STUDY ON PHYSICO-CHEMICAL PROPERTIES WITH COEFFICIENT AND CORRELATION WITH GROUND WATER QUALITY AT YAVATMAL, MS, INDIA

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A B S T R A C T

Study was carried out to know the status of ground water quality with physico-chemical properties correlated with coefficient and correlation. The aim behind it was to aware the common people of yavatmal about the quality of ground water. The ground water samples were analyzed from specific locations of yavatmal city during Feb., 2010 to Jan, 2011 at regular intervals of every month in morning hours. In the present investigation we have carried out the study to know the correlation of physico-chemical properties with pH and alkalinity (r = 0.503420). The result of analysis of ground water shows that suitability for potable use but after treatment.

Keywords: *Coefficient of Correlation, pH, Alkalinity, Ground Water, Yavatmal City*

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Introduction:

Water is one of the basic building blocks of life. Changes in physical, chemical and biological characteristics of water *i.e.* water pollution-can cause harmful effects on living organisms. The water quality for the yavatmal city was monitored for ground water. Water pollution affects plants and organisms living in these bodies of water; in almost all cases the effect is damaging not just too individual species and populations, but also to entire natural, biological ecosystems (Gaikwad *et. al.*, 2004). The consumption of polluted water also affects human healths. Contamination of ground water may take place due to various reasons such as discharge of untreated sewage, discharge of industrial effluents, solid waste dumping etc. The monitoring of ground water in yavatmal city reveals higher concentration of COD and BOD which indicates the pollution due to ingress of domestic sewage on land which leached in to ground water. The DO content which found to be very less which may cause the ground to become pollutes. The physico-chemical properties were also correlating the pH and alkalinity of ground water. The result of analysis of ground water shows that suitability for potable use. However, the well water should be disinfected especially in rainy season prior to its uses for drinking purposes.

The study of existence and the magnitude the direction of the relation between two or more variables is called as correlation. The correlation helps to determine the degree of relationship between two or more variables. The degree of correlation is also called correlation coefficient. Water samples were collected for the present study during Feb., 2010 to Jan, 2011 at regular intervals of every month in morning hours. The present work was undertaken to study the coefficient of correlation between pH and alkalinity of ground water samples of yavatmal. Many workers have studied the related problems are Gaikwad *et. al.*, 2004; Thorat and Masarrat, (2000); Batcha, 1998; Singh, 1999; Nath and Srivastava, 2001; Srivastava and Patil, 2002; Chavan and Wagh, 2005.

Material and Methods:

Water samples were collected for the present study during Feb., 2010 to Jan, 2011 The samples were collected and analyses round the clock with an interval of three hours for all the parameters in the laboratory by using standard method described by APHA, 2005; Trivedy and Goel, 1986 and statistical analysis was done with the help of Mungikar, 2003. The correlation coefficient (r)

is calculated by formula where 'x' and 'y' are any two parameters were assumed. The formula is as fallows

$$r = \frac{\Sigma(X-X)(Y-Y)}{\Sigma(X-X)^2 \Sigma(Y-Y)^2}$$

Results and discussion:

The result obtain from the result is presented in Graph 1 the total alkalinity of water was due to carbonates and bicarbonates. It was observed maximum during the months of summer followed by monsoon and winter is due to concentration of nutrients in water and decrease in water level by evaporation. A decline in total alkalinity was observed during monsoon which may be due to dilution effect, where as the alkalinity was ranged between 20.14-.48.92 mg/l. as presented in table 1 and graph 1.

As the value of coefficient of relation between pH and Alkalinity (r = 0.503420), values shows correlation coefficient. Hence, there is relationship between variable *i.e*. variables correlated. Hydrogen ion concentration (pH) plays an important role as most of the chemical process is occurred at specific pH, at normal pH all enzymatic actions are normal. Any increase in pH may lead down the biochemical reaction.

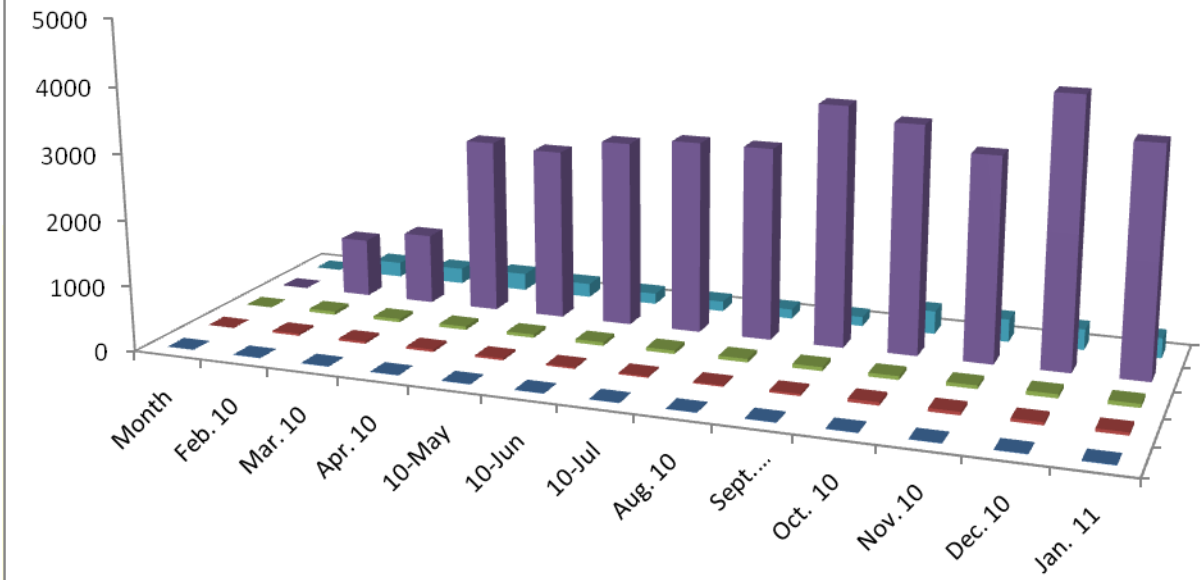
Generally high pH indicates higher productively. Bhatnagar, 1984, reported high pH with photosynthetic activity. However, the presence pH range shows that ground water was favorable for aquatic life Chavan and Wagh, 2005. During present study pH was ranged between 6.9 – 7.8. Similar results were also observed by Khare, 2002, Panda and Sahu, 2002 and Sedamakar and Angadi, 2003, Singh and Rai 2003 and Bahura, C.K. 1998. The water characteristics consider for the study indicate that the water is free from pollution. Meitei *et. al.*, 2004; Meenakshi *et. al*., 2002; Rafeeq and Khan, 2002; Gaikwad *et. al.*, 2007 and many more have studies and recorded similar type of results which we have observed in our study for water quality for Yavatmal city area.

Table 1: Showing the values of pH and Alkalinity of ground water in yavatmal city

Month	X	Y	X_2	Y_2	Xy
Feb. 10	6.9	32.78	51.22	0913.12	234.25
Mar. 10	7.2	34.32	51.22	1096.00	242.80
Apr. 10	7.2	36.82	52.68	2698.65	268.52
May 10	7.3	30.18	51.64	2639.82	214.33
June 10	7.4	23.26	54.34	2864.06	169.00
July 10	7.4	21.38	54.34	2964.06	155.50
Aug. 10	7.5	20.34	54.28	2964.06	146.35
Sept. 10	7.7	32.86	60.36	3695.00	145.94
Oct. 10	7.5	48.88	58.78	3501.50	357.64
Nov. 10	7.2	50.70	54.72	3136.21	350.74
Dec. 10	7.8	45.68	62.56	4104.67	320.70
Jan. 11	7.6	45.80	60.36	3495.00	311.30
N= 12	**ΣX =88.70**	**ΣY=423.00**	**ΣX_2=666.50**	**ΣY_2=34072.15**	**ΣX.Y=2917.07**

(r = 0.503420)

Graph 1: Showing the values of pH and Alkalinity of ground water in yavatmal city



Conclusion:

It may conclude from this study on the basis of analytical findings, pH and total alkalinity values for the samples are within permissible limit. The values of correlation coefficients and their significance levels will help in selecting the proper treatments to minimize the contaminations of ground water. There should be an increasing awareness among the people to maintain the water quality and may prove to be useful in achieving the goal. The main objective of this study was to explore the awareness among the yavatmal people.

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