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## Water quality assessment studies with reference to nitrate contamination of Modasa Taluka of Sabarkantha district (North Gujarat)

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**ABSTRACT**

*Water is indispensable for the survived of life. It constitutes 70% of the weight of human body. When water is unfit for consumption, it is biologically or chemically contained, it can lead threaten diseases. Desirable limit of Nitrate is only 45 mg/L. Permissible limit is 100 mg/L. Excess intake of Nitrogen beyond permissible limit brings out blue-baby diseases. Looking to the importance of drinking water quality is being undertaken for Sabarkantha district is reported.*

**Key words:** Drinking water, nitrate, Physico-chemical.

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## INTRODUCTION

Physico-chemical analysis of drinking water of Nadiad, located in Kheda district of Gujarat state has been investigated intensively[1-3]. Bore well water is generally used for drinking and other domestic purposes in this area. The use of fertilizers and pesticides, manure, lime, septic tank, refuse dump, etc. Are the main sources of bore wells water pollution[4]. In the absence of fresh water supply people residing in this area use bore wells water for their domestic and drinking consumption. In order to assess water quality index, we have reported the physico-chemical analysis of bore wells drinking water.

Nitrate is found in all natural water at some concentration. In ground water however low and high concentration of nitrate can occur depending upon the nature of the rocks and the occurrence of the nitrate – bearing minerals. blue-baby diseases has been described as an endemic of tropical climate[5].The main sources of nitrate intake is water[6].

In low concentration of nitrate prevent body weakness. However it has been observed that when nitrate intake through water, food and air increases to a specific level (1.0-1.5 mg / l.) the beneficial effect is lost and in fact harmful effect being to show with increasing concentration ( above 150 mg / l. ). Excess intake of nitrate beyond permissible limit bring out along with some neurological disorder. Higher concentration of nitrate also causes respiratory failure, fall of blood pressure and genera paralysis. Continuous investigation nonfatal dose of nitrate causes permanent inhibition of growth. Nitrate ions inhibit a variety of enzymes often by forming complexes with magnesium ion and other metal ions[7].

According to Water and River Commission Western Australia ground water occupies the pores and crevices in sand, sand stone and other rocks[8]. The crucial role which ground water plays as decentralized sources of drinking water for millions of rural and urban families can not be overstated[9]. Rao et al. reported that about 80 percentage of the diseases in the world are created because of poor quality of drinking water[1]0. The quality of the ground water can not be restored by stopping the pollution if it is contaminated once. Water quality index is very important tool for the information on water quality[7-10]. Some important ratings are given below:

| Desirable Limit | Parameter | Permissible Limit | Moderately safe | Unsafe |
|---|---|---|---|---|
| 1.0 | Nitrate (ppm) | 1.5 | 1.5-2.0 | > 2.0 |
| 1.0 | RSC (Meq./L) | < 1.25 | - | > 2.50 |
| 5.0 | SAR | < 10 | 10-18 | > 26 |
| 0.0-0.5 | EC m moh/cm | 0.0-0.75 | 0.25-0.75 | > 2.25 |
| 45.0 | Nitrate mg / L | 100 | 60 - 100 | >150 |

## EXPERIMENTAL SECTION

*Sample collection*

Ground water samples of 80 located in Modasa Taluka of Sabarkantha district were collected in precleaned bottles with necessary precautions. The samples were brought to the laboratory and Nitrate concentration was determined by spectrophotometric method and water analysis kit method.

## RESULTS AND DISCUSSION

Nitrate concentration in ground water of 80 sources of 65 villages of Modasa Taluka was examined. The concentration of Nitrate is shown in figure. All the villages as well as sources were categorised according to following concentration.

--- Category-I;-- Nitrate concentration Zero to 50 mg / L
---Category-II;--Nitrate concentration 50 mg / L to 100 mg / L.
----Category-III;--Nitrate concentration 100 mg / L to 150 mg / L.
---Category-IV;--Nitrate concentration 150 mg / L to 200 mg / L.
--From 80 sources of 65 villages, 27 villages (cat-I) were found to have Nitrate concentration Zero to 50mg/L. Which is maximum desirable limit of drinking water standards.
--37 sources (cat.II) were to found o have Nitrate conc. 50mg/L.
--Zero sources (cat.III) were found to have Nitrate conc. 100 to 150mg/L.
--1 sources (cat.IV) was found to have Nitrate conc. More than 200 mg/L.

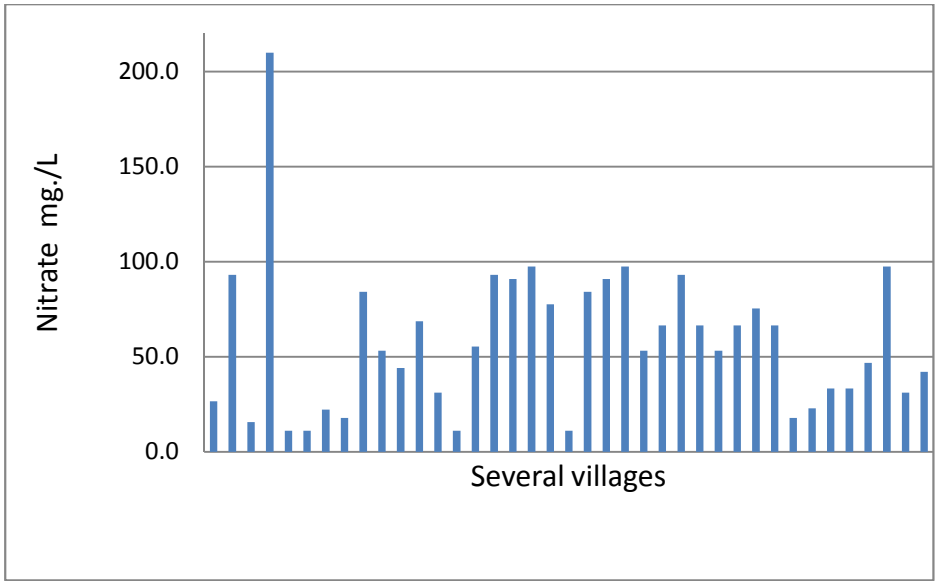


**Figure 1. Nitrate contamination of first 40 samples.**

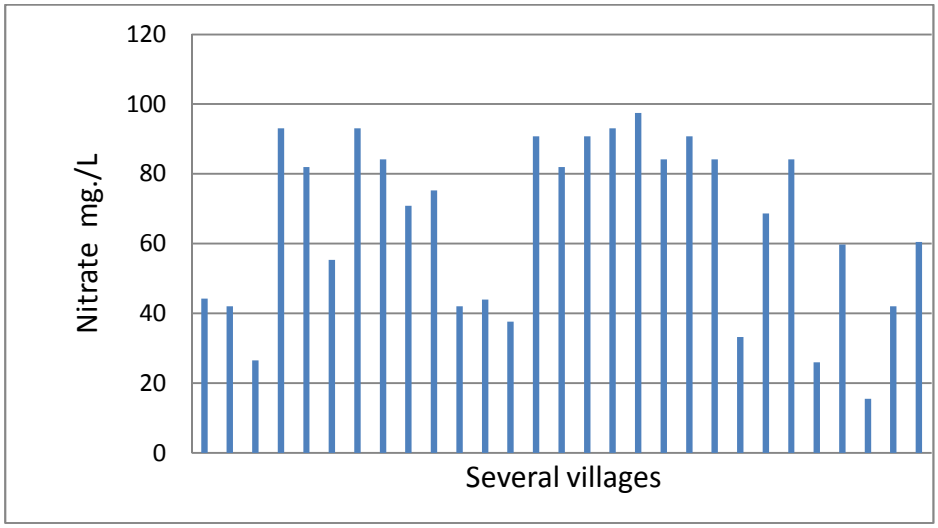


**Figure 2. Nitrate contamination of remaining 40 samples.**

## CONCLUSION

Results show the high concentration of Nitrate at most of the villages. Nitrate is one of the important parameters and an important plant nutrient. High nitrate concentration .may cause blue-baby diseases.

The high concentration of nitrate in water is reduced by diluting the high concentration nitrate water with the help of low concentration nitrate water or by avoiding excess use of fertilizer.

## REFFERENCES

[1] A. k. Rana, M. J. Kharodawala, J. M. Patel, R. K. Rai, B. S. Patel and H. R. Dabhi, *Asian Journal of Chemistry*, **(2002)**, 14, 1209.
[2] P. A. Hmilton and D. K. Helsel, *Ground Water*, **(1995)**, 33, 2.
[3] E. Brown, M. W. Skovgstd and M. J. Fishman, *Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases*, **(1974)**. 5.
[4] A. I. Vogel, *Text Book of Inorganic Quantitative Analysis*, 4 th Ed., ELBS, London **(1978).**

[5] *Guidelines for drinking water quality, World Health organization., Geneva,* **(1993)**, Vol.1
[6] *Guidelines for drinking water quality, World Health organization., Geneva,* **(1999)**, Vol.2..
[7] *Nitrate in drinking water, WHO / IWA* , **(2001)**.
[8] *Water Facts- Water and rivers commission, Government of Western Australia,* Dec. **(1998)**.
[9] M. D. Kumar and S. Tushar, *The Hindu survey of the Environment,* **(2004)**, 7-9, 11-12.
[10] N. S. Rao, *Hydrological Sci. J/J des Sci. Hydrologiques***, (2003)**, 48(5), 835-847.
[11] P. C. Mishra and R. K. Patel, *Indian J. Environ. Ecoplan,* **(2001)**, 5(2), 293-298.
[12] S. Naik and K. M. Purohit, *Indian J. Environ. Ecoplan,* **(2001)**, 5(2), 397-402.
[13] B. K. Purandra, N. Varadarajan and K. Jayshree, *Poll Res.,* **(2003)**, 22(2), 189.
[14] APHA *(American Public Health Association) standard methods for examination of water and waste water, NW, DC* **(1994)**, 20036.
[15] S.Gupta,A.Kumar,C.K.Ojha and G.Singh, *J Environmental Science and Engineering,* **(2004)**, 46(1), 74-78.
[16] K.C. Patel, K.B. Vyas, K.S. Nimavat and M.V. Hathi, *SRL, Der Pharma Chemica,* **(2009)**, 1(2), 292-295.