SHORT COMMUNICATION

EVALUATION OF ORGANIC CARBON STATUS IN SOILS OF JAIJAIPUR BLOCK IN DISTRICT JANJGIR-CHAMPA OF CHHATTISGARH

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Abstract: A Study was undertaken to evaluate the fertility status of Jaijaipur block in Janjgir- Champa district, Chhattisgarh covering 105 villages during 2011-2012. The systematic collection of samples in geo–referenced surface (0-0.15m) soils samples from 2485 sites representing *Inceptisols*, *Alfisols* and *Vertisols* using Global Positioning System. The statistical description of soil characteristics indicated that the The organic carbon content in these soils varied from 0.22 to 0.75% (mean-0.46%), which was observed to be low to medium in organic CARBON status. The present study revealed that there is wide variation in soil low to medium in organic carbon.

Keywords:

INRODUCTION

In developing nations like India, where the land-person ratio is rapidly declining, the population of our country is continuously increasing; the only means to fulfill the needs of agricultural produce is through increased productivity without detriment to environment and sustainability.

Crop production broadly depends on the fertility of the soil where a crop is raised. The kind and quality of seed, climate of the region, soil moisture regime and plant protection measures adopted by a farmer are some other factor which affect the volume of production. But even if all these factors of crop production are in their optimum, the fertility of the soil largely determines the ultimate yield.

Modern crop production technology has considerably raised the out-put, but has created problem of land degradation, pesticide residual in farm produce, atmospheric and water pollution. In general, Indian soils are poor in fertility, since their nutrients reserves are being consistently depleted over the years with continuous cultivation.

Jaijaipur is located at Janjgir-Champa district lying between 21° 84' 25 HYPERLINK "http://stable.toolserver.org/geohack/geohack.php?pagename=Baloda&params=22.15_N_82.48_E_""
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HYPERLINK "http://stable.toolserver.org/geohack/geohack.php?pagename=Baloda&params=22.15_N_82.48_E_"E HYPERLINK "http://stable.toolserver.org/geohack/geohack.php?pagename=Baloda&params=22.15_N_82.48_E_" HYPERLINK "http://stable.toolserver.org/geohack/geohack.php?pagename=Baloda&params=22.15_N_82.48_E_"longitudes. It has an average elevation of 284 m. Systematic survey is carried out for evaluation the soil fertility status of Jaijaipur block of Janjgir-Champa district, a surface (0-15 cm, depth) soil samples were collected from 105 villages sites by following the standard procedures of soil sample collection. The locations of soil sampling sites were marked on the cadastral map on 1:4000 scales.

MATERIAL AND METHOD

Organic carbon was estimated by Walkley and Black's (1934) rapid titration method. Walkley and Black's (1934) rapid titration method as described by Jackson (1967). Which was followed for organic carbon determination is as described below.

Reagent

- 1N potassium dichromate (49.04 g of AR grade $K_2Cr_2O_7$ per liter of solution).
- 0.5 N (proxy) ferrous ammonium sulphate (196 g of hydrated crystalline salt per liter containing 20 ml of conc. H_2SO_4)
- Diphenylamine indicator ; Dissolve 0.5 g Diphenyl amine in a mixture of 20 ml of water and 100 ml of conc. H_2SO_4 .
- Concentrated sulphuric acid (sp. gr. 1.84)
- Ortho-phosphoric acid (85%) (chemically pure)

Procedure

The soil is ground and passed through 2 mm sieve. Place 1 g. soil at the bottom of dry 500 ml conical

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flask and add 10 ml of 1N $K_2Cr_2O_7$ and swirl a little. The flask is kept on asbestos sheet. Then add 20 ml of concentrated H_2SO_4 and swirl again two or three times. The flask is allowed to stand for 30 minutes preferably in darkness. Add 200 ml of distilled water, 10 ml of Ortho-phosphoric acid and titrate the contents with ferrous ammonium sulphate solution till the color changes from blue-violet to green. Simultaneously, a blank is run without soil. If more than 7 ml of dichromate solution is consumed, the determination must be repeated with a smaller quantity (0.25-0.50 g.) of soil.

Calculation

Organic Carbon (%) in Soil = 10 (B-S)/B x 0.003 x 100/wt of sample (g)

Where B & S stand for the titrate value (ml) of blank and sample respectively.

(Where: B- Blank, S-Sample)

RESULT AND DISCUSSION

Organic carbon (OC)

Data presented in table 1 revealed that most of the soils are having low to medium status of organic carbon. It ranged from 0.22 to 0.75 % with a mean value of 0.46% in soils of Jaijaipur block. Nearly, 70.22% soil samples of Jaijaipur block of Janjgir-Champa district were low in OC content considering the soils having <0.25% as very low, 0.25- 0.50 % as low, 0.50- 0.75% medium and >0.75% as high in OC status. The overall OC content ranged from 0.22 to 0.68, 0.26 to 0.75 and 0.33 to 0.73% with mean of 0.45, 0.47 and 0.51% in *Inceptisols, Alfisols* and *Vertisols,* respectively (Appendix-II). The soils of Jaijaipur had 0.2% soil samples in very low, 70.2% in low and 29.6 % in medium OC status. The majority of the soil samples analyzed for soil OC content *i.e.* 75.0, 66.1 and 54.5% samples observed as low, 24.7%, 33.8% and 45.5% samples were rated as medium and only 0.3, 0.1 and 0% samples were reported as very low classes in *Inceptisols, Alfisols* and *Vertisols,* respectively.

High temperature and good aeration in the soil increased the rate of oxidation of organic matter resulting in reduction of OC content. The high temperature prevailing in the area is responsible for the rapid burning of organic matter, thus resulting in low organic carbon content of these soils. Similar results were also noted by Sharma *et al.* (2008) in soils of Amritsar district.

The above findings also corroborate with the results of Jatav (2010) in the soils of *Inceptisols* group of Baloda block of Janjgir-Champa district of Chhattisgarh, Vaisnow (2010) in soil of *Vertisols* of Dhamtari block under Dhamtari district in Chhattisgarh and Shukla (2011) in soils of Pamgarh block in Janjgir-Champa district Chhattisgarh.

An average value of OC content of the soil was found minimum *i.e.* 0.34% for the village Bhanetara and maximum *i.e.* 0.61% for Kaitha village (Appendix-I) of Jaijaipur block.

Table 1. Distribution and categorization of organic carbon status in soils of Jaijaipur block.

Organic carbon (%)	Inceptisols		Alfisols		Vertisols		Total (%)
Classes	No. of Samples	% Samples	No. of Samples	% Samples	No. of Samples	% Samples	
Very Low (<0.25)	4	0.3	1	0.1	0	0	0.2
Low (0.25-0.50)	1131	75.0	462	66.1	152	54.5	70.2
Medium (0.50-0.75)	372	24.7	236	33.8	127	45.5	29.6
High (>0.75)	0	0.0	0	0.0	0	0	0

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