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Physicochemical and Microbiological Analysis of Soil around Lonand City and adjoining Area of MIDC

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ABSTRACT

Soils on which plants depend for their nutrients, water and minerals supply. It contains number of salts, alkalis, organic matter and various biological systems. Soil is the region on the earth's crust where geology and biology meet, the land surface that provides a home to plant animal and microbial life. Soil teems with microscopic life (bacteria, fungi, algae, protozoa and viruses). Due to industrialization and other anthropogenic activities the soil gets polluted. Due to increasing relevance of these, the necessity of soil analysis is felt desirable. Also the contents vary from place to place .Soil sample were collected from around the Lonand MIDC area of various villages. Where the sugarcane & Onion is the main crop. In the present study soil sample were analyzed for their physical, chemical and Microbiology contents such as p^H, Conductance, % of organic Carbon, Density of soil, Porosity of soil, Maximum water holding capacity of soil and various essential nutrients such as Nitrogen, Potassium & Phosphorous. Experimental observation show that high values of p^H of soil sample indicate there is an excessive use of fertilizer. Results also shows that conductance also higher in sample no.5,6&9 indicate salt formation showing alkaline nature of soil which affects the yield of crop. Sample no.1, 3, 7 shows higher in nitrogen contents indicates use of excess nitrogenous fertilizer by farmer. Microbial analysis was carried out by serial dilution method. As soil is the indispensible part of all life process on earth its proper analysis is necessary

KEYWORDS

Soil analysis, anthropogenic, Nitrogen, Phosphorous. Bacteria, Fungi

INTRODUCTION

Soil, a natural body which develops as a result of pedogenic processes that takes place during and after weathering of rocks in which plants and other forms of life able to grow. Soil is one of the most significant ecological factors which are derived from the transformation of surface rock. Soil on which plants depends for their nutrients, water and mineral supply. It constitutes an important medium where numerous animals live. The word 'soil' is derived from Latin word 'solum' which means earthy materials in which plants grow. Disposal of industrial waste is the major problems responsible for soil pollution the pollutants affect the chemical and biological properties of soil (Chauhan et al., 2011). Today due to advanced agro technology huge quantity of chemical fertilizers, pesticides, herbicides, weedicides and conditioning agents are employed to increase the crop of yield. (Rabah et al., 2010, 2010a). Many agriculture lands have now excessive amount of plant and animal wastes which creates pollution problems (Doi et al., 2009). As 80% Economy of our country is depends on the agriculture it is necessary to analyzed the soil in proper way therefore in the present investigation Physicochemical analysis of soil around Lonand area is undertaken.

MATERIAL AND METHOD

Study area

The study area contours of Lonand at a radius of 15 km. In the selection of site and sample collection of soil depends on the nature of analysis. Composition sampling is the best method for soil analysis (Hossain et al., 2012). The climate is characterized by a long dry season with cool dry air from November to February and a hot season from March to May, then followed by a short rainy period from June to September.

Sample collection:

Nutrition study requires sample at the depth of 10 cm. Borer samples are used for this purpose. Soil samples were collected from local reservoirs and sealed in tight cloth bag at the depth of 10 cm and 20 cm valley.

Physicochemical analysis of soils:

The investigations were done by standard methods. p^H was calculated by digital p^H meter. Electrical conductance was estimated by standard EC-TDS meter. Nitrogen was estimated by Kell-Plus Microkjeldahls distillation unit. Phosphorus was estimated by using spectrophotometer. Maximum water holding capacity of soil sample, density and porosity of soil was calculated by standard method at Central Sugar Research Station, Padegaon.

Microbiological Analysis of Soil:

Microbial study for fungal micro flora was carried out by serial dilution method (Ime et al., 2008) and cultured on PDA medium (Potato Dextrose Agar).

OBSERVATIONS

Table : I Showing different physical Parameter of soil

Sr. No	Place of Samples	Depth in cm	pH	Cond. X 10^{-3}	% of O.C	% N	% P	% Porosity	Density	MWHC
1	Birobavasti	10	10.20	0.21	0.78	37.02	10.1	60.25	1.042	50.38
2	Birobavasti	20	10.23	0.23	0.89	26.12	30.50	58.05	1.112	47.47
3	Shedgevadi	10	09.76	0.24	0.70	45.72	50.40	51.91	1.274	37.98
4	Shedgevadi	20	09.69	0.23	0.78	19.59	45.40	54.73	1.213	37.27
5	Marichivadi	10	09.13	0.93	0.97	29.39	35.20	61.02	1.031	48.79
6	Marichivadi	20	08.93	1.01	1.09	22.86	45.40	60.57	1.0457	50.36
7	inddiranagar	10	09.54	0.32	1.32	42.45	83.00	62.02	1.006	52.85
8	inddiranagar	20	09.61	0.12	1.40	19.59	83.00	36.94	0.955	60.19
9	Kokan	20	06.96	1.00	1.89	32.66	75.20	53.146	1.2427	36.72

Cond.= Conductivity,O.C.=Organic Carbon,N=Nitrogen,P=Phosphorous,MWHC=Maximum Water holding Capacity
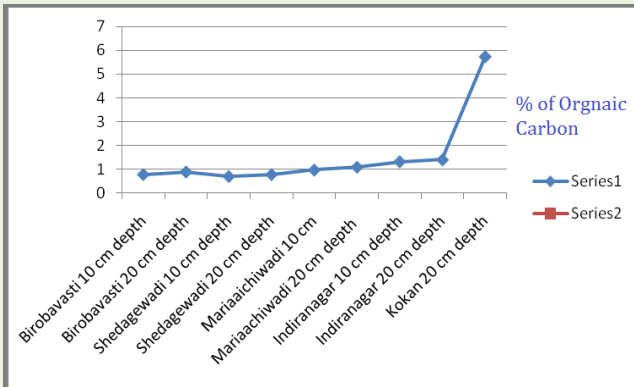
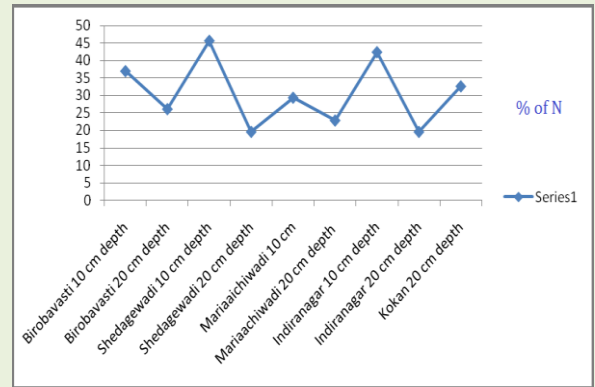**Graph.1:** Variation of p^H across all samples locations
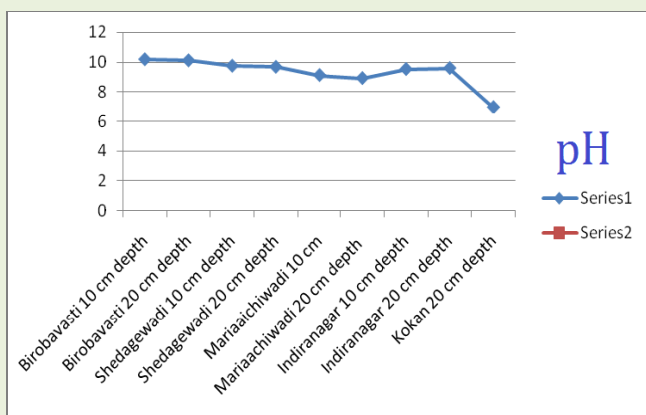
Graph.2: Variation of Conductance across all samples locations
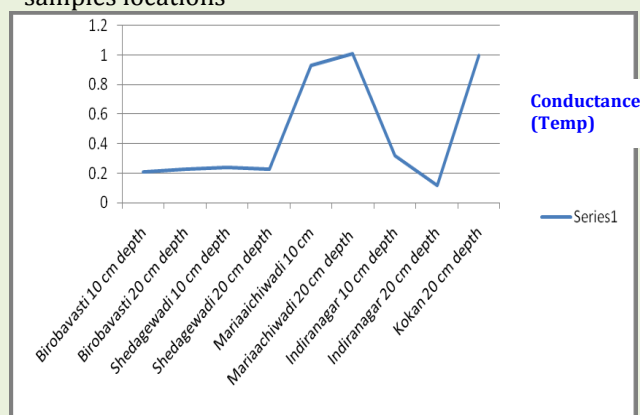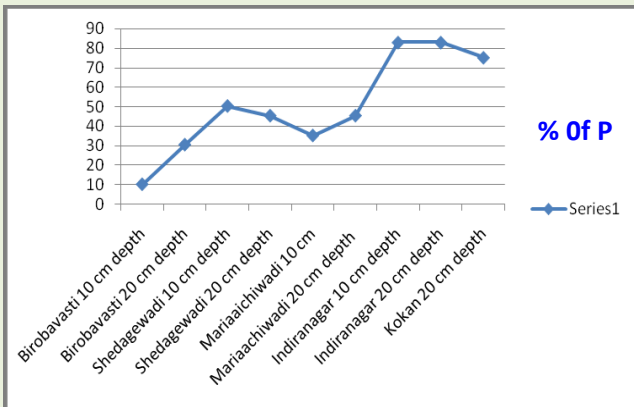
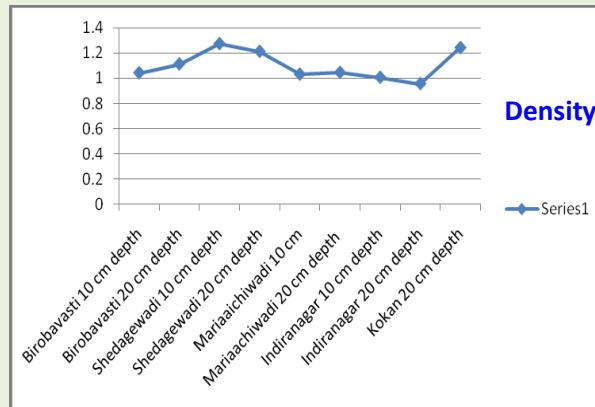**Graph 3:** Variation of % of organic carbon across all samples locations

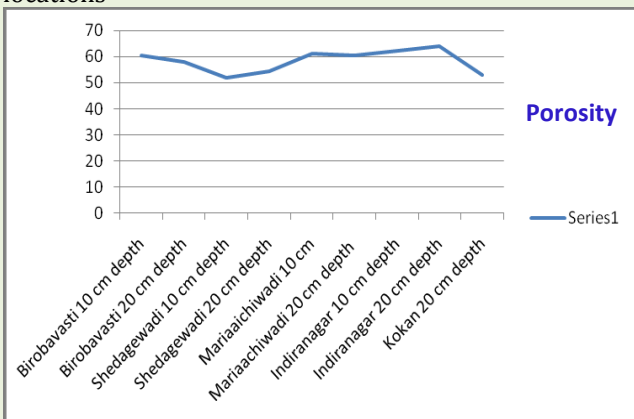**Graph 4:** Variation of % of Nitrogen across all samples locations

Graph.5: Variation of Phosphorous across all samples locations
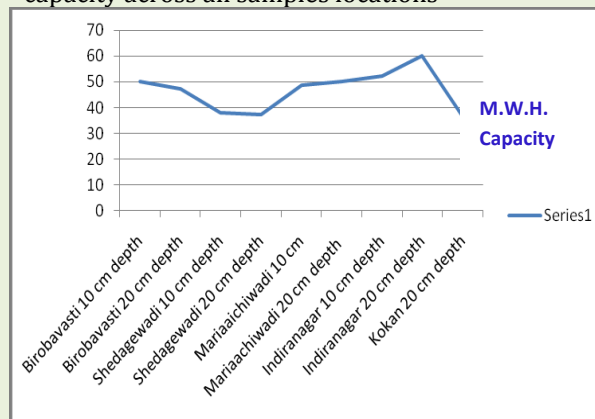

Graph.6: Variation of Density across all samples locations

Graph.7: Variation of Porosity across all samples locations

Graph.8: Variation of Maximum water holding capacity across all samples locations

RESULTS & DISCUSSION

It was observed that p^H of all tested soil samples were between 6.96 to 10.20 (as indicated in graph 1) indicates the alkaline soil, the high p^H reduces the availability of some of the nutrients. Diseases like lime induced chlorosis are developed and decreases the fertility of soil and affect over yield of crop.the electrical conductivity of water extract of soil gives a measure of the soluble salts contents of the soils Sample no.1, 3, 7 (Graph 4) shows higher in nitrogen contents indicates use of excess nitrogenous fertilizer by farmer. Common genera of Fungi isolated from collected samples include *Absidia*, *Alternaria* , *Aspergillus* , *Chaetomium* , *Fusarium*, *Mortierella*, *Mucor*, and *Penicillium* .

CONCLUSION

Lonand is a village having big market of onion in Khandala Tahasil.It is situated on the boundary of Satara& Pune district. Though it is dry & Hilly Tahasil, the main crops are "Bajara" 'sugarcane' & "Onion". Basic requirement of these crops are Nitrogen, Phosphorus, & Potash. But repeated production of "Bajara" & "Onion" causes much pollution to soil. There are mainly two reasons for cause of Soil Pollution. Firstly majority of farmers use more & more chemical fertilizers and also there is deficiency of water. Because of these reason the soil becomes either highly Acidic or highly Basic. It decreases fertility of soil & increases the hardness of soil. Secondly Nira is the nearest place to Lonand, where Polychem Chemical industry is situated. This chemical factory throws industrial west material in the river and causes water pollution. Nira as well as nearest farmers uses this polluted water for irrigation. It causes harm to the soil & affects the fertility of soil.

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