Research Paper

Impact of Bilt graphic paper industrial effluents on soil Tal - Indapur, Dist - Pune. (Maharashtra)

* Jayashri Bhore ** Bhaskar Gatkul

* Arts Science and Commerce College Indapur, Dist - Pune.
** Arts college Bhigwan, Tal - Indapur Dist- Pune

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A B S T R A C T

Bilt graphic paper industrial effluents disposal causing water pollution and Soil pollution. It is detrimental to human health and aquatic life, therefore it is needed to treatment plant such a effluent promote yield of agro productivity. Treated effluent providing nutrients, marginal fertility to soil. The pH of treated effluent is 7.8 therefore it is alkaline nature and high content of Ca, Mg, Chorine, Nitrate and TDS are observed. The impact of bilt graphic paper industrial effluent on soil is studied as analysis of effluents and analysis of soil prove that calcium and magnesium content is beyond the permissible limit and deficiency of Iron and Manganese content. Therefore ferrous sulfate and manganese sulfate is used for agro productivity of the soil.

Keywords: effluent, eutrophication

Introduction:

Pulp and paper industry is one of the oldest in term of age. First paper mill was Set-up in 1812 at Serampore, dist-Hoogley, west Bengal. Paper industry play an important role in economic development of our country. Bilt Graphic paper industry established in 1995 at Bhighwan in Dist - pune (Maharashtra). Disposal of effluent transferred towards ETP plant. Such treated effluent stored into the lagoons, which is used for irrigation. To analysis the physico chemical characteristics of the paper industrial treated effluents in order to asses it's permissible limit to understanding for further studies. Hence an attempt was made to determine the physico chemical analysis of the effluent. Effluents are hazardous to health and ecosystem for decolonization of effluent used as lime coagulation, rapid sand filtration, and adsorption on activated carbon. Paper industrial effluents site located and sample was collected from the lagoons. Then this sample was subjected analysis of different physico and chemical parameters, the different parameters were standardized by the respective authors.

Material and Methodology:

The value of different physico chemical parameter obtained after the analysis of paper industrial effluents presented in table 1 these values are compared with the Indian standard specification for drinking water as given in the table 3 the value of different parameter obtained in the analysis of paper industrial effluents. The pH in natural water is as to 8.5. The pH of the effluent is 7.8 it is alkaline in nature. Total dissolved solid consider high. Different in organic element like sulfate, carbonate, iron total alkalinity and total hardness within permissible limits. Calcium, magnesium, chloride, & nitrate were more tolerance limit compared with the Indian standard specification for drinking water. Most of the paper industry responsible for polluting the water of the water bodies around them. All the wells & lakes near the paper industries within the radius of 1to 2 km were found to be polluted percolation of effluent from the lagoons. Where it is stored through the soil this is making the ground water toxic & leading to decrease in biodiversity. The acceleration of growth of algae during the photosynthesis is consumed by bacteria for the oxidation of the organic matter during decomposition the eutrophication thus increases the BOD & COD of natural water. There is increase the carbon dioxide contents.

When the polluted ground water is consumed by the people which cause diseases.when calcium level exceed more than that of the desirable limit this cause adversely affect the domestic use high chloride contents cause corrosion & palatability of water. Impact of paper industrial effluents on soil as pH, EC, organic carbon, phosphorus pent oxide potassium oxide (potash) zinc, copper, iron, manganese, calcium & magnesium etc.

Electrical conductivity correlated with positively with the total dissolved solid (TDS) Suspended solids and TDS are common indicators of polluted water According to Mc Cutheon et al (1983) the palatability of water with TDS level less than 600 ppm is generally considered to be good whereas water with TDS greater than 1500 ppm is unfit for domestic purpose. Alkalinity of water is measure of its capacity to neutralize acid and is due to the presence of bicarbonates. water with alkalinity greater than 500 ppm as CaCO3 have objectionable tastes. Hardness is due to calcium

and magnesium. As general value less than 60 is considered soft and value above 200 are considered very hard.

The major aim of the study was to report on the assessment of the physico chemical[1] parameter and the trace metals present in the water. The toxicity of metals is depends on pH and on their solubility and this in turn depends upon pH and on the presence of different types of anions and cations. Therefore impact of effluent on soil due to which reduce fertility of soil and decrease agro productivity. Except pH, EC - mmho/cm ,all other units are in ppm

Table - 1: Analysis of Physico chemical parameters of soil in the study area.

Sr.No	Parameters	ResultStd.	permissible limit
1	pH	7.9	6.5 to 9
2	Electrical conductivity	0.4mmho/cm	0.5 to 1 mmho/cm
3	Organic carbon	1.18 %	1 to 3 %
4	Phosphorous pent oxide	13 kg/acre	55 Kg/acre
5	Potassium oxide(potash)	134 kg/ acre	300Kg/acre
6	Zinc	3.6 ppm	5 ppm
7	Copper	2.37 ppm	0.05ppm
8	Iron	0.17 ppm	6.3ppm
9	Manganese	1.97 ppm	0.1ppm
10	Calcium	7874 ppm	1000 ppm
11	Magnesium	1291 ppm	100 ppm

Table -2: Analysis of physico chemical parameters of effluents at various site near Bilt graphic paper industry (Bhigwan)

Sr.No	Parameters	S1	S2	S3
1	pH	7 .8	8.1	8.4
2	TDS	755	791	684
3	Calcium	380	360	490
4	Mg	190	120	220
5	HCo3	640	580	540
6	Cl	390	395	395
7	SO3	40	80	90
8	Total hardness	345	325	420
9	Nitrate	46	35	44
10	Total alkalinity	265	275	175
11	Iron	0.2	0.1	0.1

Result and Discussion:

The paper industrial effluent discharged near to the site S1, S2 and S3.water sample collected in plastic containers. The following physico-chemical parameters were determined as pH, electrical conductivity, TH, total alkalinity, calcium, magnesium,
chloride, iron, nitrate, bicarbonate etc. which affect the soil parameter. The pH of the soil is 7.9 which is alkaline in nature and suitable for growth of crop. organic carbon in the soil is 1.18 % which is within permissible limit

Table -3: Standard for drinking water specification WHO.

Sr.no	Parameters	Desirable limit	Permissible limit
1	pH	7.8	6.5 to 9
2	TDS	755	500
3	Calcium	380	75
4	Mg	190	50
5	Co^3	Nil	-
6	HCo^3	640	500
7	Cl	390	200
8	SO	340	200
9	Total hardness	345	200
10	Nitrate	46	45
11	Total alkalinity	265	500
12	Iron	0.2	1

as standard specification. The phosphorous in the soil is apatite mineral, hydroxy apatite. The phosphorus pent oxide found in soil is 13 kg per acre which is also within permissible limit. phosphorus increase tilllering and hasten maturity. It helps in the formation of seed and fruit in legumes. Potash in the soil is found 134 kg per acre which is in desirable range which is used to produce stiff stalks and stems. Zinc is essential component of enzyme system and regulates various metabolic activities in plants. Zinc value is 3.6 ppm within range as desirable limit. Zinc is related to seed production. electrical conductivity of soil is 0.4 mmho / cm which is suitable for growth of plants. The copper present in the soil is 2.37 ppm which is tolerance than permissible limit. copper is related to utilization of proteins in growth process of plants. calcium concentration in soil is higher than permissible limits. magnesium content is higher limit when compared with standard specification.

Conclusion:

Study of impact of Bilt graphic paper industrial effluent on soil prove that of pH, electrical conductivity, organic carbon, phosphorous pent oxide and Potash obtained within permissible limits, copper, calcium and magnesium obtained as a more beyond the tolerance limit. Iron and manganese content as a low content when compared with standard specification of soil. Iron in the soil in ferrous and ferric forms. Iron act as a catalyst in the production of chlorophyll. Thus application of ferrous sulphate as 15 kg per acre and for low content of manganese in the soil there is application of manganese sulphate as 25 kg per acre supplied to the soil for proper growth of plant. Due to manganese deficiency in plants a grayish lesion develops on the base of leaves. Thus for proper growth of crop productivity there is application of ferrous sulphate as 15 kg per acre and application of manganese sulphate as 25 kg per acre supplied to the soil.

REFERENCE

1) APHA- 1985 std.method for the examination of waste water
2) P.N Prasad - Environmental chemistry
3) Kudesia v-p - Water pollution, 1980 ku
4) Behera P. k - Effect of paper mill waste water on soil quality and crop growth , 1986
5) Shobha Rastogia- water quality and water resources
6) WHO (1990). Guideline for drinking water quality, Vol.2.
7) P.N. Prasad, T.R.Amarnath- Environmental and Agricultural Pollution.