

# Short Communication Monitoring of Temperature from different Height during Composting Process

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#### Abstract

The temperature during composting is a major factor to get the most stable and mature compost. The maintenance and monitoring of temperature profile is important in order to reduce any pathogenicity and phytotoxicity produce by microbes present in compost heap. This study was designed to monitor the temperature on daily basis and check its effect on compost. The three readings were taken from different height 4ft and 1ft after proper mixing of heap by using Oxygen/Temperature meter. It was concluded that there was a variation observed in temperature profile of compost. The temperature was tend to increase at the initial stage of composting and then decreased at the end.

Keywords: OT meter, Temperature, aeration, compost heap.

### Introduction

There are many microbes present in composting process, these microorganisms can be pathogenic. Many other pathogenic microbes can be incorporated by different animals and birds. To eliminate this pathogenicity from compost and decrease this risk, compost scientist use many strategies. The best way to reduce this risk is self-heat mechanism during composting process. The heat can be generated by providing optimized moisture and proper aeration. The process of composting can reduce pathogens if done properly<sup>1</sup>.

The biological process is the most critical component of aerobic composting process. During the process of aerobic composting Rapid decomposition normally completed within 7-10 weeks. During this period high temperatures are attained leading to speedy destruction of pathogens, insect eggs and weed seeds<sup>2</sup>.

The optimal conditions for aerobic composting can be provide by using different composting systems, one example of most suitable and disease free composting system is thermophilic composting system. The thermophilic composting is divided in three steps. The initial temperature is mesophilic which is moderate up to 40 C. the second stage of composting is thermophilic which can last few months depends on the nature of substrate material used to make compost<sup>3</sup>.

#### **Materials and Methods**

The municipal organic waste was sorted to remove any inert material at Lahore compost Pvt Ltd. The four heaps of organic waste were prepared, each with 552 tons of organic waste. The OT meter was used to take readings of temperature on daily basis. The probe of OT meter was 4 feet and 1 feet long. The temperature was monitored at 4 feet and 1 feet. The heap was mixed properly before reading measurement.

#### **Results and Discussion**

The temperature of the compost pile was tend to increase after few days of composting and then decrease at the end with increase in time interval of composting process.

The temperature of the heap was started to rise at mesophilic stage and then thermophilic stage dominated<sup>4</sup>.

At the thermophilic stage the high activity of microbes was observed and there was reduction in the moisture % of heap. The mesophilic steady stage come after 2 months of thermophilic stage and then we get mature compost. The thermophiles are active in thermophilic stage e.g *bacillus* bacteria take active part in overall degradation of organic waste<sup>5</sup>.

The temperature profile was dependent on the nature of organic material and the inoculum that was added. The temperature profile is decreases at the end of composting and also the rate of bacterial count is decreases<sup>6</sup>.

There is direct relationship between temperature and microbial counts. Temperature is inversely proportional to the aeration<sup>7</sup>. The decrease in aeration of heap increases the temperature. The increase in aeration decreases the temperature of the heap<sup>8</sup>.



Figure-1 Monitoring Temperature by OT Meter



Figure-2 Monitoring Temperature by OT Meter

 Table-1

 Temperature profile of compost during 1st month

	Temperature (°C)				
Treatments	Week 1	Week 2	Week 3	Week 4	
Α	60.3±0.80	58.6±1.00	55.9±0.97	50.9±0.78	
В	61.5±0.81	58.0±1.10	52.2±0.95	50.1±0.73	
С	61.0±0.84	58.01±0.90	54.0±0.97	50.1±0.75	
D	60.3±0.74	57.8±0.87	54.9±0.83	50.1±0.74	
Significance with 3 and 7 df	NS	NS	NS	NS	



Figure-1 Variation in temperature profile at the start of composting process

remperature prome or compost during 2 month						
	Temperature ( °C)					
Treatments	Week 5	Week 6	Week 7	Week 8		
Α	48.00±0.80	48.3±0.78	51.1±1.90	51.4±0.74		
В	47.00±0.80	48.1±0.76	51.00±1.99	51.00±0.72		
С	47.00±0.90	47.78±0.89	48.98±1.20	49.76±0.72		
D	47.9±0.97	45.00±0.96	48.80±0.95	46.56±0.70		
Significance with 3 and 7 df	NS	NS	NS	NS		

 Table-2

 Temperature profile of compost during 2<sup>nd</sup> month





## Conclusion

The variation in temperature profile was observed. The temperature rise at the start of composting process and reached at thermophilic stage. Temperature was tend to decrease at the end of composting process and mesophilic conditions dominated in a compost pile. The rise in temperature at the start of composting process is important as it remove pathogens from waste and make healthy compost which can be used as a fertilizer and soil conditioner.

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