A PHYSICO-CHEMICAL PARAMETER ON WATER QUALITY INDEX: A REVIEW

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ABSTRACT

Water is the most important compound that profoundly influence life. Due to the rapid growth of urbanization and unmanageable discharge of wastewater from industries are causing heavy and varied pollution in aquatic life and environment leading to degrade or deteriorate of water quality. In this study the analysis of physico-chemical parameter measured such as Total dissolved solid, Total suspended solid, pH, Temperature, Bio-chemical Oxygen Demand(BOD), Chemical Oxygen Demand(COD), Alkalinity, Electrochemical Conductivity, Total Hardness, Turbidity, Dissolved Oxygen.

KEYWORDS: Water Quality Index, BOD, COD.

INTRODUCTION

Water quality assessment includes the use of monitoring to define the condition of the water, to provide the basis for detecting trends and to provide the information enabling the establishment of cause-effect relationships. Important aspects of an assessment are the interpretation and reporting of the results of monitoring and the making of recommendations for future actions. For the human and industrial growth, water is considered to be the main requirement. Water quality assessment is the overall process of evaluation of the physical, chemical and biological nature of water in relation to natural quality, human effects and intended uses, particularly uses which may affect human health and the health of the aquatic system itself. Due to the waste discharged from the human and industrial activities, the quality of river water has deteriorated which affects human as well as aquatic life.

INTRODUCTION ABOUT WATER QUALITY INDEX

Water quality index (WQI) can be used which is based on aggregate data on water quality parameters. The water quality index (WQI) may also be used in relation to the sustainable management. Water quality is considered to be a key contributor to both health and the state of disease for humans. There are a number of methods to analysed water quality data that vary depending on informational goals, the type of samples, and the size of the sampling area. One of the most effective ways to communicate information on water quality trends is by use of the suitable indices. The use of indices in monitoring programs to assess ecosystem health has the potential to inform the general public and decision-makers about the state of the ecosystem.

a) **Temperature** Temperature is an important physical parameter on which other characteristics of water column in Marine Environment. The temperatures of coastal water samples ranged from 24 to 30 ^{0}C (surface).

(b) pH

The effect of pH on the chemical and biological properties of liquid makes its determination very important. pH ranged from 7.5 to 8.2 indicating neutral to marginally alkaline conditions.

(c) Turbidity

Turbidity results due to suspended matter in water such as clay, silt, finely divided organic and inorganic matter, soluble coloured organic compounds, plankton and other microscopic organisms.

(d) Alkalinity
The alkalinity of water is its capacity to neutralize acids, there by indicating the buffering capacity of water.

(e) Dissolved Oxygen
Dissolved Oxygen (DO) in water body is essential requirement for survival of aquatic organisms. The levels of dissolved oxygen were found to vary from 5.5 mg/l to 7.1 mg/l and 5.0 mg/l to 7.0 mg/l.

(f) Total Suspended Solid
The average concentration of suspended solids were found to vary from 258 mg/l to 1805 mg/l (bottom) in the estuarine zone while in the coastal region it was observed to vary between 18 mg/l and 866 mg/l (surface) indicating usual trend as observed in such water bodies..

(g) Total Dissolved Solids
The values varying between 500 mg/l and 5000 mg/l even in low tide, whereas in the coastal region variation was observed from 34,000 and 39,000 mg/l in the samples collected from surface, middle and bottom.

(h) Total Nitrogen
In the coastal water samples, total nitrogen varied from 4.0 mg/l to 17.0 mg/l.

(I) Biochemical Oxygen Demand (BOD)
The average BOD values were found to be < 3 with exceptional high values up to 10 – 13 mg/l in estuarine zone while in coastal region it was observed throughout <3 mg/l (with exceptional high values up to 6 mg/l).

LITERATURE REVIEW STUDY

Atefeh Mir (2017) conducted Analysis of TDS, SAR, EC, Na, Cl, Ca, SO4 and HCO3 was done. spatial monitoring of chemical parameters of Sistan River water in the dry and wet years in order to obtain the actual variations in the water chemical quality, determine the most suitable sites to extract potable water and irrigation, and optimize management of water resource in Sistan plain. The parameters was done in Relative using method.

Ahmed EI-Zeiny (2016) assessed water pollution using different method at Burullus Lake, Egypt. Mainly 3 parameters are analysed which are BOD, TP and TN. The result indicated that south western and north eastern part of the lake are the most polluted parts, in the form of BOD, TN, TP. Burullus Lake was extensively subjected to interrupting human activities which have a great negative impact on water quality.

Alexander H. Elliott (2016) presented model Parameters which are analysed for this study were TN, TP, sediments and E-coli throughout New Zealand. In this study, CLUSE was used for estimation of potential nutrient concentration for estuaries and provide key farm socio-economic indicators.

Dilip Kumar Jha (2015) has taken sea water samples at 54 stations in the year 2011 – 2012 from Chidiyatappu, Port Blair, Rangat and Aerial Bays of Andaman Sea to assess the water quality of the sea water. Parameters which are analysed are as DO, BOD, pH, TSS, Ammonia, nitrate, TP, chlorophyll–a (chl–a), fecal coliform (FC). WQI was calculated for all parameters and then overall WQI was evaluated for the study area. Quality parameters for sea water were interpolated using Relative weighting method.

Joyanta pal (2017) evaluates water samples are taken from 21 locations for analysis from the study area. pH, HCO3, Cl, SO4, Na, Ca, Mg, COD, NO3, NO2,Pb, Cr and Mn were taken into account for calculation of the WQI values. Water quality monitoring was performed during wet and dry period as Dry October – 2011 and wet May – 2012. Water quality for drinking purpose was evaluated using the water quality index (WQI) method. At all the sampling points, COD value is over the limit as per WHO. The main reason may be large differences in altitude because the Aksu river basin covers a large area from south to north. The computed WQI values are between 35.6133 and 337.5198 in the study.

Nidhi Gupta (2017) has been study was carried out for the development of water quality Index using eight parameters pH, Temperature, Total Dissolved Solids (TDS), Turbidity, Nitrate-Nitrogen (NO3-N), Phosphate (PO43−), Biological Oxygen Demand (BOD), Dissolved Oxygen (DO) measured at six different sites along the river Narmada. The fall in the quality of water in monsoon season was due to poor sanitation, turbulent flow,soil erosion and high anthropogenic activities.

Weiwu Yan (2016) has been evaluated the drinking water quality in Shanghai city at China by using a weighted aggregative index, a method for evaluating the problems with multiple indexes. Assessment and analysis of the drinking water quality of the study area was evaluated using seven qualitative and quantitative parameters such as total coliform group, total bacterial account, colour, turbidity, oxygen consumption, manganese and residual chlorine.215 monitoring sites were selected for comprehensive assessment and monitoring of the drinking water quality.

Rima Chatterjee (2010) the main objective of the study was to make a groundwater quality assessment, based on the available physico-chemical data from 79 locations in Dhanbad district. The anions of F, Cl, NO3, SO4, HCO3 and cations of Ca and Mg were analysed by ion chromatograph. A total of 26 surface water, 41 subsurface water and 12 mine water samples were collected from 79 locations including urban, rural, industrial and mining areas, during the pre-monsoon months of April-May 2004. The total dissolved solids (TDS) ranging between 144 and 1.412 mg/l in the subsurface water to 76-1.209 mg/l in the surface water and 298- 1.498 mg/l in mine water samples.

Nektarious N. Kourgialas (2016) the major pollutants were analysed as NO-3, PO-34, K+1, Fe+2, Mn+2, Zn+2, Cu+2 and B+3 to assess the groundwater contaminated by fertilizers. Groundwater samples collected from 235 different bore wells (10 drinking water wells and 225 irrigation wells) at Greece were analysed to determine the potential concentration in major and trace elements originated from fertilizers. Results of this study shows that the Iron (Fe+2) and Potassium (K+1) concentration was high in the groundwater.

Pradyusa Samantray (2009) Water Quality Index was computed by considered four parameters namely pH, Dissolved Oxygen, Biochemical Oxygen Demand and Fecal Coliform based on National Science Foundation studies. The samples were analysed using standard procedure (APHA 1989). Parameters such as pH, Turbidity, TDS, TH, NO3, Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Fecal Coliform has been analysed for the calculation of the WQI for the all study area. The water quality of the AtharabankiRiver is found to be the most polluted.

CONCLUSION

A main factor that influence the wider use of any WQI is the support and encouragement that is provided by the government and authority to implement the index as the main indicator or tool to evaluate the status of the that country. Moreover, there is no method by which 100% objectively or accuracy can be achieved in the development of WQI, Specially for the selection of parameters, generation of subindex values, generation of parameters weights and the choice of index aggregation method.After the study of different water quality indices is, it may be inferred that the aim of WQI is to give a single value to water quality of a source along with reducing higher number of parameters in to a simple expression resulting in to easy interpretation of water quality monitoring data.

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