



RESEARCH ARTICLE

BIOCHEMICAL SCIENCES

**CHEMICAL ANALYSIS OF RIVER WATER COLLECTED FROM DIFFERENT SITES OF KALI NADI**

**NIRANJAN LAL\* AND SMT. VANADANA GARG\*\***

\*Department of Applied Science and Humanities Vidya College of Engineering, Meerut. U. P. (India)

\*\* Department of Zoology D.N. (P.G.) College, Meerut. U.P. (India)



**NIRANJAN LAL**

Department of Applied Science and Humanities Vidya College of Engineering,  
Meerut. U. P. (India)

**ABSTRACT**

The quality of ground water depends on the ions which are dissolved in ground water. The major ions which are responsible to maintain the quality of ground water are carbonate ( $\text{CO}_3^{2-}$ ) and bicarbonate ( $\text{HCO}_3^-$ ), Chloride ( $\text{Cl}^-$ ), Sulphate ( $\text{SO}_4^{2-}$ ), Nitrate ( $\text{NO}_3^-$ ), Phosphate ( $\text{PO}_4^{3-}$ ), and Fluoride ( $\text{F}^-$ ). The above ions are present in the form of anions. These anions are in general maintain by the cat ions as  $\text{Cu}^{++}$ ,  $\text{Mg}^{++}$ ,  $\text{Na}^+$ , &  $\text{K}^+$ . These cations are present in the form of hardness and salinity. 3 water samples are collected from different locations of kali nadi, District Meerut during summer (2008). The ionic concentrations are expressed in mg/ltr.



## KEY WORDS

pH, Total alkalinity, Total Hardness, Calcium Hardness, Magnesium Hardness,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{F}^-$  Electrical conductivity & T.D.S.

## INTRODUCTION

After air, water is the most essential component for life. Appropriate concentration of ions dissolved in water is essential for human beings but their higher concentration causes adverse effects. The physical & chemical quality of water is affected by industrial activities and human activities. India has large human settlement in rural areas and villages where exist problems of water quality and quantity, Neuropharmacological studies of drevogenins isolated from Wattakaka volubilis (Linn.f.) Stapf. in mice available sources and seasonal scarcity of water.

## EXPERIMENT

pH value of river water samples under investigation were measured by using systronic pH meter, type 361. The pH meter was standardized by buffer solution of pH 4 and pH 9.2. Total alkalinity of the water samples were determined by titrating with N/50  $\text{H}_2\text{SO}_4$  using methyl orange indicator.

The Total hardness of the water samples were determined by complexometric titration with EDTA using Sorochrome black T as an external indicator.

The cadmium hardness of the water samples were determined by complexometric titration with EDTA using ammonium purpurate as an indicator. The estimation of chloride ion is generally made by titrating the water solution against the standard solution of silver nitrate using potassium chromate as an indicator.

$\text{Na}^+$  &  $\text{K}^+$  were estimated using flame photometer (128).  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{F}^-$  were estimated using U. V. Spectrophotometer. T.

D. S. is measured by gravimetric method. E. C. val Neuropharmacological studies of drevogenins isolated from Wattakaka volubilis (Linn.f.) Stapf. in mice of the sample under investigation were measured by systronic E.C. meter.

## RESULT AND DISCUSSION

The pH of water body indicates deterioration of water quality. pH range of 6.5-8.5 is normally accepted as per the guidelines suggested by WHO. The pH value of water sample in the study area ranged from 8.60-9.4. This shows that the pH of water sample was observed to be slightly alkaline.

The desirable limit for total alkalinity is 200 mg/ltr. The value of river water sample varies from 350-410 mg/ltr. Mg/ltr..

The desirable limit for hardness in drinking water according to I.S. is 300 mg/ltr whereas its value in river water sample varies from

$\text{Ca}^{++}$  hardness value in river water varies strongly from 490 – 550 mg/ltr.  $\text{Na}^+$  content more than 50 ppm makes the water unsuitable for drinking. The  $\text{Na}^+$  content for all samples was more than expected.  $\text{K}^+$  value which is an essential nutrient for plant varies from 210 – 220.3 mg/ltr. The chloride value is also more than the acceptable limit as prescribed by WHO and is greater than 5000 mg/ltr.

$\text{SO}_4^{2-}$  More than 200 mg/ltr are objectionable for domestic purpose. The  $\text{SO}_4^{2-}$  value was also found more than acceptable limit.

$\text{NO}_3^-$  value found was for plant as nutrient. Fluoride is essential for human life and its



excess may cause some health problems. The concentration of chloride exceeds 1.5 mg/ltr. causes teeth mothing and even higher concentration may cause skeletal fluoraisis.

Fluoride in river water is very strong as 1.89-3.5 mg/ltr.

Parameter	Sample 1	Sample 2	Sample3
pH	8.65	8.81	9.4
T.A.	350	370	410
T.H.	740	840	790
Ca <sup>++</sup>	490	550	522
Mg <sup>++</sup>	250	290	268
Na <sup>+</sup>	52.9	98.9	179.4
K <sup>+</sup>	210.3	205.3	222.3
Cl <sup>-</sup>	588.75	556.2	525.05
SO <sub>4</sub> <sup>-</sup>	204.1	210	222
NO <sub>3</sub> <sup>-</sup>	1.3	2.8	5.6
F <sup>-</sup>	1.89	2.81	3.5
T.D.S.	2510	3225	2780
E.C.	660	830	1830

All the values are expressed in mg/ltr. Except pH & EC

Where TA = Total alkalinity,

T. H. = Total hardness

EC= Electrical conductivity

T.D.S. = Total dissolved solid

Total solid is considered to be the sum of dissolved solid and suspended solid in water body which consists of inorganic salts and small amount of organic matter. Increase in suspended solids contains much of the organic matter. Increase in suspended solid tends to increase the pollution. An upper limit 500 ppm has been set in order to control undesirable taste and diarrhea.

## CONCLUSION

In the present study it was found that physico-chemical characteristic of a river water sample cross the maximum permissible limit.

Thus it is concluded that, in general, the river water quality was not satisfactory and unsuitable for human consumption and other domestic use.

## ACKNOWLEDGEMENT

The authors are very thankful to Dr. V. K. Agarwal, (Head Dept. of Zoology, Meerut College, Meerut) & Dr. A.K. Mishra (Head Dept. of Chemistry, D.N. (P.G.) College Meerut & also for Smt. Vandana Garg Dept. of Zoology D.N. (P.G.) College Meerut for providing necessary facilities and helpful suggestions.



## REFERENCES

1. Gupta Renuka, Garg V. K. and Khurana, Indian J. Environ. Toxicology. (11), 58 (2001).
2. Das J, Das S.N., & Sahoo, Indian J. Mar. Sci. 26,323, (1997).
3. Rana A.K. et.al., Asian j. Chem (14), 1209 (2002).
4. Sharma R.S. & Mathur R. Pollu. Res. 14, 373 (1995).
5. Dessai P.V., Pollu. Res., 14, 377 (1995).
6. Srivastava V.V., Pollu. Res. 14, 253, (1995).
7. Kudesia V.P., Water pollution Pragati prakashan Meerut (1990).
8. ISIO 500, Indian standard drinking water specification bureau of Indian standard New Delhi 5 (1991).
9. APHA water quality analysis standard method (1999).
10. Pawar C.T. and Joshi M.V. Impact of urbanization and industrialization of water quality Nat.. Environment Poll. Tech 1(10) 361 (2005).
11. Kulshrestha S., Dhindsa S. & Singh R.V. Nat. Env. Poll. Tech. 1 (15) 453 (2008).
12. Majumdar, D. and GuptN. Indian J. Env. Health 42 (1), 28(2002).