



Pollution of Soil Due To Leather Factory Near Ranipet, Tamil Nadu (India)

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Abstract

Nature mainly consists of air, water and soil. In balancing of any three causes major problems in natural process. Soil provides all the basic needs to us and is the most important medium for growing plants. Soil is one of the most important Ecological factor, which is transformed from the surface rocks and plants depend on it for their nutrition, water supply and mineral supply. It also causes the pollution in soil as well as in water and air where leather industries are situated. It has been observed that constant fall of leather waste on soil causes pollution. Chemical analysis of soil in the industrial area of leather has been studied and it was observed that as the distance from factory increases, the effect of soil pollution decreases, considerably for PH, Nitrogen, Phosphorus and Potassium content. The fertility of soil is mainly because of N.P.K. contents, which is hardened by salt (Na^+ , K^+ , Mg^{2+}) deposits on the soil surface, and not availability of these prime elements to the agriculture. The loss of agriculture is great hazard to the mankind for generations together.

Key Words :Chromium, pH, Nitrogen, Phosphorous, Potassium, Salts,.

INTRODUCTION

Nature generally made up by three main constituent air water and soil. The soil of the earth is the store house of nature and mother of all living beings. Imbalancing of any three causes pollution creat dangerous problems in natural process. Pollution problems are spread very rapidly. It effects the human health so effective step should be implemented to control. The pollution without further delay. Modern development, economic growth, intercommunication and modern trade has changed the life style to a great extent. To fulfill

The above necessities. We are exposed to a variety of toxicants. These are enter in to our system. We point-out soil pollution. It is a valuable material heritage. Soil plays an important role in our life. Human activities release the many pollutant to the nature, soil is a receptor of many pollutants like pesticides, Leather industries, insecticides, synthetic harmful chemicals, heavy metals, powerplant smoke and core inorganic compounds.

One of the highly polluted areas in India located at Ranipet occupys around 200 tanneries and other

small scale chemical industries. A study was carried out to assess the soil pollution and identify major variables affecting the soil quality in Ranipet industrial area.

A factory in Ranipet manufactures sodium chromate, chromium salts and basic chromium sulfate tanning powder used locally in the leather tanning process. The Tamil Nadu Pollution Control Board (TN PCB) estimates that about 1,500,000 tons of solid wastes accumulated over two decades of plant operation are stacked in an open yard (three to five meters high and on 2 hectares of land) on the facility premises and contaminating the groundwater. The contamination of the soil and groundwater with wastewater, as well as run off from solid wastes has affected the health, resources, and livelihood of thousands of people, in a residential colony about 1 kilometer from the factory. Three open wells, a dozen bore wells and about 25 public hand pumps have been abandoned due to high chromium levels in the water. Agricultural land about a kilometer from the factory has also been affected.

These effects have changed the biological properties. Soil pollution is developed due to constant fall of chromium, it has been observed. It is well known that in leather wastes chromium and salts. There after crystallisation and solidification develop in to a hard crust-causing low yield crops. All living things are directly and indirectly dependent on soil for day to day needs. Due to chromium pollution in the present study, common air and soil pollutants are spread around the cement factories and near by Schut, 1987; Katyal

and Satake, 1989. Soil of the study area has the following characteristics:

It is a black soil, It has clay texture, High coefficient of expansion and contraction on wetting and drying respectively, Gilgai micro relief, Extremely plastic consistency, Exchange complex nearly saturated with Ca and Mg, Dark colour with low chroma, Chromium more than 25 cm. deep, Lot of medium content of organic matter gradually decreasing with depth and Stay of weathering relatively un advanced or minimum. (Marning *et al*)

MATERIAL AND METHODS

Nine soil samples were collected from different distances and places of Leather factory are situated at ranipet (Vellore). The importance of soil analysis is to know the nature of soil because the production of crop of this region depends on the properties of soil. All human being indirectly related with soil. The soil samples collected by the following procedure:

In clean different polythene bags, soil is collected from different distances of Leather factory area with an angle boring about plough deep 5 inches made and pulled it up, the collected soil dried over the polythene sheet. After sufficient drying and removal of foreign matter like roots and small stones has done.

The dried samples after grinding in wooden pestle and mortar were mixed thoroughly and passed through 2 cm.diameter sized sieve and then are ready to use for analysis. (Black 1965 and Chopra and Kanwar 1982)

RESULTS AND DISCUSSION

(i) Soil pH : Data of the pH analysis of different soil samples are given in table. It is varied from 6.73 to 9 at study area. Hence soil were found to be alkaline type and having decreasing pH with the increase of distance. These results are in agreement with Dzombak 1987. It retard the germination of seeds and growth of seedlings.

(ii) Organic Carbon : Results shown in table. The data clearly showed gradual decrease in organic carbon content from 3.02% to 1.0% in the soil in accordance to distance from the leather factory. According to Bauder 1999 the amount of organic carbon accumulation is faster than the decomposition which makes soil unfertile.

Table 1. Comparative study of compound with distance

S NO	Distance from factory (In Km)	pH	Chromium	Salts	Nitrogen (Kg/hactare)	Phosphenate (Kg/hactare)	Potassium Kg/hactare)
1	0.0	9	32.06	3.02	830.60	6.25	590
2	1.0	8.80	28.08	2.92	790.33	6.0	588.2
3	2.0	8.60	23.68	2.63	500.03	5.36	478
4	3.0	8.30	18.26	2.42	426.24	8.33	416.1
5	4.0	8.16	16.39	2.0	386.25	10.24	308.6
6	5.0	8.03	12.30	1.96	360.26	11.32	305.4
7	6.0	7.24	8.32	1.40	320.66	12.46	303.0
8	7.0	6.92	7.29	1.31	256.33	18.23	217.6
9	8.0	6.73	6.34	1.21	250.26	20.23	210.5
10	9.0	6.2	5.6	1.0	225.36	22	209

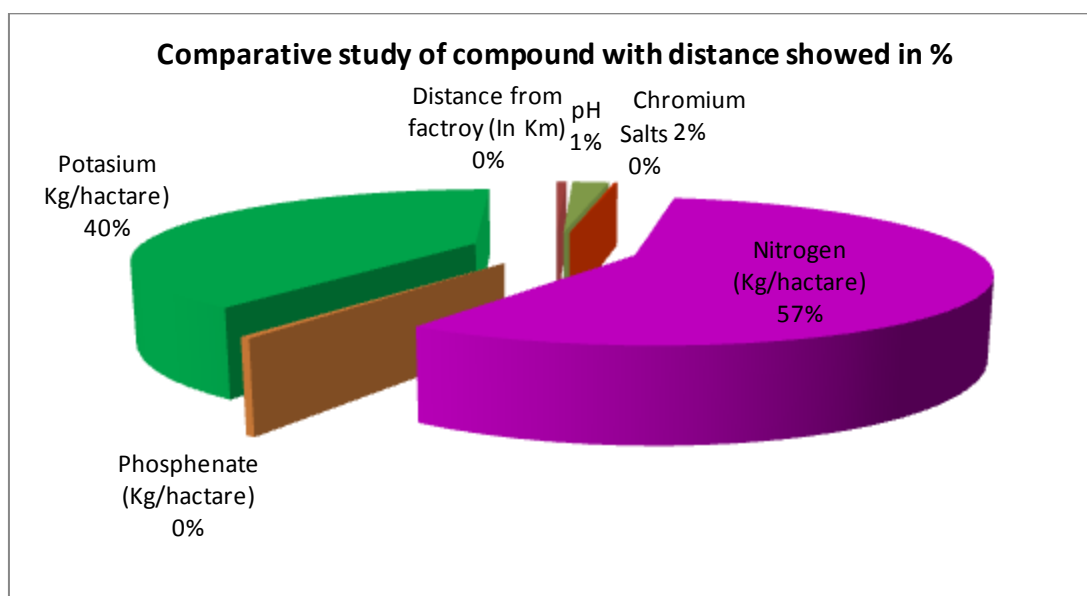
(iii) Phosphorous : The results are shown in table Phosphorous showed a positive trend towards the increment of distance from the leather-factory. It was 6.25kg/hactare at factory and 22.00kg/hactare at 8 km.from factory.These results shows that availability of phosphorous is heavily dependant upon the soil acidity (pH) and form of phosphorous in the soil (Campbell and Smith 2000) suggested that significant decrease in soluble reactive phosphorous concentration due to formation of CKD calcium phosphate.

(iv) Potassium : Total potassium content of the soil has been analysed and results are tabulated in table-1 590kg/hactare at 8 km.from Ranipet. Seeker and Ozaytekin2002 and Monayeri *et all* 1996 that chromium and salts cause increase in potassium content and it remains higher than Na,P and Mg in the affected soil.

(v) Nitrogen :The analytical results for available N in polluted soil are given in (Table.1) 830.66 kg/hactare was found at 0 km.and 225kg/hactare from Leather factory.It showed a clear trend of reduction in total Nitrogen content in soil with increasing distance. It confirm the trend of organic

carbon content in polluted area. On the basis of above results it can be concluded that the contents of chromium highly effected the properties of soil. It raise the pH of soil and make the soil alkaline. Nitrogen mineralisation process also decreases as N content increases. Ca forms chelate with P thus availability of P is decreases. Potassium content was shown higher. Physiological and Biological process of the plant are also affected by dust pollution. These conditions are not favourable for growth of plants and microbes thus make soil unfertile and tend towards the low crop yield.

Fig.1. Pie Diagram shows the Comparative study of compound with distance in % of



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