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Current Status Of Physical And Chemical Properties Of Industrial Soil In Kanpur, Uttar Pradesh

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Abstract

Kanpur is the largest city for tanning industries and manufacture for leather and major contributor of country's finance and supply leather good for millions of people. The valley experiment was conducted during the year 2024-2025 in different sites of district Kanpur, U.P. We aimed to study the physical and chemical properties in industrial soil. We collected 15 soil samples from different sites of industrial soil. The soil samples were analysed for their physical and chemical properties. Soil sample were collected from different depth at 0-30cm, 30-60cm and 60-90cm. The result declared that soil colour varied different in dry and wet condition. The texture was soil is mainly sand, Loam, alluvial, laterite and clay. Chemical properties that p^H, electrical conductivity and organic carbon. The pH range is 0.80 – 8.0 and EC found range 0.65 – 0.90 ds/m, while organic carbon was ranged from 0.43-0.71%. The study exhibit the physical and chemical properties of Kanpur U.P., India.

Key Words: Industrial, finance, pH, electrical conductivity, Organic carbon and soil texture.

Introduction

A basic natural resource is soil, on which the development of human being and other living beings in addition to water and plants has been going on from the beginning. The soil word is derived from the Latin word 'Solum' which means the early materials in which all living things live inside and outside the circumference (Saxena *et.al*, *2021*). One of the most precious natural resources is soil that provides a medium for plant growth to meet our food and fiber needs (Naphade *et al,*2021). Soil can affect physical-chemical properties under special soil use system that can modify the fertility of plants and profitability to nutrients (Sharma *et.al,* 2020). Soil has an adverse effect which affects the growth and yield of crop plants due to adverse physical chemical properties (Parihar *et al,* 2013).

Water and nutrients are a major input for crop production. In various countries, the problem of pollution is also increasing with rapid growing industrialization, resulting in exploitage valuable of fresh water for agriculture. It is predicted that in 2025 most Asian countries may face serious problem related to water availability (Singh and Singh 1999). In many areas of developing countries untreated waste flours into rivers through water channels of vegetables including tomato, carrot, cabbage and other vegetables and is easily consumed as a salad and consumption affects people's health (Akan *et.al,* 2010; Amusan*et.al,* 2005; Awcmeso *et.al,* 2009). Treated effluents can be used for irrigation under controlled conditions to minimize

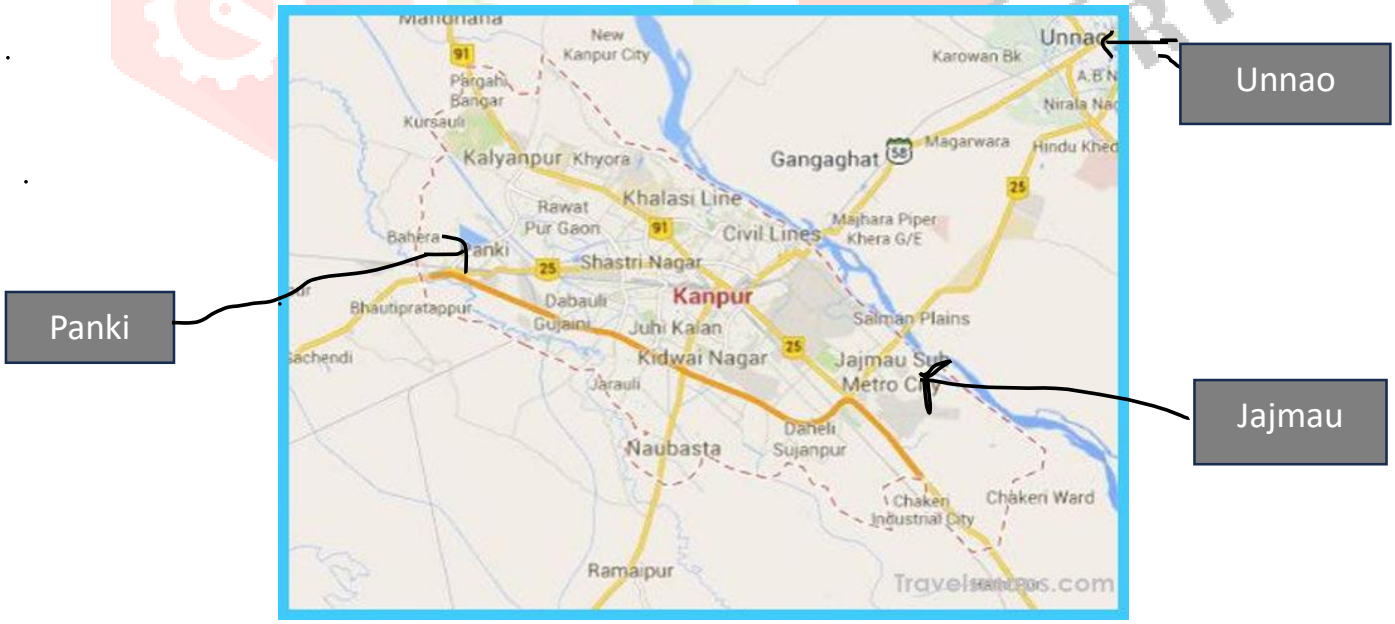
the transfer of pathogenic and toxic contaminants into agricultural products, soil surfaces and ground water (Batarseh *et.al,* 1989). The study of the physical and chemical characteristics interrelationship with each other. The physical properties of soil depend upon shape, size structure pore spaces of organic matter and mineral composition of soil (Chen *et.al,* 2016). Amount of available nitrogen, phosphorus and other nutrients also increased in the soil but excess of them can leach and pollute groundwater under continuous effluent use for long periods (Chaney, 1990).

Material and Methods

Kanpur city is located at 26^0 27' 39.60" N latitude and 80^0 19' 18.48" E longitude. Kanpur is in U.P. The perusal domain was split into three apart sites (unnao, Jajmau, Panki) from the district under study. Samples of Upper, middle and lower layers of soil were collected from a place at a distance of about 1 kilometer from the industrial area (Unnao, Jajmau, Panki). The distance between the three layers is 0-30cm, 30-60cm and 60-90cm (Pal *et.al,* 2025). 15 soil samples were collected from these sites. The collected soil pattern was procedures examine the physio-chemical properties of soil by the apart device such as atomic absorption spectrometer and spectrophotometer.

The research was conduct in different sites of Kanpur Nagar. Kanpur a major industrial district of U.P. The current examination soil sample collected from three apart sites and various field for study the physico-chemical characters of soil and examine by standard analytical device. The data was recorded during the research of analyzed were subjected to statistical analysis by (ANOVA)" Analysis of variance technique (Fisher *et.al,* 1927).

Filtrate soil samples were determined for physical properties like soil texture and soil coiour (Bouyoucos, 1927., Munsell 1954., Muthuvel *et.al,* 1992). Determine the chemical properties of soil like pH, EC and OC. pH was measured by digital pH meter in which ratio 1:2 soil and water are present, While EC measured by EC (Wilcos, 1950), OC determine by wet oxidation method (Walkley, 1947).



Source: Pinterest, Map of Kanpur

Result and discussion

Physical properties

The outcome showed that most of the soil of Kanpur Nagar, reflected brownish, reddish brown, yellowish brown and grayish colour. Soil texture of soil sample was sandy, loamy, laterite and alluvial soil. Result of this study are described under table (1).

Table 1. Soil colour and soil texture of different industrial sites of Kanpur

			Soil colour		
S.No	**Sites**	**Soil texture**	**0-30 cm**	**30-60 cm**	**60.90 cm**
1.	**Unnao**	Alluvial soil	Light grey	Dark brown	Dark brown
		Laterite soil	Yellow	Reddish	Brownish
		Alluvial and Laterite soil	Reddish brown	Black brownish	Dark grey
2.	**Jajmau**	Sandy soil	Yellowish brown	Dark yellow	Brownish
		Alluvial soil	Light grey	Dark yellow	Dark brown
		Loam soil	Yellowish	Yellow	Brown
3.	**Panki**	Loam soil	Light yellow	Reddish yellow	Brown
		Sandy soil	Yellowish	Light Reddish	Yellowish brown
		Laterite soil	Light Reddish	Brown	Dark brown

Chemical properties

The data for soil pH, EC and OC, that maximum pH 8.0 recorded with depth of 60-90 cm where the land use for the production of Maize, rice and wheat, minimum pH 0.80 was found with the depth of 60-90 cm where the land is also used for vegetables such as Beans, cabbage and potato. The maximum OC is 0.71% was recorded from the depth of 60-90 cm and the land is Grass whereas, minimum OC is 0.43% was found at the depth of 30-60 cm where land is agriculture. The EC is concerned the maximum EC 0.90 ds/m was recorded at 60-90 cm where the land is vegetable and minimum EC 0.65 ds/m was found at the depth of 0-3- cm where land is agricultural.

The pH value range of the various land use system (0.80-8.0), EC (0.65-0.90 ds/m) and OC (0.43-0.71%). The higher OC in soil which is used for Grass. The EC is less at Upper layer (Agriculture) and more at Lower layer (Vegetables). The pH increases to rising of soil depth under all lands. Similar finding was reported by (Kumar *et.al* 2023, Sahu *et.al* 2016). Result of this study are mentioned under table (2).

Table 2. pH, Electrical Conductivity and Organic Carbon values of various Land in Kanpur

S.No	Land	Soil depth	pH	Electrical conductivity ds/m	Organic carbon (%)
1.	**Agricultural**	0-30 cm	7.8	0.65	0.44
		30-60 cm	7.9	0.78	0.43
		60-90 cm	8.0	0.75	0.63
		Mean	**7.9**	**0.72**	**0.5**
2.	**Vegetable**	0-30 cm	7.6	0.72	0.70
		30-60 cm	7.6	0.80	0.46
		60-90 cm	0.80	0.90	0.63
		Mean	**7.8**	**0.80**	**0.59**
3.	**Pulse**	0-30 cm	7.7	0.78	0.70
		30-60 cm	7.8	0.79	0.64
		60-90 cm	7.0	0.75	0.64
		Mean	**7.7**	**0.77**	**0.66**
4.	**Grass**	0-30 cm	7.8	0.70	0.50
		30-60 cm	7.6	0.74	0.51
		60-90 cm	7.7	0.75	0.71
		Mean	**7.7**	**0.73**	**0.57**
		Total Mean	**7.78**	**0.74**	**0.54**
		Standard deviation	**0.1304**	**0.357**	**29.2836**

Conclusion

The soil around the industrial area present in Kanpur is not good for harvestable. The harvest manufacture at such a place is low. This research exhibit apart industrial soil sites of Kanpur Nagar at various parameters. These result help to retouch the soil health for peasant harvest manufacture. Soil texture exhibit alluvial, sand, loam and laterite soil qualities. Soil has pH natural to alkaline in temper. EC is moderate in soil, its also united that farming soil and vegetables soil need the addition of organic carbon. Some organic and inorganic carbon used as fertilizers which help in preserve of soil soundness and creativeness in the account of field.

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