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Short Communication

Effect of different substrate on organic matter during composting process

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Abstract

Organic matter is important to assess the maturity of compost prepared by using organic waste. The decrease in organic matter content reveals that the degradation rate is active. Many microbes utilize this organic matter by mineralization. The study was designed to check the effect of different organic wastes used as a substrate on organic matter. It was concluded from this study that different organic waste substrate show variation in organic matter during the process of composting. The highest value of organic matter was observed in experimental heap with humic acid addition and the lowest was observed in control heap.

Keywords: Substrate, Organic matter, Composting process.

Introduction

Biological degradation of organic waste by optimizing conditions is known as the process of composing. The process of composting is occurring naturally but it can be increase by controlling some parameters. The temperature of compost windrow is increased by the activity of microbes. Different stages of composting come with the activity of different microbes and thus pertain variation in temperature profile. Thermophilic microbes work at their optimum temperature of 50-70^{0}C. Mesophilic microbe's works at moderate temperature[1]. The final output of composting process is humus like substance which can be used to condition the soil and also as bio fertilizer. The main focus of this composting process is to eliminate the phytotoxicity, stability and the reduction of the volume[2]. The polluted soil can be decontaminated by addition of compost in it. The compost used in soil reduces the emission of greenhouse gases. Many technologies are added in to the composting of solid wastes. These technologies include the preparation of material, reduction in size and biological processing.

Composting time is mainly dependent on the nature of organic material[3]. Composting process can be increased by monitoring and optimization of different parameters such as aeration rate, temperature and C: N, it can also increase by the addition of some microbial inoculants. The maturity and stability of prepared compost can be checked by estimating the organic matter content. The value of organic matter must not decrease from 25%[4].

Material and methods

The experimental heaps were prepared with volume of 60 Tons and with different composition of substrates.
Treatment A: municipal solid waste, cow dung and green waste
Treatment B: Screening matter, cow dung, saw dust and green waste.
Treatment C: Cow dung, green waste, municipal solid waste and press mud.
Treatment D: Cow dung, green waste, municipal solid waste and humic acid.
Treatment E: Screening matter, cow dung, paper and green waste.

The sample were collected from each heap after 3.5 months of composting process.

Table-1: Composition of different substrates

Heap No.	Substrate composition	Weight of heap (MT)
1	Cow dung, green waste and municipal solid waste	60
2	Screening matter, cow dung, saw dust and green waste	60
3	Cow dung, green waste, municipal solid waste and press mud	60
4	Cow dung, green waste, municipal solid waste and humic acid	60
5	Screening matter, cow dung, paper and green waste	60

Estimation of organic matter from compost sample: The 15g of compost sample was taken from each heap and left in oven at 120 C for 4 hours. The dried sample was then placed in muffle furnace for 8 hours at 400C. The ash was weight. Organic matter was determined by deducting ash weight from fresh weight[5].

Results and discussion

The organic matter content in all different experimental heaps was tend to decrease by increment of time. The organic matter was decreased in all heaps having different substrate. The highest organic matter was found in compost made up of substrate composition Screening matter, cow dung, press mud and green waste which had a value of 30.9 and lowest organic matter was determined in compost having substrate composition Cow dung, green waste and municipal solid waste which had a value of 24.5.

Table-2: Effect of substrates on organic matter.

Heap No.	Substrate composition	Weight of heap (MT)
1	Cow dung, green waste and municipal solid waste	24.5
2	Screening matter, cow dung, saw dust and green waste	24.8
3	Cow dung, green waste, municipal solid waste and press mud	30.9
4	Cow dung, green waste, municipal solid waste and humic acid	32.5
5	Screening matter, cow dung, paper and green waste	27.5

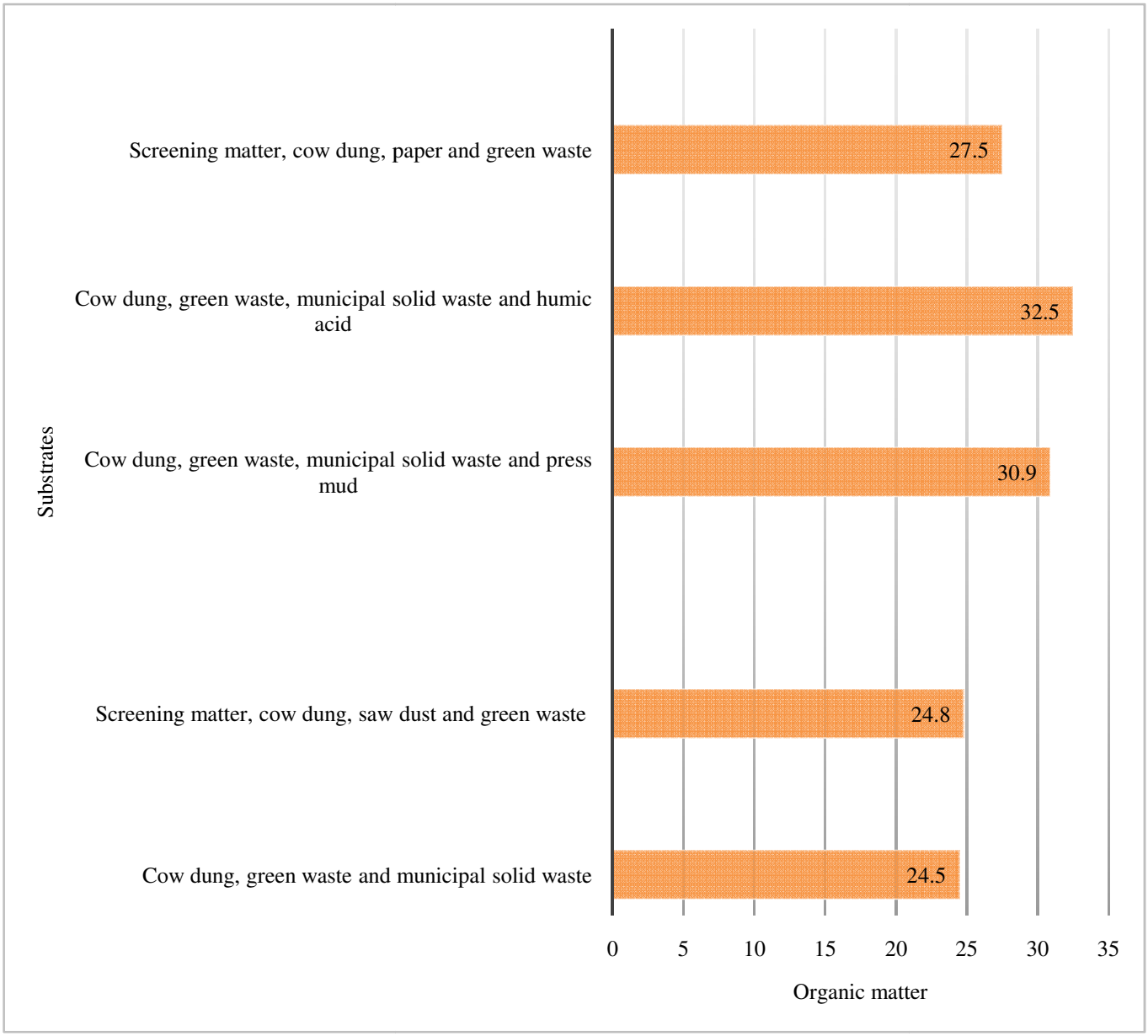

Figure-1: Effect of different substrates on organic matter.\

There is inverse relationship between temperature and organic matter[6]. The percentage of organic matter should be below 30%[7]. The amount of organic matter should be decreased by the activity of microbes because they utilize organic matter [8]. The organic matter content should be below 30%, higher value of organic matter shows that the compost is less stable and mature. The higher degradation is a sign of higher activity of microbes[9]. The less amount of organic matter below 25% showed that the compost is not very essential for the plant growth[10].

Conclusion

The conclusion were made from this study that different substrate showed variation in O.M. The highest value of organic matter was observed in experimental heap with humic acid addition and the lowest was observed in control heap.

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