**Contamination of Nitrate In Groundwater of Amravati Region**

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***Abstract –*** *Groundwater is an important natural resources with high economic value and social significance. It supplies almost half of all drinking water in the world (WWAP, 2009) and plays a key role in food production all over the world. Nitrate (NO3-) is one of the main groundwater pollutant. Nirate treats depends on scale which can be take on acute and chronic forms.Consuming water containing high nirate concentration can have almost immediate effect on a person and could cause the risk of various diseases one of which is “Methemoglobinemia” in which blood lacks the ability to carry sufficient oxygen to the individual body cells. As difference in concentration of nitrates in water has made it important to study the contamination so that proper parameters or undesirable effect of nitrate can be studied. In rural areas, groundwater contamination by nitrates is a problem related to the spreading of organic and chemical fertilizers by farmers and, to some extent, to efﬂuents from domestic sewage systems. Health effects of groundwater contamination by nitrates have been assessed several times and may lead to important consequences for infants. Usually groundwater cannot be controlled so it become very difficult to study the variation in parameters. However, several reportsshows that there is an increase in groundwater contamination because of Nitrates.*

***Keywords-*** ***Nitrates,Methemoglobinemia,Groundwater***

1. **INTRODUCTION**

**N**itrate is the most common chemical contaminant in the world’s groundwater aquifers. Nitrate is a colorless, odorless, and tasteless compound that is present in

groundwater. Nitrate is present widespread in the environment and the major sources of nitrate pollution in both developed and developing countries is crop fertilization (Gatseva et al., 2008). Common sources of nitrate include: Fertilizers and manure, animal feedlots, wastewater-disposal, industrial waste, and food processing waste, septic systems, and N-fixation from atmosphere by legumes, bacteria and lightning (Smith et al., 2005). Nitrate and nitrite have some hazards for human. Most important environmental problems caused by nitrate are eutrophication in water supplies and infectious disease (Loganathan et al., 2013) Toxic nitrate has a negative effect on the human's health, which could result in many diseases, such as birth defects, spontaneous abortion, increased infant mortality, diarrhea, abdominal pain, vomiting, diabetes, hypertension, respiratory tract infections, changes in the immune system, and methemoglobinemia (Azizullah et al., 2011; Ward et al ., 2011). The aim of the present study was thus to determine the concentrations of nitrate and in ground water sources of Amaravati region and to compare the nitrate and contents with standards levels because there is no whole information available on nitrate in ground water sources.

**1.2. About the Amravati region**

Amravati District is one of the eleven districts of Vidarbha region of Maharashtra State. It is situated in the northern part of the State abutting Madhya Pradesh State and lies between north latitudes 20°32’ and 21°46’ and east longitudes 76°37’ and 78°27’. The total area of the district is 12210 sq. km. and falls in Survey of India degree sheets 55 G, 55 H, 55 K and 55 L. The district is bounded on the north by Madhya Pradesh, on the east by Nagpur and Wardha districts, and on the south and south west by Yavatmal, Akola and Buldhana districts. Wardha River forms the eastern boundary of the district.

**II- MATERIAL AND METHODOLOGY**

2.1 MPCB monitors ground water quality for parameters like pH, total hardness, Calcium, Magnesium, Chloride, total dissolved solids, Fluoride, Manganese, Nitrate, Sulphates and so on once in six months. Based on the stringency of the parameters and its relative importance in the overall quality of water for drinking purposes each parameter has been assigned specific weightage. The relative weights of the same have been determined for the parameters monitored and recorded by MPCB for the water samples monitored .These weights indicate the relative harmfulness when present in water. The maximum weight assigned is 5 and minimum is 1.

**Table No. 11: Groundwater classification based on the Water Quality Index**

|  |  |  |
| --- | --- | --- |
| **WQI Value** | **Water Quality** | **Colour code used in this report** |
| <50  |  Excellent  |  |
| 50-100 | Good water  |  |
|  100-200  | Poor Water  |  |
| 200-300  | Very Very Poor water |  |
| >300  | Water Unsuitable for drinking  |  |

**2.2 Sample Collection, Preservation And Storage**

* Samples should be collected in plastic or glass bottles. All bottles must be thoroughly cleaned and rinsed with reagent water. Volume collected should be sufficient to insure a representative sample, allow for replicate analysis (if required), and minimize waste disposal.
* Samples must be preserved with H 2 SO4 to a pH <2 and cooled to 4°C at the time of collection.
* Samples should be analyzed as soon as possible after collection. If storage is required, preserved samples are maintained at 4°C and may be held for up to 28 days.
* Samples to be analyzed for nitrate or nitrite only should be cooled to 4°C and analyzed within 48 hours.

**2.3. Analytic Measurements**

Nitrate and nitrite were measured using a Spectrophotometer 2100 UV-Vis, at 549 and 410 nm according to the standard methods for the examination of water and wastewater (APHA, AWWA, WPCF 1992). The SPSS software was used for statistical analysis with a significance determined at p<0.05.

1. **RESULTS AND DISCUSSION**

**3.1. Nitrate contamination of different Taluka’s of Amravati reagion**

From the table given below we find out that groundwater reading of NO3. The reading where taken in three parts and the reading given below is average of the three reading taken from the different taluka’s of the Amravati region.The reading of the following samples were taken as per the process describe in chap.3 methdology and the experiment was carried out at college laboratry.

**Table No. Readings of Nitrate from different taluka of Amravati**

|  |  |  |
| --- | --- | --- |
| **Sr No** | **Taluka** | **Average Reading (NO3)** |
| 1 | NandgaonKhandeswar | 63.34 |
| 2 | Tiwasa | 68 |
| 3 | Chandur Railway | 62 |
| 4 | Bhatkali | 49.33 |
| 5 | Morshi | 49.67 |
| 6 | Achalpur | 39.67 |

**3.2 Nitrate contamination in different villages of the above Taluka’s**

|  |  |  |
| --- | --- | --- |
| Sr No. | Village Name | Avg. Reading of NO3 |
| 1 | Maulichor | 68 |
| 2 | Hiwaramurade | 62 |
| 3 | Bharwadi | 70 |
| 4 | Anjangaon | 72 |
| 5 | Asegaon | 59 |
| 6 | AmlaVishvesheir | 61 |
| 7 | Dapori | 53 |
| 8 | pardi | 52 |
| 9 | Chaasala | 43 |
| 10 | Pathrot | 42 |

**IV- CONCLUSION**

Groundwater contamination by nitrate is a widespread problem in our India. By affecting the groundwater quality it can cause public health problems, and environmental degradation of ecosystems. All these negative effects can be minimized by proper groundwater management and good governance to mitigate the risks for nitrate contamination. However, in order to better manage nitrate contamination in groundwater systems, researchers, water resources specialists and policy makers do need information on the scope, distribution and severity of groundwater nitrate contamination. In other words, it would be better to facilitate early diagnosis of possible changes and widen their inspiration for selecting effective measures for interventions.

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