# Effect of Different Manure Application on Organic Carbon of Soil Sample from Agra City

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*Abstract*— Study of physicochemical parameters is important to agricultural chemists for plants growth and soil management. Organic Carbon and Organic matter showed significant variation as shown in the present study. Three different types of manure were used (cow, goat, and buffalo manure). Organic Carbon varied from 0.035% - 1.81%, while Organic matter varied from 0.06% - 3.12% among all the manure treatments.

*Keywords*— Soil parameters, Organic Carbon, Organic matter, Manure treatments.

### I. INTRODUCTION

medium of unconsolidated materials and nutrients, Awhich forms a life layer of plants and is an essential component for plants, is known as soil. It is a very basic life support components of biosphere. For soil management and plants growth the physicochemical study of parameters is important to agricultural chemists.[1]-[2] For growth of roots in plant, Phosphate is used. Calcium provides normal transport and retention of other elements and it is an important part of plant cell wall.[3]-[6] Environmental factors such as (climate, soil and topography) among other affect the health of roadside tree/shrub species. These factors affect the distribution of roadside vegetation. Soil remains natural as it provides nutrients, moisture and grip to the plants among the various environmental factors which determine the distribution of tree/shrub species.[7] Several studies on the effect of soil properties affecting tree/shrub distribution mainly focused on the forest ecosystem [8]-[12] and some other studies focused on automobile induced contamination levels. [13]-[15] Few studies are also found on the effect of roadside soil in affecting tree/shrub speciation and abundance.[7], [16]-[18] These studies identified varying soil properties that affect the distribution of roadside flora species. These differences could be explained by the change in soil, climate and vegetation among other factors.

The soil forms the middle zone between the atmosphere and the rock cover of the earth, the lithosphere. It also forms the line between water bodies (hydrosphere) and the lithosphere and so forming a part of biosphere. The soil may be defined as the uppermost weathered layer of the earth's crust in which are mixed organisms and products of their death and decay. It may also be defined as the part of the earth's crust in which plants are anchored. In this paper effect of different manure application on organic carbon of soil sample from agra city were studied.

### II. EXPERIMENTAL

#### Determination of percentage organic carbon (% OC)

Organic carbon content in the soil/sludge was determined according to the modified Walkey and Black's method as described by Jackson (1958). One gram of soil/sludge samples was placed in a 500mL conical flask. Then 10ml of 1 N Potassium Dichromate (K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>) solution was poured on the soil and the content was mixed by swirling the flask. This was followed by the addition of 20 mL of concentrated H<sub>2</sub>SO<sub>4</sub> and the mixture was allowed to stand for 20-30 minutes. A blank (without soil) was also run in the same manner. The mixture was diluted to 200 mL with water. To the contents of flask 10 mL (87%) Orthophosphoric acid, 0.2 gram of Sodium Fluoride and 1 mL Diphenylamine indicator was added. The solution was back titrated with 0.5 N Ferrous Ammonium Sulfate (FAS till a turbid blue colour changed to brilliant green at the end point). The organic carbon content in the soil/sludge samples was calculated as follows:

### Where,

0.003- Milli equivalent weight of carbon

0.76- Fraction of organic carbon which was oxidized to carbon dioxide

100- Percentage conversion factor

Milli equivalent oxidation – Volume of  $K_2 C r_2 O_7 \, x$  normality of  $K_2 C r_2 O_7$ 

Milli equivalent reduction – Volume of ferrous ammonium sulfate x normality of ferrous ammonium sulfate

### Organic matter

Organic matter is defined as the organic fraction derived from living organisms. The organic matter is obtained by multiplying the % OC concentration by a constant factor. This factor varies from 1.724-2.00.

Organic Matter (%) =  $1.724 \times \text{Organic Carbon}$  (%)

### **III. RESULTS AND DISCUSSION**

Organic Carbon and Organic matter showed significant variation as shown in Table 1. Three different types of manure were used in the present study (cow, goat, and buffalo manure). Organic Carbon varied from 0.035% - 1.81%, while Organic matter varied from 0.06% - 3.12% among all the manure treatments.

Cow dung was used in three different amendments i.e. 26t/h, 52t/h and 104t/h. It was found that Organic Carbon and Organic matter showed a variation from 1.43% - 1.81% and 2.46% - 3.12% respectively. Cow dung at 104t/h had the highest (1.81%) and 26t/h had the lowest (1.43%) Organic Carbon. The highest Organic Carbon percentage was found to be 5071.42% more than the control soil sample (without manure addition) and 26.57% more than the its respective 26t/h manure addition.

Goat manure was also used in three different amendments i.e. 26t/h, 52t/h and 104t/h. It was found that Organic Carbon and Organic matter showed a variation from .87% - 1.29% and 1.5% - 2.22% respectively. Goat dung at 52t/h had the highest (1.29%) and 26t/h had the lowest (.87%) Organic Carbon. The highest Organic Carbon percentage was found to be 3585.71% more than the control soil sample (without manure addition) and 48.27% more than the its respective 26t/h manure addition.

Buffalo manure was also used in three different amendments i.e. 26t/h, 52t/h and 104t/h. It was found that Organic Carbon and Organic matter showed a variation from .593% - 1.43% and 1.02% - 2.46% respectively. Buffalo dung at 52t/h had the highest (1.43%) and 104t/h had the lowest (.593%) organic carbon. The highest Organic Carbon percentage was found to be 3985.71% more than the control soil sample (without manure addition) and 95.35% more than the its respective 26t/h manure addition.

Table 1: Organic carbon and organic matter in control and different manure amended soil samples

Sample name	Soil Organic Carbon	Soil Organic Matter
Control	.035±.002	0.06±.026
Α	.87±.02	1.5±.200
В	1.29±.01	2.22±.053
С	1.11±.06	1.91±.036
D	1.43±.02	2.46±.036
Ε	1.63±.060	2.81±.036
F	1.81±.096	3.12±.035
G	0.732±.006	1.26±.036
Н	1.43±.02	2.46±.036
I	.593±.004	1.02±.020

Figure1: Variation in SOC and SOM with control soil and different cow dung amended soil samples



Figure2: Variation in SOC and SOM with control soil and different goat amended soil samples



Figure3: Variation in SOC and SOM with control soil and different buffalo amended soil samples



## **IV. CONCLUSION**

From the above study it may be concluded that when we use different types of manure at different concentration, cow dung showed the highest organic carbon (1.810%) as well as organic matter (3.12%) at 104t/h. This highest organic carbon in cow dung manure was found to be 5071.42% higher than the control (0t/h manure) and 63.06% and 205.22% more than the other manures (goat and buffalo) at the same amendment respectively.

It was also concluded that goat and buffalo manure showed the best results at 52t/h, while cow manure showed the best results at 104t/h amendments.

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