



## Organic matter decomposition assessment

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### ABSTRACT

A laboratory experiment was conducted to assess the state of decomposition of organic matter; the different methods of assessment followed were the estimation of the amounts of carbon dioxide (in aerobic) and biogas (in anaerobic) evolved during the decomposition, moisture, nitrogen, phosphorous and potassium content of the decomposed mixtures. Addition of zinc in the decomposition mixtures affected the decomposition of organic matter. Correlation co-efficients between different methods were highly significant.

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**Key words :** Assessment of decomposition, Nitrogen, Phosphorus, Potassium content, Biogas and carbon dioxide evolved

### INTRODUCTION

Decomposition rate of organic matter depends upon the oxygen supply, temperature, moisture, pH, C, N, P, S and heavy metal contents of the decomposition mixtures. Presence of heavy metal effect on decomposing organisms and litter decomposition because these elements can reduce population of decomposers and decomposition rates (Jorden and Lechevalier, 1975). In the present investigation, an attempt has been made to find out an easy and most practical method to measure the relative state of decomposition of organic matter.

### MATERIALS AND METHODS

#### Aerobic decomposition:

To 150 gram of fresh dung (86% moisture) 30 g of wheat straw (10% moisture) and 55 ml water were added and mixed uniformly. Increasing amounts of zinc were added so as to get total concentrations of 1000, 2000, 4000, 6000, 8000 and 10000 ppm Zn through  $ZnSO_4$  and 2000, 6000, 10000 ppm Zn through ZnO on dry weight basis. The municipal and industrial decomposable wastes may contain significant amounts of soluble and insoluble

zinc compounds which in present investigation are represented by  $ZnSO_4$  and ZnO, respectively.

The mixture were transferred to one liter round bottom flask which were connected to an aeration unit  $CO_2$  – free and moisture saturated air was passed continuously through the flasks and the  $CO_2$  evolved was absorbed in NaOH. The amounts of  $CO_2$  were determined periodically by titrimetric method. The experiment was run at 30°C and continued upto 35 days, when there was little change in the rate of  $CO_2$  evolution per unit time in the untreated mixture.

#### Anaerobic decomposition:

Water (255ml) was added to 150g of fresh cow dung to make slurry containing 5% dry matter. Different amount of zinc were added as  $ZnCl_2$  under anaerobic conditions  $SO_4$  is reduced to  $H_2S$  which becomes toxic to fermenters and ZnO is not soluble in water, hence  $ZnSO_4$  and ZnO were excluded to the mixture so as to get final concentration of 50, 100, 200, 400 and 500 mg Zn (equivalent to 10000 ppm dry matter) per liter.

The mixtures were transferred to one liter round

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