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Study of Some Physicochemical Parameters of Drinking Water Sources in Shendurjana Ghat Region Dist. Amravati, MS, India

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Abstract: ***Physicochemical analysis of water samples KMK-I, KMK-II and KMK-III have been collected from Shendurjana Ghat Dist. Amravati (MS, India) region. Insectisides, pesticides and various fertilizers were used for getting higher yield of crops, vegetables, fruits which is continuously create soil, air and water pollution, all these things in to consideration to carry out physicochemical analysis. Physicochemical analysis of water samples it was found that, generally all parameters studied do not show undesirable effect on the human being except in few parameters.***

Keywords: Physicochemical parameter, drinking water sources.

1. Introduction

The availability of water both in terms of quality and quantity is essential for the very existence of mankind. There is heavy extraction of water for domestic, industrial and agricultural purposes leads to more than 50 per cent of water wastage in the domestic, agriculture and industrial sectors. Water pollution is rendering much of the available water unsafe for consumption. In India, Most of the populations are depend on surface water as the source of drinking water supply. Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life [1]. Poor water quality has a direct impact on water quantity which is available for drinking in a number of ways. Polluted water that cannot be used for drinking, bathing and industry or agriculture purpose effectively reduces the amount of usable water within a given area. Not with standing, the use of low quality water (for example saline or brackish water) may have important and direct impacts on productive water such as irrigated agriculture, with important effects on land degradation, crop production and consequently on rural income and food security. Around 700 million people in 43 countries suffer today from water scarcity, a situation there are not sufficient water resources to satisfy long-term average requirements of mankind (Falkenmark, et al., 2001). According to WHO organization, about 80% of all the diseases in human beings are caused by water [2].

Water is essential to sustain life, and a satisfactory (adequate, safe and accessible) supply must be available to all (WHO, 2008). Adequate safe water supply is an indispensable ingredient in promoting economic development and betterment of human welfare in every nation. Water is the basic resource essential for the survival of mankind on earth and it is the greatest gift of nature. Man's activities on the environment often results in pollution and degradation of water bodies. Water bodies must therefore be jealously guided and protected from being polluted, which will affect water quality and availability for desired usage. Causes of water quality impairment are urban and rural storm water runoff, inadequate waste water treatment, nutrient entrophication, atmospheric deposition and acid rain, pollutant in sediments and fish, and nuisance aquatic weed growth and invasive species.

As we all know water is the most important requirement for human life to survive. Depending upon the intended use of water certain quality parameters are established and based on this criteria quality standard is specified. Physical parameters play an important role for quality of water and waste water. The quality of water depends on the location of sources and environmental protection in given area. Water is a natural resource that is fundamental to maintaining life. Water ecosystems have undergone profound changes in recent years, mainly due to human activities, at a range of levels. These ecosystems receive a large variety and quantity of pollutants, either through the soil or by being directly discharged into water, with subsequent impact both on the environment and on human health [3].

Minerals are good for human health but in appropriate quantity. If minerals are consumed in high or low intake, it may impose life threatening risk to human health [4]. Among all the minerals, fluoride is one of the important in ground water that prevents the tooth decay and controls the metabolic bone diseases [5]. Various types of water related activities can cause beneficial or adverse impacts on the environment, water channelization, flood, land alteration and changes in land use patterns. In recent year's continuous growth in pollution, rapid industrialization and accompanying technologies involving waste disposal has endangered the very existence of human

race [6-7]. The physical and chemical parameters of the particular area will be changed. The quality of water varies with depth of water. Seasonal changes are governed by the extent and composition of dissolved salts depending upon subsurface environment. The main objectives of the physico-chemical study are to know the distribution of solutes in the dam water and suitability of the ground water for domestic, agriculture and drinking purposes.

On the world map Nagpur city from Maharashtra state is popularly known as "Orange City" and famous for oranges. So the orange zone of agriculture land it is termed as "Orange Belt".

2. Literature Survey

N. Subba Rao et al (2018), focused on impacts of geogenic and anthropogenic sources change seriously quality of groundwater and found that the inferior groundwater quality directly affects the human health, agricultural output and industrial sector. The groundwater quality evaluate for drinking purpose and also to identify the pollutants responsible for variation of chemical quality of groundwater, using pollution index of groundwater (PIG). Groundwater samples collected from a rural part of Telangana State, India, were analyzed for pH, total dissolved solids (TDS), calcium (Ca^{2+}), magnesium (Mg^{2+}), sodium (Na^{+}), potassium (K^{+}), bicarbonate (HCO^{-3}), chloride (Cl^{-}), sulfate (SO_2^{-4}), nitrate (NO^{-3}) and fluoride (F^{-}). The characterization of geochemical evolution of groundwater, using trilinear diagram, also further supports the assessment of PIG in the variation of groundwater quality. From this study, the TDS, Mg^{2+}, Na^{+}, Cl^{-}, SO_2^{-4} and NO^{-3} are considered as indicators in assessing the groundwater pollution sources [8].

Dr. P. B. Nagarnaik (2008) et al studied different Physico-Chemical and Biological parameters (using WHO and INDIAN STANDARDS) of ground water which was based on one of the most useful water sources from different areas of Wardha City [9]. Arunabh Mishra and Vasishtabhatt (2008) have carried out, Physico-Chemical and Microbiological Analysis of Under Ground Water in V.V Nagar and Nearby Places of Anand District,Gujarat, India [10]. Ashwani Kumar and et al (2009) studied Water quality of River Ravi, a tributary of Indus River System was evaluated by Water Quality Index (WQI) technique [11]. Divya Bharatwaj [2013] tested and concluded that how water can be utilized based on various values of parameters [12]. Juneja (2013) measured the quality of drinking water in rural areas of Jhunjhunu district, Rajasthan and its effects on human health and analyzed various physical, chemical and microbiological assessments on the water sample collected from the villages [13].

3. Material and Methods

The sites from Gitti khadan water, Tap Water and Well Water from Shendurjana ghat were selected because from these sites the water is daily used for drinking as well as irrigation purpose KMK-I - The sample collected from the Gitti khadan, KMK-II The sample collected from the Tap Water, KMK-III - This sample is collected from the Well Water of of Shendurjana ghat. Samples were collected from approximately after cold water runoff of 2 minutes before collection of sample, by holding the sampler bottle near the base of tap. Care must be taken not to catch any floating material or bed material into the container.

The glass and polythene bottles were used for the collection for samples. Before sampling the bottles were treated with dilute mineral acid solutions for two days and they were washed with dilute water (no acidic to litmus) Nearly one liter water sample was collected in between 10 am to 11.30 am. Before performing physicochemical analysis the water samples was filtered and filtrate was used for physicochemical analysis. The Physicochemical Parameters such as temperature, pH, conductance, total hardness, temporary hardness, permanent hardness, calcium, magnesium, alkalinity, B.O.D., C.O.D., chlorides was determined by using standard methods [14].

Table 1: Physicochemical Parameters of Drinking Water Sources

Sr. No.	Parameters	KMK-I	KMK-II	KMK-III
1	**pH**	**9.24**	**7.25**	**6.23**
2	**Temperature (^{0}C).**	**24**	**23**	**27**
3	**EC (µS/cm)**	**271**	**235**	**224**
4	**Alkalinity (ppm)**	**56.6**	**51.7**	**49.6**
5	**Ca^{2+} (mg/l)**	**58**	**81**	**91**
6	**Mg^{2+} (mg/l)**	**110**	**115**	**145**
7	**Cl^{-} (mg/l)**	**82**	**98**	**112**
8	**TDS (mg/l)**	**468**	**396**	**327**
9	**Hardness (ppm)**	**195.06**	**158.4**	**168.3**
10	**COD (Mg/Lit.)**	**2**	**08**	**00**
11	**DO (ppm)**	**0.35**	**1.08**	**1.9**
12	**CO_2 (mg/l)**	**0.50**	**0.06**	**0.001**

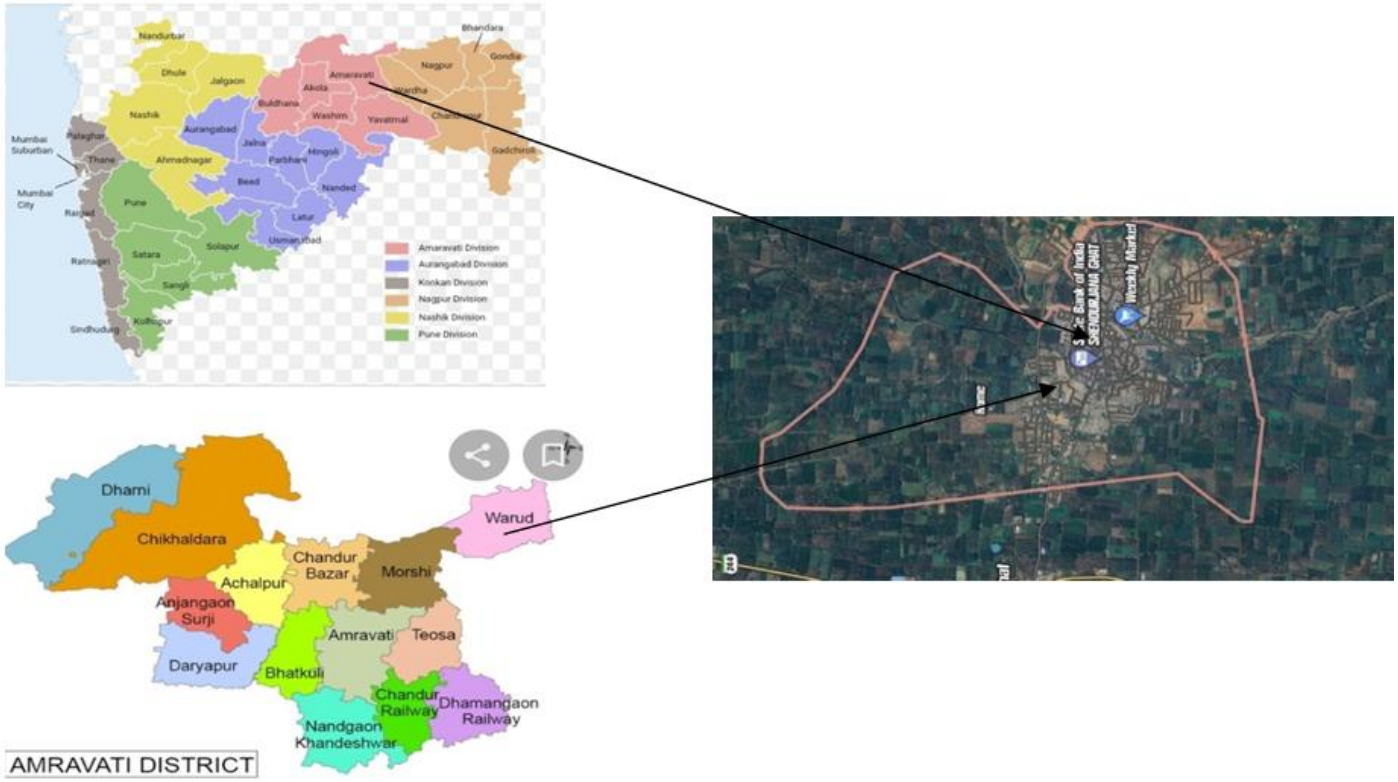

Figure: Sample area of shendurjana Ghat Village

4. Results and Discussion

The range of water temperature during the present study was in between 23^0C to 27^0C. The determination of pH of water is very important as it plays a role in the growth of flora and fauna of the aquatic body and also indicates whether the water is safe for drinking and irrigation purpose. The range of pH in water 6.23 – 9.24 which is slightly greater in KMK-I, the normal pH range for drinking water according to Indian standards is 6.5 to 8.5. Undesirable effects outside the desirable limit will affect the mucous membrane and/or water supply system.

The range of water Conductance is 224-271 µS/cm. According to Water quality standards Electrical conductivity is a measure of the saltiness of the water and is measured on a scale from 0-50,000 µS/cm and scale between 0-800 µS/cm is good for drinking for humans and irrigation. to Indian standard requirement of 75-200 mg/L of calcium in water is safe for drinking water. The present investigation shows that the concentration of Calcium of the water sample is 58-91 mg/L.

The total hardness of water sample was found in between 158.4 to 195.06 mg/L. From the booklet of NEERI Nagpur, page no.38 clearly indicates that when the range of hardness is in between 0-69 mg/L the water is soft, when it is in between 70-120 mg/L then it become medium, when it is in between 120- 180 mg/L then it become hard, when it is above 181mg/L it is very hard and when it is above 300 mg/L causes adverse effect on domestic use. The suitability of water resources for the drinking and irrigational use in agriculture is depending upon salt concentration, especially chloride content. In this region water sample chloride content was in the ranges from 82 to 112 mg/L. According to WHO maximum permissible limit for chloride is 500 mg/L.

5. Conclusion

From the results of physico-chemical analysis in the present investigation indicates that the quality of underground water parameters like pH, chloride, total hardness and calcium lye within the maximum permissible limit prescribed by WHO and Indian standards specification for drinking water except magnesium which just cross the desirable boundary line. It has also been concluded that the water has no hazardous effect on human health. So on the basis of these, water was potable.

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