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A STUDY ON FLUCTUATION OF HYDROGEN ION CONCENTRATION (PH) INPRAVARA RIVER IN AKOLE TEHSIL OF AHMEDNAGAR DISTRICT

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Abstract:

The present study deals with the fluctuation of hydrogen ion concentration (pH) in Pravara river in Akole tehsil of Ahmednagar district. The pH of river water is the measure of how acidic or basic the river water is. Power of hydrogen ion (pH) is a vital environmental factor for all aquatic media. pH is a scale of intensity of acidity or alkalinity and measures the negative logarithm of hydrogen ion concentration. The optimum pH for river water is around 7.4. Extremes in pH can make a river inhospitable to life. Low pH is especially harmful to immature fish and insects. Acidic water also speeds the leaching of heavy metals harmful to aquatic life. The present study was carried out for the fluctuation of water hydrogen ion concentration (pH) in Pravara river at west Ahmednagar district during the period of 2011-2012. The hydrogen ion concentration (pH) in this study ranged from 6.85 to 7.95 at different stations with little seasonal variation.. It is conclude that hydrogen ion concentration (pH) of this river in the considered region was never too low or too high to threat the aquatic life and productive in nature.

KEYWORDS:

Water, hydrogen ion concentration, pravara river.

INTRODUCTION

pH is a way of expressing the hydrogen ion concentration in water. It is related to the acidic or alkaline nature of water. Consideration of hydrogen ion concentration is important in almost all uses of water. In particular, pH balance is important in maintaining desirable aquatic ecological conditions in natural waters. pH is also maintained at various levels for efficient operation of water and wastewater treatment systems such as coagulation, disinfecting, softening, anaerobic decomposition of wastes, etc. The pH of most natural waters lies between 6.5 and 8. Unlike lakes and ponds, rivers are open systems, where frequent water exchange occurs. Despite this fact, the organisms that depend on rivers require some equilibrium. Various indicators gives a measure of the quality of a river. These measurement include dissolved oxygen, temperature, and pH, which is a measure of hydrogen ion concentration. Low pH levels cause fish kill by stressing animal systems and causing physical damage, which in turn makes them more vulnerable to disease. The effects of low pH levels can be lessened by the presence of limestone along river banks and in soil. Other external factors that can cause fluctuations in the river pH include agricultural runoff, acidic mine drainage (AWD), and fossil fuel emissions such as carbon dioxide, which creates a weak acid when dissolved in river water. Testing pH levels indicates the acidity or alkalinity of a sample. Rivers have some capacity to prevent changes in pH by the structure and composition of the river bed.

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However, drastic changes in pH can have detrimental effects on river health. This parameter determines the productivity of aquatic life. pH affects directly or indirectly physical and chemical parameters such as transparency, total dissolved solids (TDS) conductivity and viscosity. These properties are very important in fisheries and water management. Literature reveals that there is a scarcity of sufficient knowledge about pH of water in Pravara river. There is a dearth of knowledge about pH of Pravara river and therefore, it is important to surveying quality of pH in this region.

MATERIAL AND METHODS:

Pravara river is one of the important river in the western parts of Maharashtra. It is one of the main tributaries of the Godavari river. It comes present in east coast river system. The Pravara rises on the eastern slopes of the Sahayadris between Kulang and Ratangad. Total length of Pravara is 120 miles. The study was carried out by systematic collection and analysis of water samples. The water samples were collected during the period of 2011-2012 in four different seasons viz., pre-monsoon (March-May), monsoon (June-September), retreating monsoon (October-November) and winter (December-February). During the study period the half tributary and effective part within Akole and Sangamner tehsil was divided into five zones as survey stations on the basis of altitudinal, geographical variation and usages. The selected survey stations are respectively- From Station-1 : Ratanwadi (19.51 N to 73.74 E) , Station-2 : Wilson Dam (19.33N to 73.45 N), Station-3 : Randha fall (19.34 N to 73.46 E), Station- 4 : Akole (19.32N to 74.00E) , Station-5 : Kalas Bridge (19.31N to 74.05 E), Station-6 : Sangamner Bridge (19.33N to 74.12E). After sampling, water was filtered by filter paper. The pH value of the clear filtrate was read with a field pH meter and also neutralist pH paper. Water analysis was done in the Department of Chemistry, Adv.M.N. Deshmukh Arts, Commerce and Science college Rajur, Tal-Akole, Dist-Ahmednagar (M.S). The field procedure and laboratory techniques adopted by using standard methods and finally evaluation of data obtained. Collected samples by the standard methods and finally evaluation of data obtained. Each step being significant in its own way, was undertaken with almost care.

RESULTS:

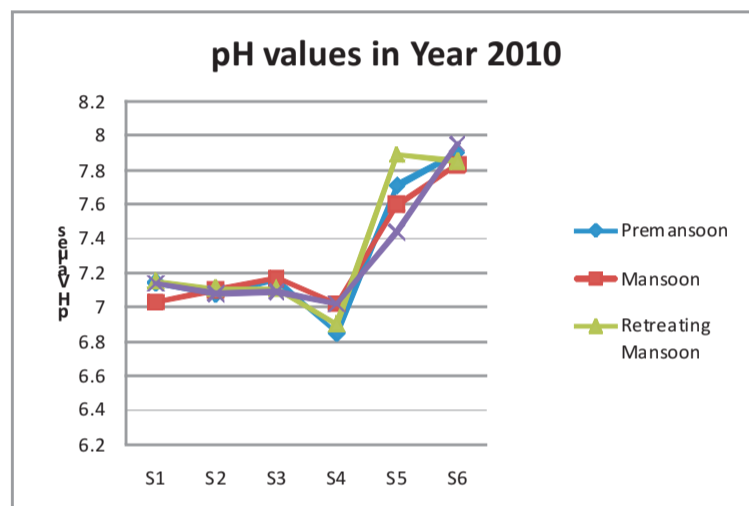
During year 2010 and 2011, pH values of river water ranged between 6.85 (minimum) in pre-monsoon and 7.95 (maximum) in retreating monsoon and winter. pH values of river water at station-1 is ranged between 7.03 (minimum) in pre-monsoon and 7.15 (maximum) in retreating monsoon and winter. This station is very near to origin of the river. At station-2 it is 7.05 (minimum) in pre-monsoon and 7.11 (maximum) in retreating monsoon. This station is Wilson dam. There is no more variation in pH values during both the years. pH values of river water at station-3 is ranged between 7.09 (minimum) in winter and 7.17 (maximum) in monsoon. This is the station called Randha fall. pH values of river water at station-4 is ranged between 6.85 (minimum) in pre-monsoon and 7.05 (maximum) in winter. This is the station near to Akole city. pH values of river water at station-5 is ranged between 7.44 (minimum) in winter and 7.89 (maximum) in retreating monsoon. pH values of river water at station-6 is ranged between 7.78 (minimum) in retreating monsoon and 7.95 (maximum) in pre-monsoon and winter. This station is near to Sangamner city. All the values of pH of water collected from field survey plotted in table-1.

Sr.No.	Seasons	Year	S1	S2	S3	S4	S5	S6
1	Pre- monsoon	2010	7.14	7.07	7.16	6.85	7.71	7.90
		2011	7.12	7.05	7.15	6.90	7.75	7.95
2	Monsoon	2010	7.03	7.10	7.17	7.02	7.60	7.83
		2011	7.06	7.09	7.16	7.04	7.85	7.88
3	Retreating Monsoon	2010	7.15	7.11	7.11	6.90	7.89	7.85
		2011	7.13	7.10	7.14	6.99	7.85	7.78
4	Winter	2010	7.14	7.08	7.09	7.02	7.44	7.95
		2011	7.15	7.06	7.10	7.05	7.50	7.90

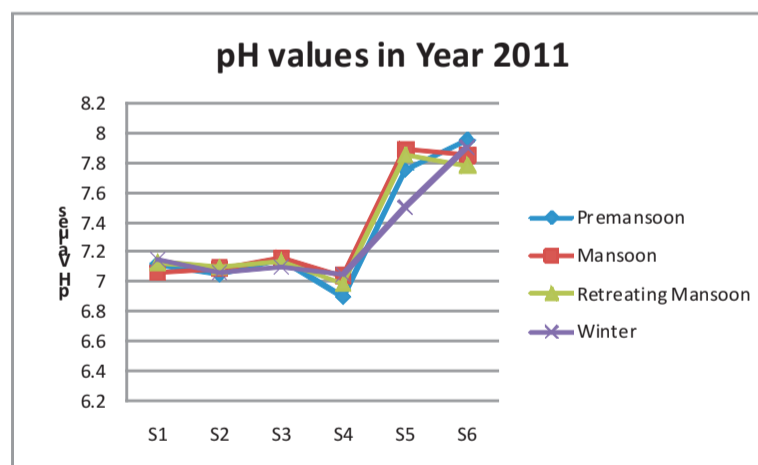
Table-1: Water pH of river Pravara

DISCUSSION:

In present study it is realized that minimum pH is 6.85 and maximum pH is 7.95. There is little seasonal fluctuation at different stations. (Table- 1) It is stated that the pH value below 7 and above 8.5 is not suitable for normal life of aquatic organisms. According to this in considered tributary pH was below 7 at station – 4 during pre-monsoon and retreating monsoon. During these seasons there is threats for aquatic life. At the rest stations for all the seasons in this tributary pH was never too low or too high to threat the aquatic life. It reported that alkaline water is more productive than acidic water. The normal range for pH in water lies between 6 and 8.5. The human body functions optimally in a slightly alkaline state, at a pH of 7.4. Weak alkaline reaction (pH) is considered most suitable for fish production due to availability of various nutrient elements in the aquatic environment and physiological activity of fish remains optimum at this point. So, it may be concluded that this tributary was productive in nature and river water is useful for drinking purposes.



Graph-1 pH values in year 2010



Graph-2 pH values in year 2011

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