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Effect of Total Hardness Present in Industrial Water Sample of Koparkhairne, Navi Mumbai

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ABSTRACT: Koparkhairane is an established locality of Navi Mumbai, surrounded by Ghansoli, Vashi and MIDC Industrial Area. The locality hosts a blend of co-operative housing societies (CHS), multi-storey apartment complexes, commercial office spaces and industrial entities. Some prominent residential projects. For the study purpose six industrial water samples were selected. Industrial water samples collected from selected sites monthly from Jan 2021 to June 2021 and analysed for total hardness parameters. Total Hardness in study area was found between 120 to 150 mg/l. Total hardness at all sampling stations were found below permissible limit.

KEYWORDS: Total Hardness, Industrial Zone, Permissible limit, Geology.

I. INTRODUCTION

Water is the most critical component of this earth, which is necessary for the survival of life. On this planet water is that essential and mandatory part which constitutes about 75% of our world, Earth's crust. It is one of the vital natural ingredients needed for the survival of all kinds of lives present on the surface. Water is affected by different kinds of natural and anthropogenic activities performed by human beings. Due to increase in industrialisation water pollution problem is the major problem arising day by day. In industrial waste water contains harmful chemicals, organic and inorganic products, which are directly or indirectly affecting the natural source of water and agricultural practices very severely. As a result of which the properties of natural water and aquatic animals are affected adversely by getting in contact with these chemicals may include pollutants which may be thrown in to the water body without treatment. Different types of harmful chemicals from the industries cause life in water body to get destroyed by the action of these toxic chemicals with the physiological system of the living beings, including animals as well as plants. One of the most significant origins of water pollution is due to the wastes from the industries and sewage. Through different researches, it proves that the primary cause of all this pollution by addition of harmful material in water bodies mainly because of human activities (Anthropogenic Activities) rather than the natural or geogenic processes. In many developing countries, it is proof that the primary source of degradation of water bodies is the massive rate of growing industries and urbanization well. Due to the presence of these chemicals in water, it became unhealthy for any use. Man is not only using natural resources, but he is also discharging the different types of solid, liquid waste material into the same resources, which day-by-day degrading the quality of this vital resource. Hardness is one of the properties of water, which prevents the lather formation with soap and increases the boiling point of water. Calcium and magnesium cations mainly cause hardness. Koperkhairne area is an industrially developed area having number of industries; therefore, study had undertaken to find out the Total Hardness level in industrial waste water around Koperkhairne area.

II. MATERIAL AND METHODS

For study purpose six sites around Koperkhairne industrial zone were selected. Water samples were collected monthly from selected sites during Jan 2021 to June 2021. Following sites were selected for study purpose. Table No.1- Sampling Sites. Samples were collected in clean glass bottles. The bottles were rinsed with the groundwater to be taken for analysis. Collected samples were analyzed using EDTA method for Total Hardness. The EDTA method was used to measure the concentration of Calcium and Magnesium ions in water samples to determine their total hardness. This method is based on the principle that EDTA and its sodium salt forms a soluble complex when added in the solution of certain cations. $M^{2+} + EDTA \rightarrow M-EDTA \text{ Complex}$ A small amount of Eriochrome Black-T indicator is added to an aqueous solution containing calcium and magnesium ions at pH -10.0. As a result, calcium and magnesium ions get complex and the solution becomes wine red. Since EDTA has strong affinity towards calcium and magnesium ions, on



the addition of sufficient amount of the reagent, a new complex of blue colour is formed at the end of titration. 50 ml sample was taken in conical flask. If sample was having higher calcium, a smaller volume was taken and diluted to 50 ml. 1 ml of buffer solution was added if the sample was having higher amount of heavy metals than 1 ml of Na₂S solution was added 100-200 mg of Eriochrome black-T indicator was added, the solution turned wine red. The contents were titrated against EDTA solution. At the endpoint, the colour changed from wine red to blue.

Calculation Total Hardness as CaCO₃, mg/l. = ml of EDTA used x 1000 ml of sample

III. RESULTS AND DISCUSSION

The amount of hardness equivalent to sum total of carbonate and bicarbonate alkalinity is called as bio-carbonate hardness and the amount exceeding this, is called as bio-carbonate hardness (Sawyer and McCarty, 1987). The amount of hardness due to carbonate and bicarbonate is called as temporary hardness and the hardness due to sulphate and chloride is called as permanent hardness. According to Durfor and Beaker (1964), water with total hardness below 60 mg/lit. expressed as calcium carbonate are soft, between 61 to 120 mg/lit. , moderate hard, between 121 to 180 mg/lit hard and more than 181mg/lit are very hard. The concentration of total hardness at sampling stations in industrial water samples S1, S2 & S4 are soft, sampling station S3 are moderate hard and the sampling stations at S5 & S6 are very hard (Table -1) due to continuous discharge of industrial effluent at koparkhairne. Total average hardness of industrial water sample at sampling station are soft in the month of April & May ,and hard in the month of March, January , February and June.

Table -1: Level of Total Hardness (mg/lit) in industrial Water Sample

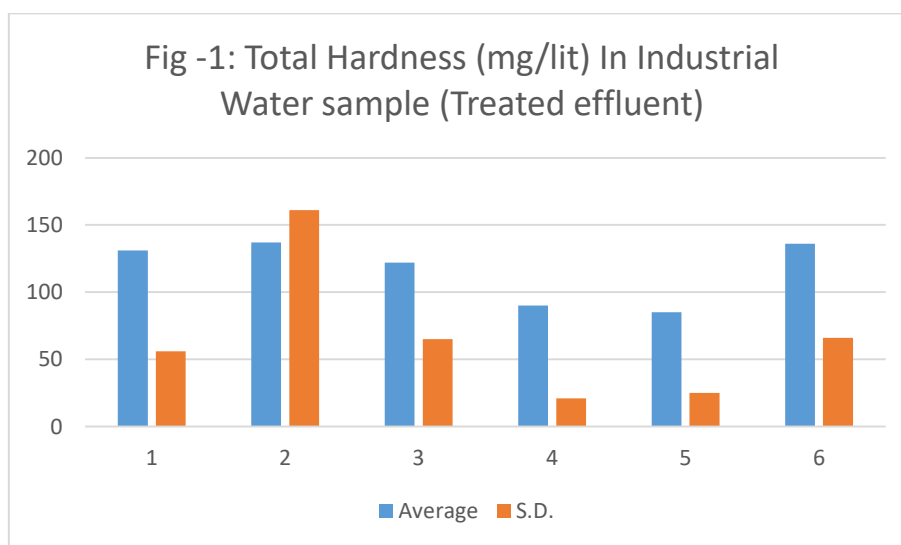
Stations	Jan	Feb	Mar	Apr	May	Jun
1	94	72	81	84	75	110
2	110	103	94	85	67	77
3	141	142	160	95	85	114
4	120	104	120	98	74	172
5	240	136	280	144	150	230
6	184	114	196	96	68	300





Fig. 1: Total Hardness (mg/lit) in Industrial Water Sample (Treated Effluent)

Average	131	137	122	90	85	136
S.D.	56	161	65	21	25	66



Station	Summer	Rainy	Winter
1	164.09	150.87	116.50
2	148.16	120.82	212.47
3	240.16	171.80	345.41
4	418.50	204.44	537.87
5	552.86	165.71	554.26
6	335.36	188.70	278.55

Average	22.3	158.19	245.00
S.D.	140.07	25.74	156.89

REFERENCES

1. Bureau of Indian Standards :BIS (IS 10500 : 2012)- Water Quality Standards.
2. De. A.K., 2004 Environmental Chemistry , 5th edition , New Age Int. Ltd.Publishers , New Delhi.
3. MamtaTomer , 1999“ Quality Assessment of water and wastewater “ , Lewis publisher Boca Ratan
4. Maiti , S.K., 2004.Hand Book of Methods in Environmental Studies . 1. Water and WasteWater Analysis 1st edition , ABD publisher, Jaipur
5. Shrivastava V. S., P. R. Patil. 2002.Tapti river water pollution by industrial wastes: A statistical approach. Nature Environment and Pollution Technology Journal. 1(3) pp. 279-283.
6. Saxena . M.M., 1998 Environmental Analysis of water , soil and Air ,Agro Botanica publication , Bikaner
7. Sharma , D.K.2005 Seasonal variations in certain physico-chemical characteristic of Rampur reservoir of Guna district (M.P.) . In : Ecology of lakes and reservoirs. Vishwas Balasaheb Sakhare (Eds.) Daya publishing House : 63-104
8. Trivedi and Goyal, 1986, Chemical and Biological Methods for Water Pollution Studies, Environmental Publications,Karad,India.
9. Yashodhara Varale , 2017 Study Of Nitrate Present In The Industrial Water Sample Of Nipani Town International Journal of Applied and Pure Science and Agriculture (IJAPSA) Volume 03, Issue 10, e-ISSN: 2394-5532, p-ISSN: 2394-823X
10. Yashodhara Varale , 2021 Intensity of Colour Present in Industrial WaterSample (Treated) of Nipani TownInternational Journal of Science and Research (IJSR)ISSN (Online): 2319-7064 Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391



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