



Characterisation of Na and K level in underground water in Sultanpur city, UP, india

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ABSTRACT

Groundwater the 1/3rd of the world is covered with land. Other sector is in water. Water is one of the most important natural resources for living. It is use for drinking, fertilizing, washing and many other things to do with it. Now the water condition is very bad. The environment suffers the water condition and its purity. The ground water is one of our valuable sources. "The water we drink and use everyday might be called our most valuable resource. Agriculture, manufacturing, brewing, and other day-to-day activities depend on reliable, pure groundwater. In the presented study a number of water samples were collected from selected sites in Sultanpur City UP India in the month of October-2017. The collected water samples were carried out to the laboratory to analyze the Na and K level to check the suitability of water for drinking and cooking purposes, by using standard procedures. People usually identify ground water pollution when people start getting sick while drinking it, once discovered ground water pollution needs to be addressed, both to clean the contaminated water and to prevent its spread. At result it was found that these parameters were present in permissible limits according to the BIS and WHO standards yet we should check the quality of water time to time. People can help to prevent the ground water pollution by disposing of hazardous materials like oil, paints, unused prescriptions and solvents responsible in a facility which is certified to handle such materials.

1. Introduction

Our oceans cover approximately 75% of the planet Earth. A distinct percent of our food resources come from these waters including fish and plants. The air around us is what keeps the flame of life from fading and flickering out. Why would anyone pollute these precious parts of our ecosystem? Water pollution is a global plague that affects the people, animals, and plants. These life forms need water to survive. The causes are contributed greatly by the human population^[1]. Recently, laws have been passed to protect the precious drinking waters. Although they are in effect, most are ignored or loop holes have been found by major corporations so the can still "legally" dump harmful waste near water supplies. There are several factors that causes water pollution. One of the reasons that the water pollution problem is so severe is that it is not actually illegal to dump pollutants into water bodies. Sewage, sludge, garbage, and even toxic pollutants are all dumped into the water^[2].

Nitrate is the most common chemical contaminant in the world's groundwater and aquifers. Elevated nitrate levels in groundwater can be caused by on-site sanitation, sewage sludge disposal and agricultural activities. Nitrate can also enter the groundwater via excessive use of fertilizers, including manure spreading. This is because only a fraction of the nitrogen-based fertilizers is converted to produce and other plant matter. The remainder accumulates in the soil or lost as run-off. The occurrence of fluoride is close related to the abundance and solubility of fluoride-containing minerals^[3] such as fluorite (CaF₂). Underground water is easily available, and its

temperature and quality are quite stable. At the same time, however, underground water is an important element of the earth's water circulation system^[4]. Therefore, the underground water environment must be conserved. Water pollution is a major problem in the global context. It has been suggested that it is the leading worldwide cause of deaths and diseases, and that it accounts for the deaths of more than 14,000 people daily. An estimated 700 million Indians have no access to a proper toilet, and 1,000 Indian children die of diarrheal sickness every day. Some 90% of China's cities suffer from some degree of water pollution, and nearly 500 million people lack access to safe drinking water. In addition to the acute problems of water pollution in developing countries, industrialized countries continue to struggle with pollution problems as well. The burial of corpses and their subsequent degradation may also pose a risk of pollution to ground water. In the most recent national report on water quality in the United States, 45 percent of assessed stream miles, 47 percent of assessed lake acres, and 32 percent of assessed bay and estuarine square miles were classified as polluted.

2. Materials and Methods

Groundwater quality comprises the physical, chemical, and biological qualities of ground water. Temperature, turbidity, color, taste, and odor make up the list of physical water quality parameters. Since most ground water is colorless, odorless, and without specific taste, we are typically most concerned with its chemical and biological qualities. Although spring water or

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groundwater products are often sold as “pure,” their water quality is different from that of pure water^[5].

Ground water samples were collected during the day time between 10 am to 5.0 pm from dug wells (A), hand pumps (B), IM II hand pumps (C) and tube wells (D) from the selected sites in the month of October 2017. The different sampling locations are given in **Table 1**. The flame photometry technique is used in the presented study to analyse the Na and K level in taken water samples.

Table -1. Sampling Location in Sultanpur City (U.P.)

S.No.	Sampling Sites	Code	Sources
1.	Payagipur	S1	A- Dugwells
			B- Handpumps
			C- I.M.II Handpumps
			D- Tubewells
2.	Amahat	S2	A- Dugwells
			B- Handpumps
			C- I.M.II Handpumps
			D- Tubewells
3.	Sabjimandi Chowk	S3	A- Dugwells
			B- Handpumps
			C- I.M.II Handpumps
			D- Tubewells
4.	Golaghat	S4	A- Dugwells
			B- Handpumps
			C- I.M.II Handpumps
			D- Tubewells
5.	Lohramau	S5	A- Dugwells
			B- Handpumps
			C- I.M.II Handpumps
			D- Tubewells

3. Results and Discussion

Researchers from the Federal Institute for Geosciences and Natural Resources (BGR) conducted a modelling study for a deep shale-gas formation in the North German Basin. They concluded that the probability is small that the rise of fracking fluids through the geological underground to the surface will impact shallow groundwater. The degree of pathogen removal strongly varies with soil type, aquifer type, distance and other environmental factors.

Most water pollution doesn't begin in the water itself. Take the oceans: around 80 percent of ocean pollution enters our seas from the land. Virtually any human activity can have an effect on the quality of our water environment. When farmers fertilize the fields, the chemicals they use are gradually washed by rain into the groundwater or surface waters nearby. Sometimes the causes of water pollution are quite surprising. Chemicals released by smokestacks (chimneys) can enter the atmosphere and then fall back to earth as rain, entering seas, rivers, and lakes and causing water pollution. Water pollution has many different causes and this is one of the reasons why it is such a difficult problem to solve. Water pollution is the contamination of water bodies (e.g. Groundwater). Water pollution affects plants and organisms living in these bodies of water; and, in almost all cases the effect is damaging not only to individual species and populations, but also to the natural biological communities. Water pollution occurs when pollutants are discharged directly or indirectly into water bodies without adequate treatment to remove harmful compounds. The effects of water pollution strongly impact the balance of nature, which ultimately impacts all humans. With proper care and consideration, many of the situations that cause water pollution can be stopped or decreased. Man-made

situations are typically the causes of water pollution. Often, it's unintended and unknown that actions are contributing to water pollution. Many times it's the last thought on someone's mind that their actions could significantly impact the environment locally and beyond.

Effects of Water Pollution

There are various effects of water pollution-

1. Spread of disease: Drinking polluted water can cause cholera or typhoid infections, along with diarrhea.
2. Affects Body organs: The consumption of highly contaminated water can cause injury to the heart and kidneys.
3. Harms the food chain: Toxins within water can harm aquatic organisms, thus breaking a link in the food chain.
4. Causes algae in water: Urea, animal manure and vegetable peelings are food for algae. Algae grow according to how much waste is in a water source.
5. Flooding: The erosion of soil into waterways causes flooding, especially with heavy rainfall.
6. animals: Birds that get into oil-contaminated water die from exposure to cold water and air due to feather damage. Other animals are affected when they eat dead fish in contaminated streams.
7. Bacteria feed off the algae, decreasing the amount of oxygen in the water.
8. The decreased oxygen causes harm to other organisms living in the water.

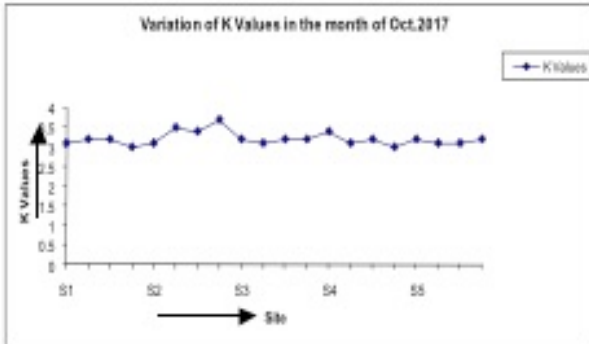
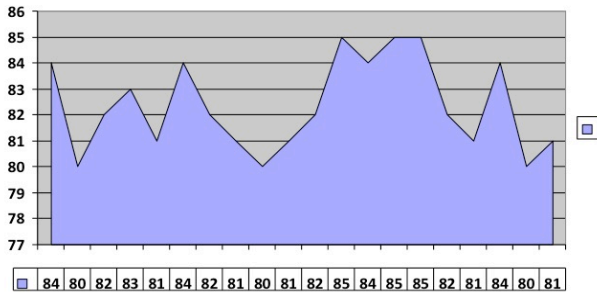
Table 2. Na and K level in underground water in Sultanpur city, UP, India in the month of October-2017

PARAMETERS			Na (mg/L)	K (mg/L)
SAMPLING SITES	SITE	SOURCE		
PAYAGIPURE	S ₁	A	84	3.1
		B	80	3.2
		C	82	3.2
		D	83	3
AMAHAT	S ₂	A	81	3.1
		B	84	3.5
		C	82	3.4
		D	81	3.7
SABJIMANDI CHOWK	S ₃	A	80	3.2
		B	81	3.1
		C	82	3.2
		D	85	3.2
GOLAGHAT	S ₄	A	84	3.4
		B	85	3.1
		C	85	3.2
		D	82	3
LOHRAMAU	S ₅	A	81	3.2
		B	84	3.1
		C	80	3.1
		D	81	3.2

The effects of water pollution are not always immediate. They are not always seen at the point of contamination. They are sometimes never known by the person responsible for the pollution. However, water pollution has a huge impact on our lives. With knowledge, consideration and preparation, water pollution can be decreased. It doesn't take much effort just a little thought. Domestic sewage is 99.9% pure water; the other 0.1% is

pollutants. While found in low concentrations, these pollutants pose risk on a large scale.

Variation of Na Level in the month of Oct.2017



4. Conclusion

In the presented work on the basis of data analysis among twenty water samples analyzed from different located sites it was found that the Na values ranges from 80 to 84 and the K values ranges from 3.0 to 3.7. It was concluded that except few water samples, all other water samples were found in permissible limits according to the WHO and BIS standard yet a regular monitoring should be carried out to check the level of different parameters in the underground water to develop a healthy society.

Perchloroethylene is a highly utilized solvent in the dry cleaning industry because of its cleaning effectiveness and relatively low cost. It has also been used for metal-degreasing operations. Because it is highly volatile, it is more frequently found in groundwater than in surface water.

Further causes of groundwater pollution are chemical spills from commercial or industrial operations, chemical spills occurring during transport (e.g. spillage of diesel fuels), illegal waste dumping, infiltration from urban runoff or mining operations, road salts, de-icing chemicals from airports and even atmospheric contaminants since groundwater is part of the hydrologic cycle.

The precautionary principle, evolved from Principle 15 of the Rio Declaration on Environment and Development, is important in protecting groundwater resources from pollution. The precautionary principle provides that “where there are threats of irreversible damage, lack of full scientific certainty shall not be used as reason for postponing cost-effective measures to prevent environmental degradation.”

It was also found that the underground water quality was contaminated at few sampling sites due to domestic wastes. Ground water is only portable source in the Sultanpur city of UP India. It may be said that water in Sultanpur city is though fit for domestic and drinking purposes but need treatment to minimize the contamination **Table -2**.

Hence our study concludes that the underground water quality in this region shows a variation in different parameters against standards. So it is highly important to take periodical monitoring of the underground water quality in Sultanpur city for our future sustainability.

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