITS STUDY

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A B S T R A C T

This paper reviewed studies on the percentage of sand, silt, clay in urban derelict soil as well as in fertile soil (with the help of processes like) composting process of organic waste, vermicomposting, cow dung ,cow urine and neemastra. The soil is basically divided into three major types on the basis of their particle size. When soil gets separated, the mineral soil particles which are determined by the clay portion are generally less than 0.02 millimeters in diameter. According to the soil textural class, the clay resembles about 20 percent or more, **sand resembles 45 percent almost and simultaneously silt resembles 40 percent of the percentage of soil**. Here the soil is being processed through the 2mm sieve due to which the fine grain soil is obtained. In this research it has been determined that the polluted soil can get converted into a fertile soil with the help of basic farming techniques and by the help of composting process of organic waste, vermi-composting , cow dung ,cow urine and neemastra. We must have seen that mostly common garden plants prefer loamy soils. Hence we are targeting to convert derelict soil into a loam soil where it will be having a balanced percentage of sand ,silt and clay (approximately **40% sand, 40% silt, and 20% clay**) with ample organic matter and pore space in which we have successfully determined the pH , specific gravity and the percentage as well as the graph of growth rate of plants in both derelict and derelict converted loam soil.

Keywords: Urban Derelict Soil, Composting, Vermi-Composting, Loamy Fertile Soil.

1. Introduction

Soil is the main factor for cultivation of plants in towns and cities. And it also plays an important role to control all types of pollution directly as well as indirectly. Composting need to be performed on a large scale mainly on urban derelict soil. The compost-treated soil should be used in the conversion of huge dumping yards into large fertile lands(where any flower or non-flower could grow easily).The concept of large fertile lands made from waste management and compost-treated soil can be brought into consideration or can be utilized in green belt zone. Green belt land refers to an area that is kept in reserve for an open space, most often around larger cities. The main purpose of the green belt policy is to protect the land around larger urban centres from urban sprawl, and maintain the designated area for forestry and agriculture as well as to provide habitat to wildlife.

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1.1. Literature Review

Horea Cacovean has studied and verified the use of source-separated municipal waste compost could improve the physical quality of urban soils and create better conditions for their management when planted with herbaceous species.

Giuseppe Corti has examined the use of biosolids with or without sawdust, pulp sludge, and the contribution of an earthworm species to improve the properties of nonacidic mine tailings.

David C. Weindorf has done their present study on assessing soil fertility changes under stubble removal and stubble retention in the Loess Plateau where soil is prone to severe erosion.

David C. Weindorf has studied and compared the impact of surface broadcasted N-Viro biosolids and inorganic fertilizer applications on soil properties and nutrients, leaf nutrient concentration.

1.2. Objective

The main objective of this project is to study and transform the urban derelict soil samples into loam soil in which crops or any plants can be cultivated efficiently and effectively. It also focuses on the improvement of the physical quality of urban soil and also on the improvement of the stability of soil aggregate by composting and managing solid waste where it improves the duration of flowering of any plant species through organic fertile technique in which we use large amount of biodegradable waste so that the rate of pollution also decreases gradually and reduces all types of pollution simultaneously.

1.3. Requirements

In this project we have been required to use materials like seed sample (wheat), four types of soil samples, weighing scale, ruler, glass jars, plastic bottles, organic waste, ruler, distilled water (1ltr bottle), pycnometer, pH meter, sieve, earthworms for vermi composting, cow dung, cow urine an neemastra

1.4. Methodology

The methodology includes the selection of four types of soil samples from different sites such as roadside, industrial area , construction site and hospital premises. These soil samples are taken into consideration find the percentage of sand , silt and clay by the means of simple settling technique. Afterwards these soil samples were treated organic matter and with the application of basic farming techniques. Again the percentage of sand , silt , clay of treated soil samples were taken followed by pH, specific gravity and growth rate of a plant is done (noted in line chart).

2. Design methodology

2.1. Data of untreated and treated soil samples(including percentage of sand, silt and clay, pH and growth rate of plant in each soil sample respectively).

Figure 1 Roadside soil sample (untreated).

Figure 2 Construction site soil sample (untreated).

Figure 3 Hospital premises soil sample (untreated).

Figure 4 Industrial area soil sample (untreated).

Figure 5 Roadside soil sample (treated).

Figure 6 Construction site soil sample (treated).

Figure 7 Hospital premises soil sample (treated).

Figure 8 Industrial area soil sample (treated).

2.1.1. Table of untreated soil samples with percentage of sand, silt and clay.

Sr. No.	Location	Sand	Silt	Clay
1.	ROADSIDE	36mm/51mm = 0.705mm (70.5 %)	13mm/51mm = 0.254mm (25.4 %)	2mm/51mm = 0.039mm (4 %)
2.	CONSTRUCTION SITE	39mm/62mm = 0.629mm (62.9 %)	19mm/62mm = 0.306mm (30.6%)	4mm/62mm = 0.064mm (6.4%)
3.	HOSPITAL PREMISES	34mm/58mm = 0.586mm (58.6%)	18mm/58mm = 0.31mm (31%)	6mm/58mm = 0.103mm (10.3%)
4.	INDUSTRIAL AREA	29mm/49mm = 0.591mm (59.1%)	17mm/49mm = 0.346mm (34.6%)	3mm/49mm = 0.061mm (6.1%)

2.1.2. Table of treated soil samples with percentage of sand, silt and clay.

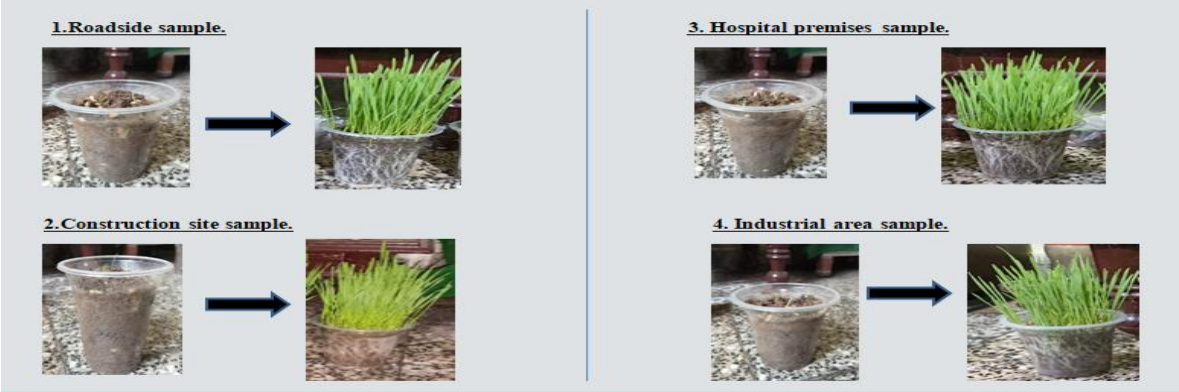
Sr. No.	Location	Sand	Silt	Clay
1.	ROADSIDE	24mm/53mm = 0.452mm (45.2%)	19mm/53mm = 0.358mm (35.84%)	10mm/53mm = 0.188mm (18.8%)
2.	CONSTRUCTION SITE	34mm/65mm = 0.523mm (52.3 %)	20mm/65mm = 0.307mm (30.7%)	11mm/65mm = 0.169mm (16.9%)
3.	HOSPITAL PREMISES	25mm/60mm = 0.416mm (41.6%)	24mm/60mm = 0.40mm (40%)	11mm/60mm = 0.183mm (18.3%)
4.	INDUSTRIAL AREA	22mm/52mm = 0.423mm (42.3%)	23mm/52mm = 0.442mm (44.2%)	7mm/52mm = 0.134mm (13.4%)

2.1.3. pH of untreated and treated soil sample

Soil pH is **a** measure of the acidity or alkalinity of the soil**.** Generally, the ideal pH range is **between 6.0 and 7.0**. Any pH reading below 7 is acidic and any pH above 7 is alkaline. Most crops grows satisfactorily in soils having a pH between 6 (slightly acid) and 8 (slightly alkaline). Here we have determined the pH of untreated and treated soil samples with the help of pH meter.

Sr. No.	Soil samples	pH (untreated sample)	pH (treated sample)
1.	ROADSIDE	5.7	8.22
2.	CONSTRUCTION SITE	5.9	7.56
3.	HOSPITAL PREMISES	5.4	7.85
4.	INDUSTRIAL AREA	5.1	7.65

2.1.4. Growth of plants in untreated and treated soils of each soil sample.

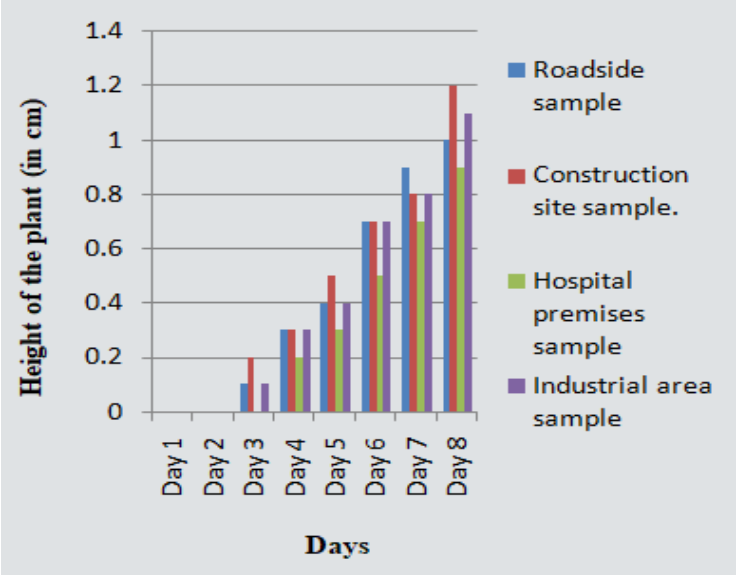


The above picture shows the growth rate of a plant in four samples (untreated and treated respectively). The seed which is used for determining the growth of plant in the above soil samples is wheat seeds. The left hand side photos in the above picture represents the growth of plants in untreated soil as well as the right hand side photos in the above picture represents the growth of plants in treated soil.

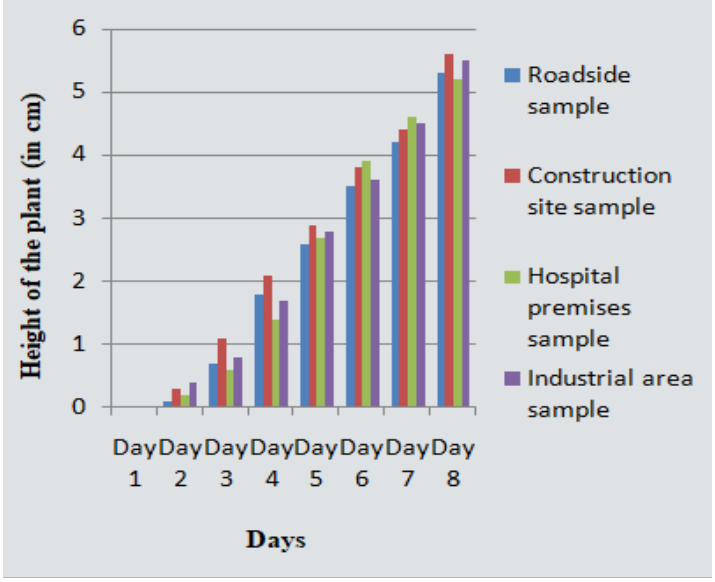
3. Results and discussions

The main objective of this project is to study and transform the urban derelict soil samples into loam soil in which crops or any plants can be cultivated efficiently and effectively. Whereas the growth rate of plants are noted on a line chart and simultaneously the specific gravity of each soil sample is calculated to determine the porosity and compactness between the soil particles.

Clustered column graph:-



The above clustered column graph chart shows the growth rate of plants in each soil samples in centimeters when observed carefully for eight days. The above mentioned chart represents the growth rate of plants in untreated soil samples.



The above clustered column graph chart shows the growth rate of plants in each soil samples in centimeters when observed carefully for eight days. The above mentioned chart represents the growth rate of plants in treated soil samples

4. Conclusion

Here we determined that the polluted soil can get converted into a fertile soil with the help of basic farming techniques and by the help of composting process of organic waste, vermi-composting , cow dung ,cow urine and neemastra. Here we have successfully targeted our goal to convert derelict soil into a loam soil where it will be having a balanced percentage of sand , silt and clay (approximately 40% sand, 40% silt, and 20% clay) with ample organic matter and pore space. The determination of finding the correct percentage of soil , silt and clay is done and simultaneously the pH of all eight soil samples is done perfectly with the help of pH meter in the environmental laboratory. We have derived our whole project with all the proofs determined with facts and figures, calculated and proposed every single answer by our thorough research and hard work.

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