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CHEMO TOXICITY INVESTIGATION AND PHYSICO CHEMICAL STUDY OF SAMPLES OF SOIL WITH CHEMICAL WASTE EFFLUENT

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Abstract— **Soil degradation from different organic and inorganic pollutants, is not only an environmental risk, but at the same time it is also a Socio-economic problem, such soils grow into reduced in physico-chemical properties and reduced food chain quality. Industrial Effluent entering the water bodies is one of major source of environmental toxicity. It has harmful impact on the soil. Industries keep on releasing effluents, which are quite toxic. In the present study was an attempt to evaluate quality of polluted soil and the physico-chemical properties of industries effluent. Investigation were carried out for selected parameters i.e. pH, electric conductance, organic carbon, Potash, Phosphorus, Mn, Zn, Cu and Fe etc.**

Keywords— **Industrial effluent, contamination, soil, physico-chemical investigation.**

I. INTRODUCTION

Nature has an amazing capability to manage up with little amount of water wastes and pollution, but it would be dangerous if billions of gallons of waste water produced everyday are not treated before releasing them back to the environment. [1]The quantities and characteristics of discharged effluent vary from industry to industry depending on the water consumption and average daily product [2]. Soil is also one of the dynamic resources on living planet Earth. It is heterogeneous in nature [3]. Lot of scientists have familiar adverse effects of different industrial effluents on the growth of plants and sewage effluent has also been found toxic to several crop plants [4]. Heavy metals like zinc, copper, manganese, iron etc. are present in the industrial and sewage effluents. The present investigation was aimed to know the effect of industrial and sewage effluent on soil quality. Most of the heavy metals are essential for growth of organisms but are only required in low concentrations. The present study was carried out to characteristic industry effluent in turn to their physico-chemical properties and to evaluate the impact of industrial effluent on the soil.

II. MATERIALS AND METHODS

Collection of Soil Samples:

The soil samples were collected from 0-15 cm depth from ten different sites of Jaipur City (Rajasthan)India during summer session (March-June 2015). The collected soil samples have been investigated for physico-chemical parameters like pH, organic carbon, electric conductivity, phosphorus, Potash and heavy metals like Zn, Cu, Mn, Fe. The samples were named as SS-1, SS-2, SS-3, SS-4, SS-5, SS-6, SS-7, SS-8, SS-9 and SS-10 [5].

Methods:

Physico-chemical Characterization of Soil

The soil samples were collected from the investigational site where untreated effluent was discharged by the industry. Each sample from ten different sites was collected from 0-12 cm. depth from different locations. The normalized samples were air dried for few days, gently crushed with a mortar and passed through 2 mm sieve. All samples were investigated by carried out as per the standard methods.

III. RESULT AND DISCUSSION

The results of the investigation are presented in Tables 1. The values represent averages of at least ten measurements. The electrical conductivity of the soil was found to be 0.28 (Table 1). The pH value was found to be 8.1 which indicated the slight alkalinity of soils [6].Organic carbon values of soil samples have been observed in 0.187 (Table 1) .The variations in Phosphate was also observed at soil 30.3 kg ha-1, Potash was observed at 282.6 kg ha-1(Table 1) [7].

Four heavy metals Cu, Fe, Zn and Mn were estimated in all the soil samples (Table 2). Pronounced contamination was observed for Cu 0.27 mg kg-1, Fe 4.64 mg kg-1, Zn 0.93 mg kg-1 and Mn 2.37 mg kg-1 [8,9].

IV. CONCLUSION

The present study shows the contamination of heavy metals was found to be high which might be due to the use of chemical waste effluent. The results showing that the use of chemical waste polluted water affect physico-chemical parameters of soil. It can be concluded by the above investigation that there is a severe problem of alkalinity which goes up to 8.1 on pH scale and percentage of organic carbon in soil is also found to be low in most of the soil samples. Regarding to pH value and percentage of organic carbon soil doesn't hold good for solubility & availability of various micronutrients as well as trace metal-ions. Most of the soil samples belongs to medium category of phosphate and potash level. Regarding micronutrients Fe & Mn-ion shows high concentration. The value of EC and Zn & Cu-ionconcentration shows normal permissible range and good for irrigation.

Table.1: Obtained Values of Various Parameters of Soil during summer session (March-June 2015)

S.No.	Soil Sample	EC	pH	Organic Carbon	phosphate kg/ha	potash kg/ha
1	SS-1	0.21	8.4	0.16	30	260
2	SS-2	0.35	7.8	0.24	32	260
3	SS-3	0.28	8.1	0.18	30	340
4	SS-4	0.08	7.7	0.12	35	298
5	SS-5	0.05	7.9	0.19	38	160
6	SS-6	0.28	8.1	0.21	33	320
7	SS-7	0.55	8.0	0.11	20	260
8	SS-8	0.37	8.2	0.26	30	340
9	SS-9	0.25	8.0	0.24	18	268
10	SS-10	0.35	8.8	0.16	37	320
	Average	**0.277**	**8.1**	**0.187**	**30.3**	**282.6**

Table.1: Table 4: Physicochemical parameters of different sites soils at Jaipur City

S.No.	SoilSample	Zn ppm	fe ppm	Cu ppm	Mn ppm
1	SS-1	0.88	4.55	0.26	2.58
2	SS-2	1.02	4.74	0.25	2.52
3	SS-3	1.14	4.48	0.24	2.34
4	SS-4	0.82	4.67	0.28	2.41
5	SS-5	0.92	4.49	0.26	2.52
6	SS-6	1.00	4.60	0.30	2.00
7	SS-7	0.75	5.00	0.24	2.18
8	SS-8	0.68	4.55	0.26	2.64
9	SS-9	1.05	4.64	0.28	2.48
10	SS-10	1.00	4.66	0.30	2.00
	Average	**0.926**	**4.638**	**0.267**	**2.367**

V. ACKNOWLEDGEMENTS

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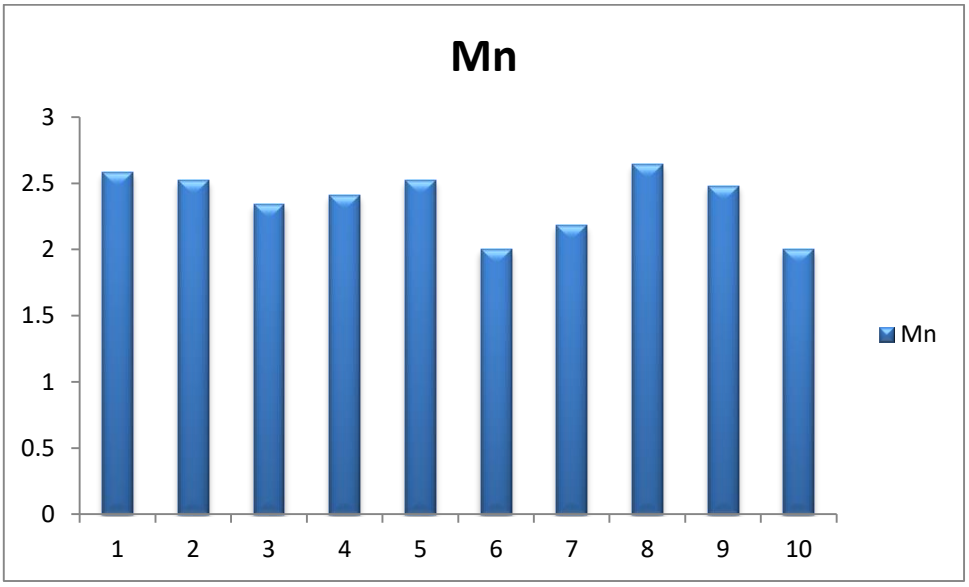
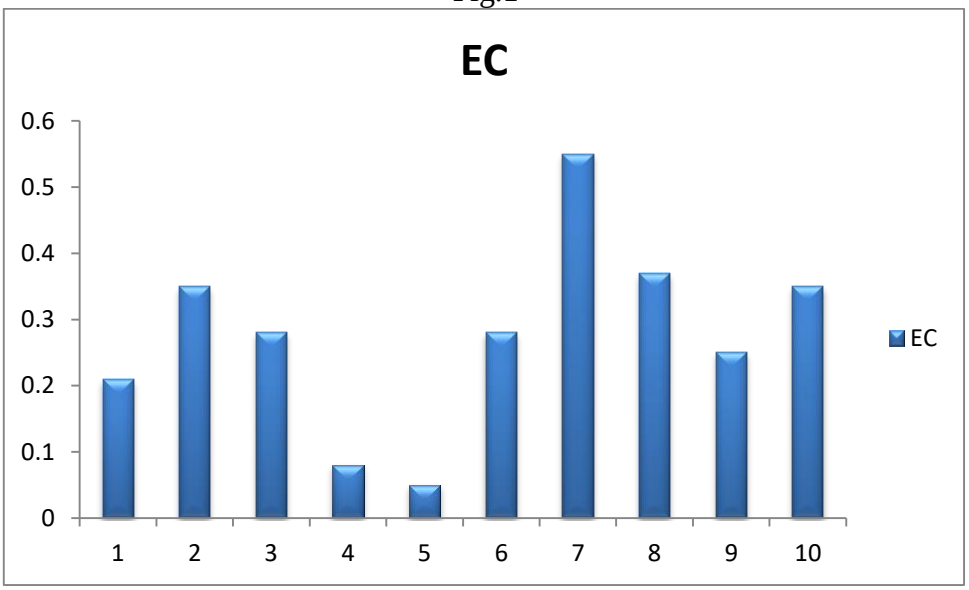


Fig.1



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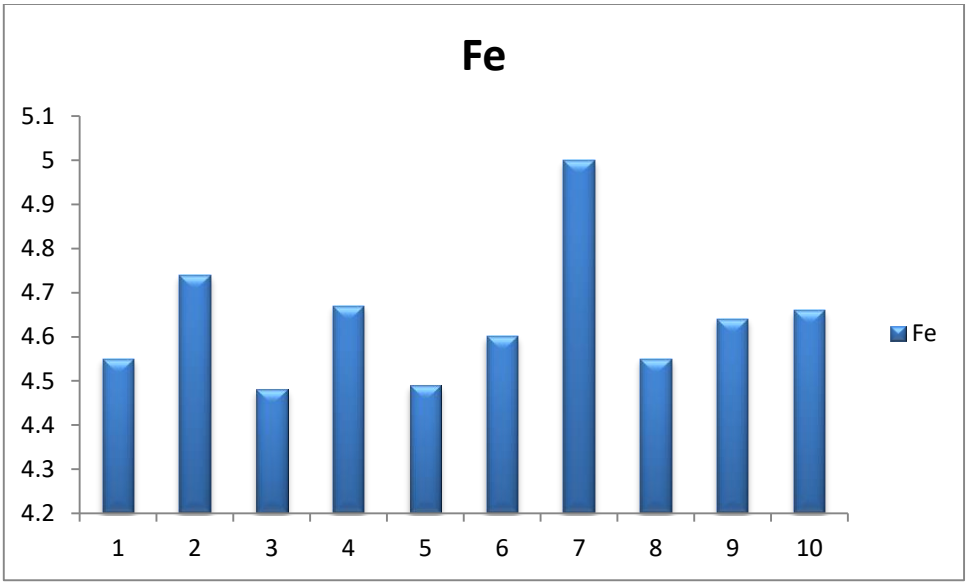

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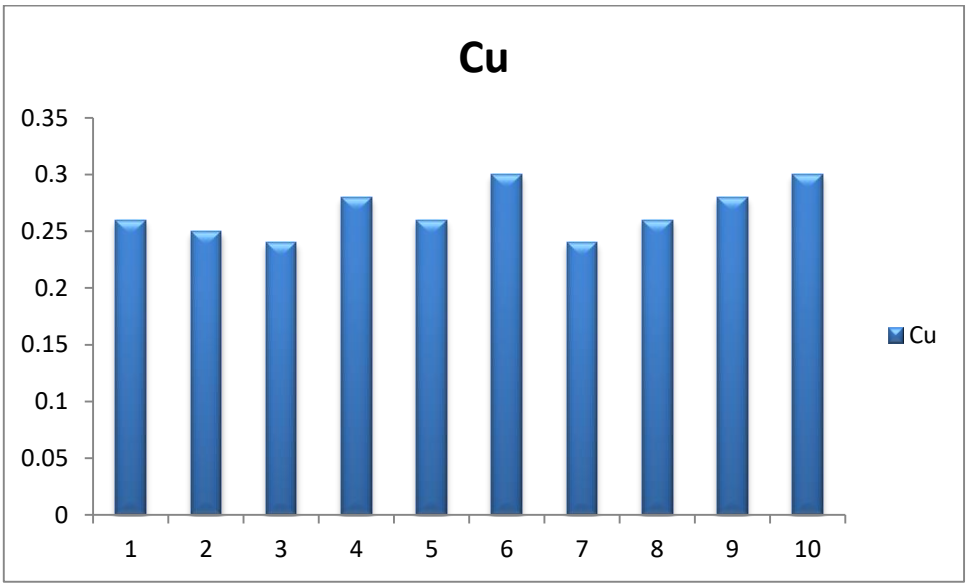

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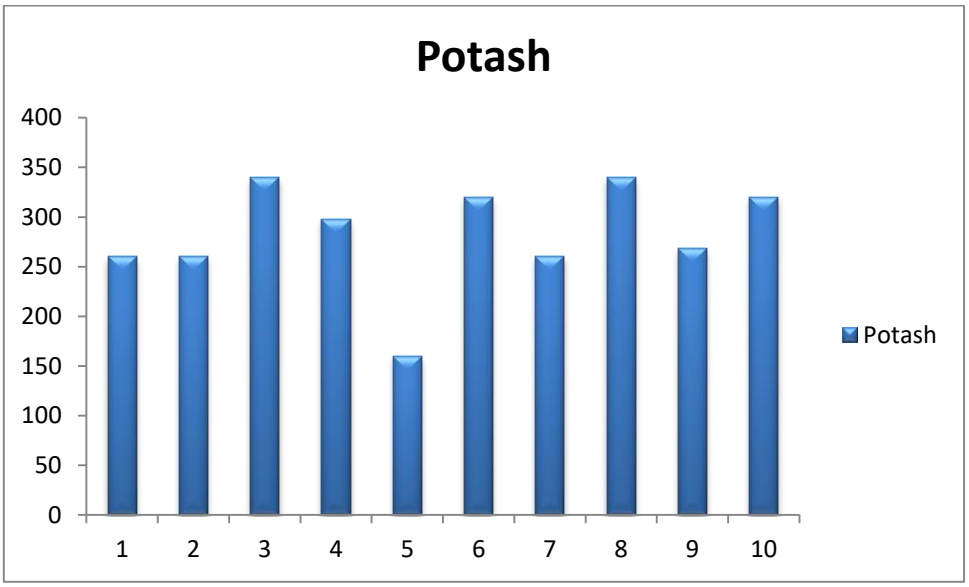

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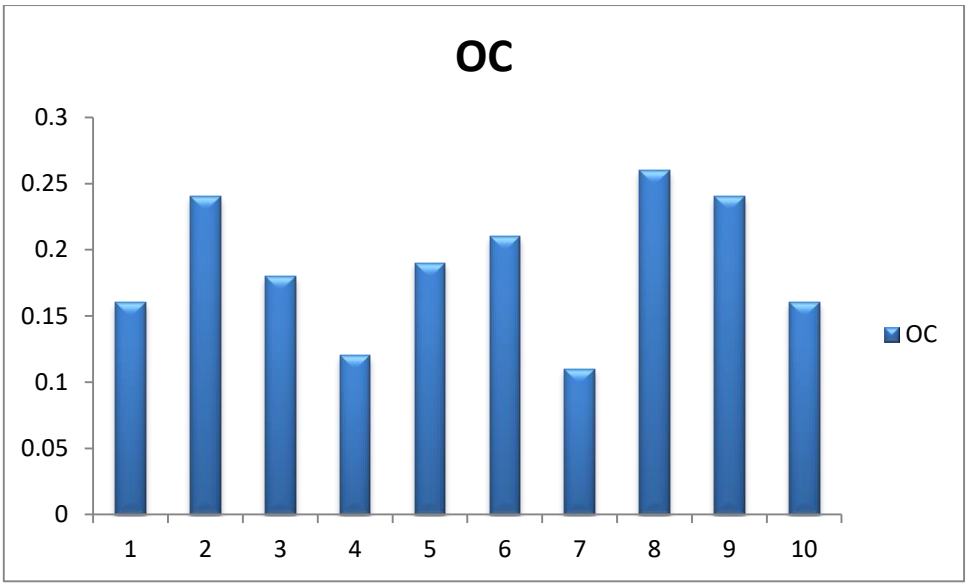

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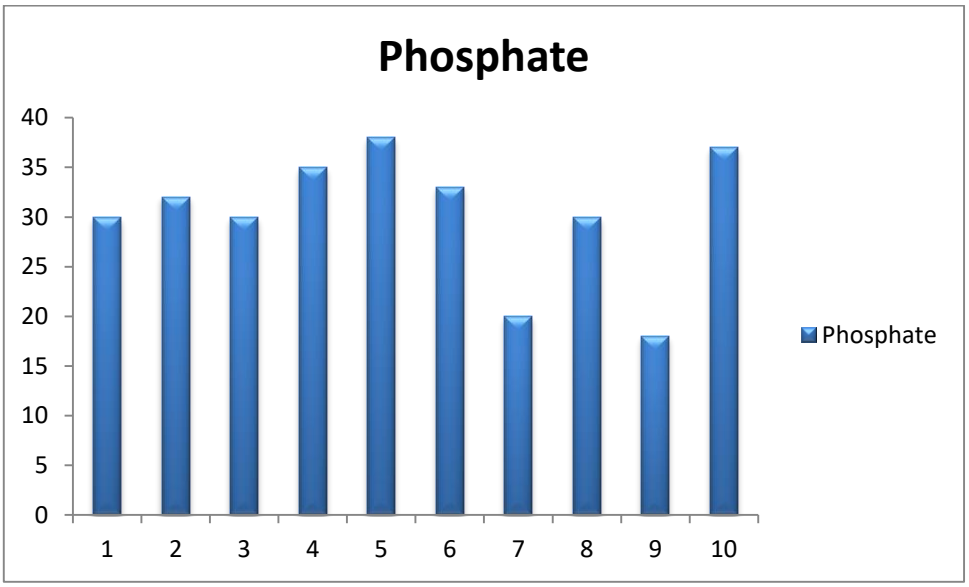

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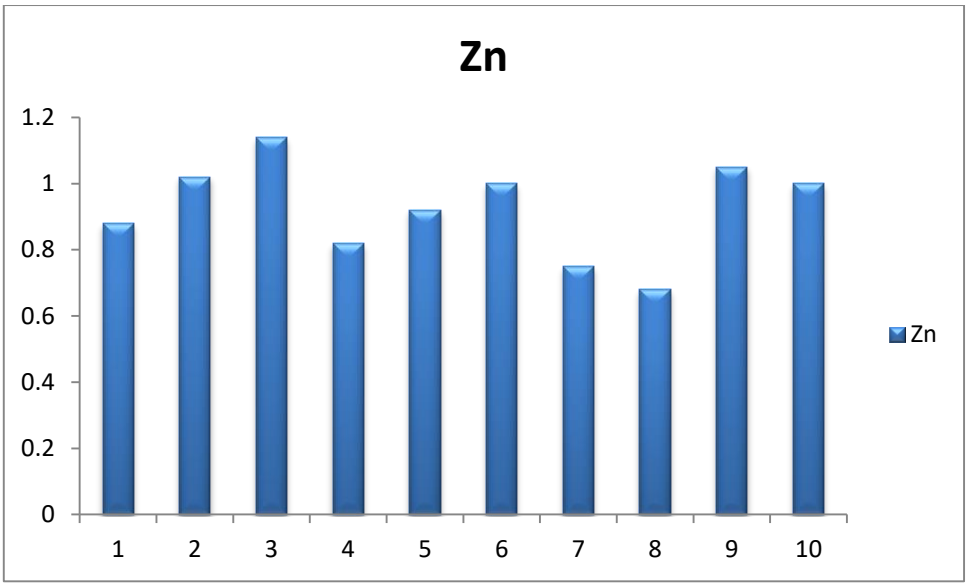

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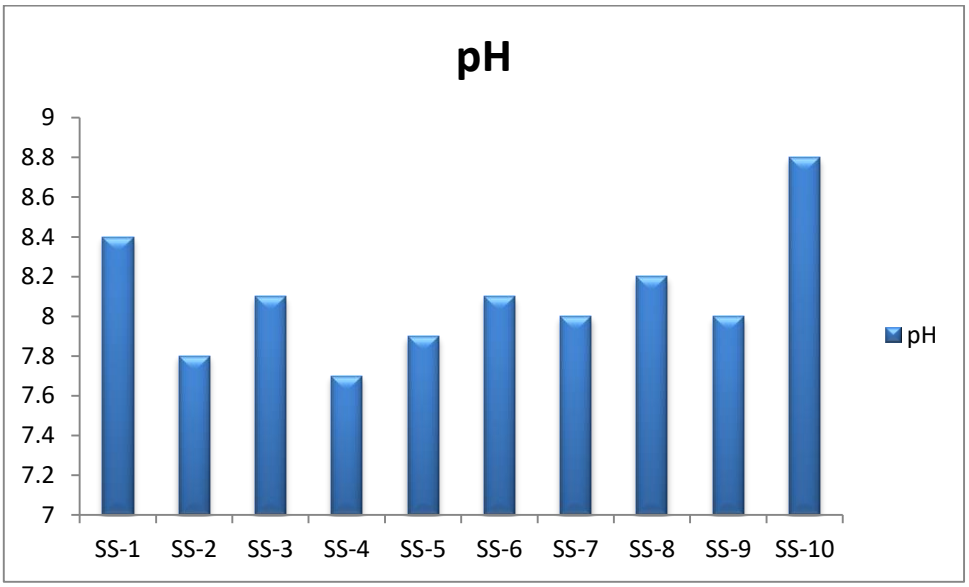

Fig.9