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STUDY OF PHYSICO-CHEMICAL PROPERTY OF GROUND WATER IN BHADAR BLOCK DISTRICT AMETHI, UTTAR PRADESH

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ABSTRACT

The efficient and long-term management of natural resources, particularly soil and water, is critical to India's agricultural prosperity and national economy. In this environment, soil productivity is critical for agricultural development. In order to meet the various soaring demands of the swelling population, unscientific management of soil and water resources without regard for long-term sustainability has not only had a negative impact on agricultural productivity growth rates but has also resulted in marked resource degradation as well as serious environmental concerns. Overexploitation and haphazard use of scarce resources without concern for long-term sustainability has resulted in many types of soil degradation, endangering soil productivity and food security. As a result, continued large-scale extraction has severely depleted groundwater in different rural and urban parts of the state, to the point where prospective aquifers in the Ganga basin are nearing the end of their lives. Groundwater contamination has surfaced as a considerably more significant danger to water security in many sections of the state, adding to the situation.

KEYWORDS: Physico-Chemical, Ground Water, Pollution, Natural Resource

The water quality from the rivers has considerable importance for the reason that these water resources are generally used for multiple matters such as: drinking domestic and residential water supplies, agriculture hydroelectric power plants, transportation, and transportation tourism, recreation, and other human or economic ways to use water (Antony, 2012.) to the conclude water management, many hydrological studies have been available around the world, which highlights the ecological role of water from the rivers there has been more research-based on water quality evaluation (Brabec *et al.*, 2002.) Human and animal drinking water demands should take precedence over accessible water (Ferencz and Balog, 2010). According to the World Health Organization (2002), improper water hygiene and sanitation result in 1.7 million deaths and 54.2 million disability adjusted life years (Days) lost each year globally. According to the U.N. World Water Development Report (2003), over two million tonnes of garbage are dumped into waterways every day. With human waste, industrial wastes, chemicals, and agricultural wastes, the total world wastewater output is estimated to be over 1,500 km3 per day. As a result of overexploitation and pollution, freshwater has become a scarce commodity today (Garg *et al.*, 2004). Unfortunately, due to haphazard and unplanned development and industrialization in a few sections of the nation during the last several decades, the resource has been exhausted or degraded in quality (Ghose and Basu, 1968). Water table depth varies with monsoons, dropping to 4-6 M in the pre-monsoon period and rising to 0-3 M during the monsoon and post-monsoon periods. Excessive quantities of nitrate have been found in groundwater in several sections of the state throughout the years (Gupta and Shukle, 2006.). Because particle matter is naturally filtered out of groundwater, it appears pure and clean. Groundwater, on the other hand, contains both natural and man-made contaminants. Because of anthropogenic activities (such as sewage wastewater, industrial effluents, trash dumping, and so on), (Noortheen *et al.*, (2016). Explained the uneven distribution of major and trace elements in groundwater. Water pollution is responsible for around 80% of the world's illnesses and more than one-third of fatalities in impoverished nations (WHO, 2002). 3 The wastewater contains many pathogenic bacteria, microorganisms, suspended solids, nutrients, minerals, toxic metals, etc. For several years the primary goal of wastewater treatment was to reduce the number of suspended solids, oxygen-demanding materials, harmful bacteria, and dissolved inorganic compounds. However, in recent years more stress has been placed on improving the municipal treatment processes for the disposal of solid waste. In traditional wastewater treatment physical, chemical, and biological processes are working to remove organic matter, nutrients, and solids from wastewater. (Hariharan and Purnima, 2015). The study of wastewater properties is important regarding the biological and chemical wastewater treatment processes, which include (aerobic treatment such as anaerobic treatment. Also, the chemical

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wastewater treatment processes include chemical precipitation (coagulation and flocculation), ion exchange, neutralization, and adsorption. Heavy-metal contamination is not a modern problem arising out of industrialization it began when humans started processing ores. Since, then the use of metals and their impacts on the environment have accelerated, with a major increase during the 19th and 20th water pollution are As Zn, Cu, Cd, Pb, Hg, Ni, and Cr. Some of these metals (e.g. Cu, Fe, Ni, Mn, and Zn) are required as nutrients in trace amounts for life processes in plants and microorganisms but become toxic at higher concentrations. According to the composition and diversity of the microbial community have the greatest collision on the stability and performance of the wastewater treatment systems. The biological community of activated sludge has a large biological diversity and contains a variety of viruses, bacteria, protozoa, fungi, algae, and metazoan. In this complex ecosystem, bacteria typically account for 95% of the total number of microbes and play a crucial part in wastewater treatment. In the secondary illuminating pond, good compaction and 4 departure of the activated sludge have a positive effect on the effluent quality. However, bulking sludge due to the overgrowth of filamentous bacteria organisms has a significant influence on the performance of the activated sludge system as it can result in poor settle and poor compaction. The overgrowth of filamentous bacteria in activated sludge has considerably affected the procedure of wastewater treatment plants for many years. (Cydzik-Kwiatkowska and Zielinska, 2016). Sludge bulking can easily occur at low temperatures and is consequential in adverse effects on effluent treatment.

MATERIALS AND METHODS

Study Site

Amethi district is situated at 26°09'14.53 N and 81°48'51.26 E, with an average height of 101 meters (331 feet) above mean sea level in east India. The river Gomti, which runs through the heart of the Amethi area, provides a replenishing source for groundwater. Except for certain areas near the Gomti River, which drains practically the whole district, the geography of the Amethi district is mainly flat. Amethi is the name of a district in the Faizabad division of Uttar Pradesh, India. Amethi was divided into 15 blocks, encompassing the whole Amethi district 2 (Amethi, Bahadurpur, Bhadar, Chhatoh, Deeh, Gauriganj, Jagdispur, Jamo, Musafir khana, Salon, Sangrampur, Shahgarh, Shukul Bazar, Singhpur, Tiloi).

Description of Sampling Area

Rivers, lakes, and underground water have historically been important sources of water for sustaining life on earth. The dug-well was perhaps the first human endeavour to construct a man-made reservoir for public use. Drilled-well water was regarded as a virtuous social work in ancient India as I t provided all of the drinking water, washing, irrigation, and other needs for residential use. With the development of technology pumping sets, water canals, pumps and tube wells are used to replace the dug-well.

Collection of Water Sample from Various Sources

Water samples were collected in sterilized polypropylene bottles from different water bodies of Uttar Pradesh region from underground. The bottles were filled leaving no air space, and then the bottle was sealed to prevent any leakage. Each container was clearly marked with the name and dates of sampling.

Sampling and Analytical Methods

Components of groundwater contamination were analysed for following physio-chemical & microbiological Water Quality parameters:-

- Bacterial colony count
- Physiochemical analysis of water

Bacterial Colony Count

1. Total Plate Count (TPC): by Bureau of Indian Standards: IS 5402: 2002, ISO 4833: 1984.
2. Coliform count: Membrane Filter Technique for Members of the Coli form Group from Cappucino Sherman, A laboratory manual (Microbiology), 7th edition, 2007, pp331-337.
3. Yeast and mould count: MPN for Potability testing of water sample from Cappucino Sherman, A laboratory manual (Microbiology), 7th edition, 2007, pp321-330.
4. Vibrio count: MPN for Potability testing of water sample from Cappucino Sherman, A laboratory manual (Microbiology), 7th edition, 2007, pp321-330.

Physiochemical Analysis of Water

1. Determination of pH by Electrometric method; Bureau of Indian standards. IS: 3025 (Part-2)-1984.
2. Measurement of Temperature by Laboratory and Fields method; American Public Health Association (APHA), Standard method for the examination of water & waste water 19th edition volume-1, 1995.
3. Determination of Total Dissolved Solid by Bureau of Indian standards. IS: 3025 (Part-16)-1984.
4. Measurement of Biological oxygen demand: 5-Day BOD Test from APHA, Standard method for the examination of water & waste water 19th edition volume-1, 1995.
5. Determination of alkalinity: Titration method by APHA, AWWA, WPCF, 19th edition, Volume-1, 1995Turbidity

6. Conductivity Determination of Conductivity by Laboratory method of American Public Health Association (APHA), Standard method for the examination of water & waste water 19th edition volume-1,1995.

7. Measurement of Chemical oxygen Demand COD: Standard method for the examination of water & waste water 19th edition volume-1, 1995.

Analysis Report (Block- Bhadar)

Sample code	Bhadar
Date receipt	21/03/22
Sampling Description	Water Sample
Sample Nature	Water Sample

S.N.	Parameter	Unit	Result	Specification in any	Test Method
	Chemical Testing	-	-	-	-
1	Floride	Mg/L	1.400	-	ISC3025(P-60)
2	Arsenic	Mg/l	0.009	-	ISC3025(P-37)
3	Lead	Mg/l	0.016	-	ISC3025(P-47)

RESULTS AND DISCUSSION

The physicochemical investigation and the GPS location of the water samples collected in Bhadar block. The parameters determined were pH, hardness, Arsenic, Fluoride and Lead content. In our study the pH range in all seasons 7.64, 8.42 and 8.06 respectively. The pH range indicate that the water is alkaline. These value were within the limits prescribed by BIS. In present study a most important knowledge evaluate that in our life a big challenging agent is ground water because year to year our ground water quality decreases. This study suggest that manage and prevention of ground water quality degradability in modern life and awareness to village peoples of Amethi district.

CONCLUSION

The ground water quality in around Bhadar block have been evaluated for physico chemical composition and suitability for drinking purpose. In the study area majority of ground water samples are within permissible limits prescribed for drinking purpose. Ground water in the area is alkaline in monsoon and winter session. TDS level in all ground water samples in all sessions are above drinking water standards.

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