International Journal of Research in Advent Technology, Vol.2, No.4, April 2014
E-ISSN: 2321-9637

Study of Dissolved Oxygen of Krishna River at Karad (Maharashtra): A Case Study

S.D. JADHAV[1], M.S. JADHAV[2], R.W. JAWALE[3]
[1,3]Bharati Vidyapeeth Deemed University, College of Engineering, Pune
(Department of Engineering Science) E mail: sdjadhav49@gmail.com
[2]Sinhgad Technical Education Society's Sou. Venutai Chavan Polytechnic, Pune
(Department of civil Engineering)

Abstract- Oxygen is important to all life. Dissolved oxygen is the form of oxygen in water that is freely available to aquatic plants and animals. Dissolved oxygen is vital to fish and other aquatic life and for the preventation of odours. Oxygen is transferred from the atmosphere into surface waters; as well as being produced by aquatic plants, algae and phytoplankton as a byproduct of photosynthesis. Once dissolved in water, oxygen diffuses throughout a water body very slowly since distribution depends on the moment of aerated water by turbulence and currents, water flow and thermal upwelling. Dissolved oxygen (DO) of Krishna river was studied at two sampling stations in the year 2010.

Index Terms- ***Krishna river, Dissolved oxygen, phytoplankton, photosynthesis***

1. INTRODUCTION

Oxygen in water is measured as dissolved oxygen (DO). A high percentage of dissolved oxygen is conducive to supporting aquatic flora and fauna, such as algae, fish, plants, mollusks and invertebrates. A low percentage of dissolved oxygen indicates a negative impact on a body of water, which results in an abundance of worms and fly larvae. Aquatic life uses oxygen that is dissolved in the water and is in much smaller quantities than in the air. If more oxygen is consumed than is produced, dissolved oxygen levels decline and some sensitive animals may move away, weaken, or die. One of the best indicators of the health of a body of water, such as a river, stream, lake, or pond, ecosystem is the dissolved oxygen (DO) parameter. Dissolved oxygen can range from 0-18 mg O_2/l. Most natural water systems require 5-6 mg O_2/l to support a diverse population. Oxygen enters the water either by direct absorption from the atmosphere or by plant photosynthesis. The oxygen is used by plants and animals for respiration and by the aerobic bacteria which consume oxygen during the process of decomposition. When organic matter such as animal waste or improperly treated wastewater enters a body of water, causing the dissolved oxygen levels to decrease as the plant material dies off and is decomposed through the action of the aerobic bacteria

2. SOURCES OF DO IN WATER

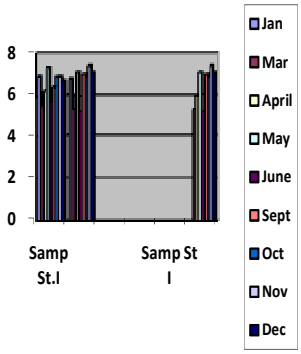
Aeration from wind and waves, photosynthesis of aquatic plants, when the dissolved oxygen levels decreases it affects the number and types aquatic macro-invertebrates which live in a water ecosystem. Natural processes and human pollution can result in severe reductions in dissolved oxygen levels. Both anoxia and hypoxia are harmful to most marine animals.

2. EXPERIMENTAL

Iodometric technique or the winkler method (1988) is the most precise and reliable titrimetric procedure for DO analysis. The chemistry of this test is based on the addition of a manganese solution followed up by a strong alkali solution. The DO present rapidly forms hydroxide salts with the manganese. The colour of the precipitate formed is an initial andicator of how much DO is present. In the presence of iodide ions in an acidic solution, the oxidised manganese reverts back to the divalent state and the liberated iodine is equivalent to the original DO content. This iodine is then titrated with a standard thiosulphate solution.

3. OBSERVATION TABLE

Month & Year	Sampling station I	Sampling station II
January 2010	6.9 mg/l	6.8 mg/l
March 2010	5.5	5.3
April 2010	6.2	6.0
May 2010	7.3	7.1
June 2010	5.7	5.2
September 2010	6.4	7.0
October 2010	6.9	6.9
November 2010	6.9	7.4
December 2010	6.7	7.1



4. APPLICATIONS

The results are useful to assess the quality of water when contaminated. Dissolved Oxygen in water is necessary for aerobic biological activities

5. CONCLUSION

Determination of Dissolved Oxygen (DO) is important for industrial purposes. Dissolved oxygen is needed for living organism to mentain their biological processes. In corrosion also it is important factor. The higher concentrations of DO in winter were probably due to the fact hot conditions during winter are more favorable for higher photosynthesis. DO is the most important parameters in assessing water quality and reflects the physical and biological processes, prevailing in the water. Good water should have the solubility of Oxygen. 7.6 and 7.0 mg/L at 30^{o}C and 35^{o}C respectively. (Kudesia 1985). In the present investigation observed values are in the range of 5.2 to 7.4 mg/l. Both these figures are observed at sampling station II (June and November).

As per Kudesia 1985 with rise in temperature decrease in DO is observed and with this result it is proved. Dissolved Oxygen in water is necessary for aerobic biological activities. In the absence of sufficient amount of dissolved oxygen in water, the anaerobic degradation of the pollutants makes the water foul smelling.

REFERENCES

[1] APHA, - (American Public Health Association) American water works Association and water pollution control filtration. Standard methods of examination of water and waste water 19th Edition, New York U.S.A. (1995).
[2] A.K. De, The Saga of the Damodar River. J. Indian Chem. Soc. 62, 1038 (1985).
[3] P. Singh, Physico-Chemical characteristics of a tributary of Mahanadi river near orient paper mills site with ref. To water pollution J. of Env. Poll. 8 (3), 237 (2001).
[4] Pandey G. N, and Carney G. C. (1998) Environmental Engg. Tata McGraw Hill Publishing Company Limited, New Delhi.
[5] R. K. Trivedi; Assessment of water quality of some Indian Rivers based on factor analysis.
[6] Samiksha Chaturvedi; Dineshkumar and R. V. Singh; Vol. 7(3) Sept. (2003) Res. J. Chem. Environ.
[7] Sharma D. K., J. P. Jangir, C. P. S. Chandel and C. M. Gupta, J. Indian water works Association; 57; 1988
[8] Sahasranaman, A; and Buljan, J., 2000 Environment Management in India tanneries in 34th, Leria: 27-30
[9] V. P. Kudesia, Water pollution. Pragati Prakashan, Meerut (1985).
[10] WHO, Guidelines for Drinking water Quality, 2nd Edition (1996)
[11] C.S.E. 1982, Survey of Indian Environment Centre for science and Environment, New Delhi.
[12] S.D.Jadhav,D.G.Kanse,R.W.Jawale,V.V.Dhapate and M.S.Jadhav "Water Quality Assessment Of Katraj Lake, In Pune City." National Environmental Science Academy, Bulletin New Delhi. Dec 2007 Pg. 337-340
[13] The Status Of Water Supply and Waste Water Collection, Treatment and Disposal in Class-I Cities. CPCB, New Delhi. CUPS /30/1989-90.
[14] M. Y. Yazdandoost and M.S.Katdare, Aquatic Pollution and Toxicology
[15] Quasim, S.Z. and Kureishy, T.W.(1986), Proceedings INSA.
[16] Nishtha Koul, R.S. Lokhande1 & J.K. Dhar, Assessment of physico-chemical, microbiological and pesticide content in potable water in metropolitan city of Delhi, *IndiaJournal of Applicable Chemistry*, 2012, 1 (4):512-518
[17] Pandey M., Sundaram S.M., (2002), Trend of water quality of river Ganga at Varanasi, using WQI approach, International Journal of Ecology and Environmental Science, 28, 139142.
[18] B. Venkateswara Rao and etal, Physicochemical and Biochemical Characterization of Ground waters near point Sources for Assessing their Quality for user End Application. *Journal of Applicable chemistry*, 2014, 3 (1): 290-301
[19] J.SURESH P. VENKATESWARLU AND A.V.L.N.S.H.HARIHARAN, Studies on the Phisico- chemical characteristics of water in Pidaparthi village [Anaparthi mandal] E.G.Dt., A.P. *Journal of Applicable Chemistry*, 2012, 1 (3):427-432