

“DOMBIVLI MIDC SOIL POLLUTION: CAUSES, EFFECTS AND SOLUTIONS”

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Abstract

Post independent industrialization got accelerated due to government of India initiatives through the five year plans followed by efforts of the state government through the state industrial development policies. This accelerated industrial development in the state could be seen as one of the important factors of pollution and environmental degradation of many regions. Though laws have been enacted to establish statutory bodies such as the pollution control boards for controlling environmental pollution of land, soil and noise yet effective enforcement is lacking.

Pollution is becoming a greater threat to the environment, especially as populations and industrial economies expand. There are studies to suggest that several plant species may be useful in reducing the migration of such pollution further down the soil column or perhaps even into the ground water. Given its widespread natural habitat, dandelions (*Taraxacum officinal*) are an appealing prospect for such soil remediation. Climatic changes disturbing precipitation cycle, natural calamities due to human interferes, irrational fresh water usage by greedy section of the socio-economic-political economy, pollution of surface and subsurface water bodies by unregulated human activities are the issues of great concern that need continued attention and concerted efforts for mitigating future irreplaceable and irreversible disasters on this habitable planet the earth in the solar system.

Dombivli MIDC is experiencing saturation that has led to the closure of textile and allied industries. The Dombivli is emerging a preferred destination for industrial investment therefore is experiencing rapid industrial growth supported by the state industry infrastructure development policy. The present paper is an attempt, through field surveys, to focus on identifying industrial zones in the study in the study area and assessing the impact thereof on the Dombivli soil. Scientific method will be adopted to test water quality of the soil and resultant environmental impact.

The results of the physico-chemical parameters, inorganic and organic contents obtained from the assessment of soils samples. In all Dombivli soil samples are high acidic, color of the soil also changes and in these samples quantity of the heavy metal are above permissible limits. Present conditions of the soil as well as water and air are dangerous conditions for humans, animals, plant etc.

1. Introduction:

Since the very beginning of human civilization some thousand years ago man started interfering with the environment. He divested forest by cutting trees for the wood and for other household needs. He removed stretches of forests for bringing land under cultivation, only to find his water diminishing and his supply of soil ending away. He killed animals, the gentle one for food and the fierce for safety. He had polluted the river with chemicals from factories thereby making the water unfit for his use.

Man made activities emit 450 million tones of particulates every year. Particulate pollutants are present in troposphere and lower stratosphere, where they stay for a long period. The layer about 1-100 meters high from ground is most polluted in urban area and industrial sites. These pollutants are absorbed on the

water surface, soil vegetation and building etc. posing several health hazards on the living biota. These pollutants affect and alter the chemical and biological properties of soil. As a result hazardous chemicals can enter into human food chain from the soil or water, disturb the biochemical process and finally lead to serious effect on living organism.

Keeping above view in mind, present study has carried out to observe the effects of pollutant on soil properties, analysis of toxic metals in the chemicals waste or dust polluted soil and to assess the growth and yield of agricultural crops in soil of polluted area. For that, the area surrounding various types of industrial zones such as, Rubber, Chemicals, and Fertilizers, Pigment-Dye, Paint and Ceramic industries situated at Dombivli MIDC in Thane district has been selected as affected area.



Figure-1: Images of soil pollution

2. Experimental:

All chemicals used will be AR grade. Double distilled water will be used throughout the experiments. All glassware's were used by pyrax glass. The collected sample stored in clean polyethylene bags. Analytical balance is 0.1mg of sensitivity was used for sample weighing more than 25mg. Elico Li-120 model of pH meter were used for pH measurement. Elico-PE-136 was used to measure the conductance of soil samples. Shimadzu UV-100 model was used for absorbance measurement. Heavy metal analyzed on Coupled Plasma Emission Spectrometer-6300 DUO(Model ICAP-6300 Duo). The heavy metals concentration was expressed as mg kg^{-1} .

3. Result and Discussions:

In the present studies, samples are collected from six different locations on the basis of the different types of the industries such as Rubber, Paint, Dyes, Ceramics, Fertilizer and Chemical. pH of the collected samples of chemical industries zone is highly acidic and other points its neutral. The observed results of the conductivities are permissible limit.

No any remarkable or dangerous contents of collected Zr, V, Co, Zn, Hg, Sn, Pb, P, As, Sb, Se, Cd, Au, Ag and Pd metals found in the all collected samples of six different locations. High organic carbon observed at dye and fertilizer industries location. The Ca, K, Mg Sr, Ti, Ni, Mo and Al metal content observed are slightly higher levels which is effect the human and animals health. Cr, Mg and Ca content observed above permissible limit and highly dangerous content observed Fe and Si metal.

Table-1: Test Reports for different industrial zones

Test	1(Black/ Rubber)	2(Brown/ Paint)	3(Dyes/ Greenish Yellow)	4(Whitish Black/ Ceramics)	5(Dark Blck/ Fertilizer)	6(Faint Brown/ Chemical)
Na	0.07	0.25	0.34	0.22	0.38	0.17
K	0.02	0.12	0.3	0.18	0.43	0.21
Mn	0.13	0.04	0.21	0.25	0.16	0.12
Ca	0.08	1.26	2.76	3.82	8.1	6.7
Sr	0.002	0.004	0.08	0.068	0.071	0.042
Ba	0.006	0.009	0.008	0.007	0.007	0.012
Ti	0.001	0.52	0.31	0.41	0.22	0.15
Zr	0.001	0.006	0.008	0.007	0.0001	0.004
V	0.005	0.005	0.006	0.005	0.007	0.004
Cr	2.31	0.02	1.3	2.38	1.88	1.94
Mg	0.05	3.43	0.09	2.45	3.89	4.32
Co	0.006	0.002	0.007	0.006	0.008	0.015
Ni	0.28	0.006	0.51	0.88	0.11	0.43
Fe	27.22	2.13	21.28	24.61	25.1	17.12
Mo	0.12	0.004	0.18	0.24	0.007	0.012
Zn	0.003	0.01	0.002	0.018	0.018	0.025
Cu	0.1	0.002	0.1	0.17	2.5	2.2
Si	31.66	16.22	27.56	42.73	21.2	9.5
Hg	0.001	0	0	0	0.001	0.001
Al	0.12	1.17	0.18	0.23	0.28	0.31
Sn	0.001	0	0	0	0.001	0.001
Pb	0.04	0.001	0.02	0.02	0.001	0.001
P	0.07	0.02	0.06	0	1.4	0.05
As	0.001	0	0	0	0.001	0.001

Sb	0.03	0.001	0.05	0.02	0.001	0.001
Se	0.001	0	0	0	0.001	0.001
Cd	0	0	0	0	0.001	0.001
Au	0	0	0	0	0.001	0.001
Ag	0	0	0	0	0.001	0.001
Pd	0	0	0	0	0.001	0.001
Org. C	0.06	0.02	1.23	0.03	2.21	0.09
pH	7.5	7.8	7.4	8.2	7.5	6.9
EC	0.35	0.18	0.12	0.05	0.15	0.32

4. Conclusion:

The results of the physico-chemical parameters, inorganic and organic contents obtained from the assessment of soils samples. In all Dombivli soil samples are high acidic, color of the soil also changes and in these samples quantity of the heavy metal are above permissible limits. Present conditions of the soil as well as water and air are dangerous conditions for humans, animals, plant etc.

Working with soil releases particles into the air that may be inhaled by workers and others nearby. Very small particles may lodge in the lungs, and there is a chance that contaminants may be absorbed into the bloodstream. Compared to ingestion, this is a far less significant source of exposure, but may be relevant to those exposed repeatedly over a long time period. The more toxic form of chromium can cause skin contact problems. Absorption of a chemical through the skin is known as 'dermal absorption', or sometimes 'cutaneous' or 'transcutaneous absorption'.

Solutions for Land Pollution

1. Make people aware about the concept of Reduce, Recycle and Reuse.
2. Reduce the use of pesticides and fertilizers in agricultural activities.
3. Avoid buying packages items as they will lead to garbage and end up in landfill site.
4. Ensure that you do not litter on the ground and do proper disposal of garbage.
5. Buy biodegradable products.
6. Do Organic gardening and eat organic food that will be grown without the use of pesticides.
7. Create dumping ground away from residential areas.

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