

Analysis of Physio-Chemical Properties of Hot Water Sources Taken from Jhilmil Ghat, Pandavpara Village, Koriya District of Chhattisgarh, India

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Abstract: Water is life. Life cannot be imagined without water. From the biological point of view such as man, animal, plant, water has many unique properties which are important for the spread of life. It fulfills this role by allowing organic compounds to react in those ways. All known forms of life depend on water. Many chemical elements are present in water such as chloride, nitrate, calcium carbonate, calcium, magnesium, iron, fluoride, sulfate, oxygen, hydrogen etc., along with bacteria are also present. If the presence of all these chemicals is up to a critical limit, then it is useful for humans and agriculture. But due to its deficiency or excess, there is a bad effect on the human body and on agricultural production. The main objective of our research is to study the physico-chemical properties of water coming out from a self-flowing hot water source in Jhilmili Ghat, Koriya district of Surguja division of Chhattisgarh. Because the people living in this village drink the water coming out of this source, and the animals also drink it. We will study in our research whether this water is safe for humans and animals to drink or not. We will study the conductivity, pH-value, presence and quantity of chemicals like Chloride, Nitrate, Calcium Carbonate,

Calcium, Magnesium, Iron, Fluoride, Sulphate etc. in the sample of water coming out from the sources.

Keywords: Hot water source, Self flowing water, Jhilmili Ghat, Conductivity, pH-value, Physical properties, Chemical properties etc.

Introduction: The source of self-flowing hot water is in Pandavpara village located in Koriya district in Surguja division of Chhattisgarh. Which is known as Jhilmili Ghat. This water is used by the residents of Pandavapara village for drinking and the nearby animals also drink it. The water coming out of Jhilmili Ghat remains warm from 40° to 45°. Pandavpara village is 65 Km away from Ambikapur, the headquarter of Surguja division and the distance of this place is 344 Km from Raipur, the capital of Chhattisgarh. and geographical location position of this research area is at 23°21'7.189"N latitude and 82°43'58.663"E longitude and no research has been done here.



- **Conductivity :-** Conductivity is a measure of water’s capability to pass electrical flow. This ability is directly related to the concentration of ions in the water[1]. These conductive ions come from dissolved salts and inorganic materials such as alkalis, chlorides, sulfides and carbonate compounds [2]. Compounds that dissolve into ions are also known as electrolytes [3]. The more ions that are present, the higher the conductivity of water.
- **pH-value :-** pH is a determined value based on a defined scale, similar to temperature. This means that pH of water is not a physical parameter that can be measured as a concentration or in a quantity.[4],[5]. pH is a measure of how acidic/basic water is. The range goes from 0 to 14, with 7 being neutral. pHs of less than 7 indicate acidity, whereas a pH of greater than 7 indicates a base. pH is really a measure of the relative amount of free hydrogen and hydroxyl ions in the water. Water that has more free hydrogen ions is acidic, whereas water that has more free hydroxyl ions is basic. Since pH can be affected by chemicals in the water, pH is an important indicator of water that is changing chemically. The pH of water determines the solubility (amount that can be dissolved in the water) and biological availability (amount that can be utilized by aquatic life) of chemical constituents such as nutrients (phosphorus, nitrogen, and carbon) and heavy metals (lead, copper, cadmium, etc.). For example, in addition to affecting how much and what form of phosphorus is most abundant in

the water, pH also determines whether aquatic life can use it. In the case of heavy metals, the degree to which they are soluble determines their toxicity. Metals tend to be more toxic at lower pH because they are more soluble[6].

- **Density:-** The density of water is the weight of the water per its unit volume, which depends on the temperature of the water. The usual value used in calculations is 1 gram per milliliter (1 g/ml) or 1 gram per cubic centimeter (1 g/cm³). [8]
- **Viscosity:-** The viscosity of a fluid is a measure of its resistance to deformation at a given rate. For liquids, it corresponds to the informal concept of "thickness": for example, syrup has a higher viscosity than water.[9]

MATERIAL & METHODS

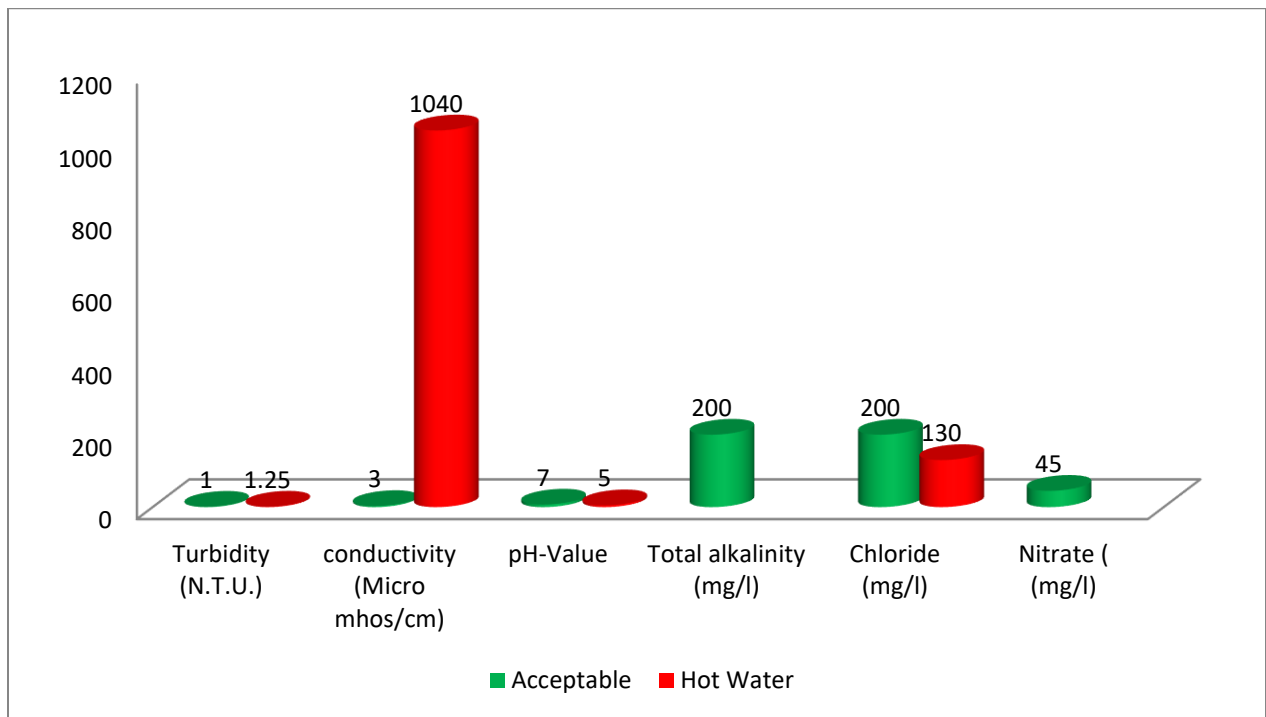
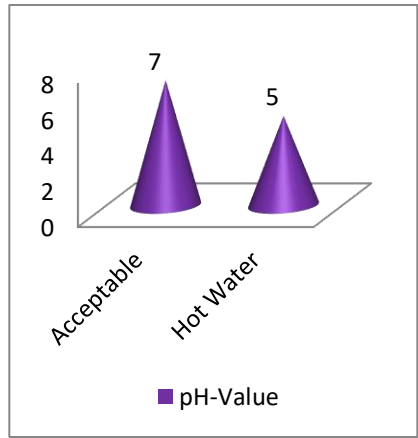
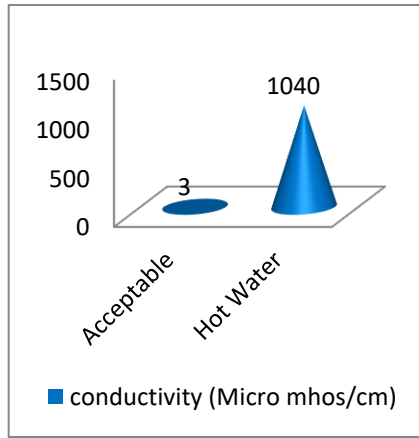
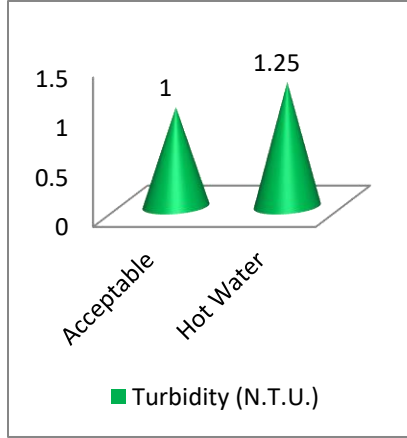
We are using experimental Method as Methodology in this research, Our research area from where hot water is continuously coming out automatically. The place from where the source of hot water is located is at Jhilmil Ghat in Pandavpara village of Koriya district. During our research, we went to this hot water source and measured the temperature of the water where we got the temperature of water from 38 to 42 degree. And we took a sample of the water coming out of the source in a bottle. The physico-chemical properties of the samples taken were studied. In which we studied the presence and quantity of conductivity, pH value, chloride, nitrate, calcium, carbonate, magnesium, iron, fluoride, sulfate etc. which are as follows-

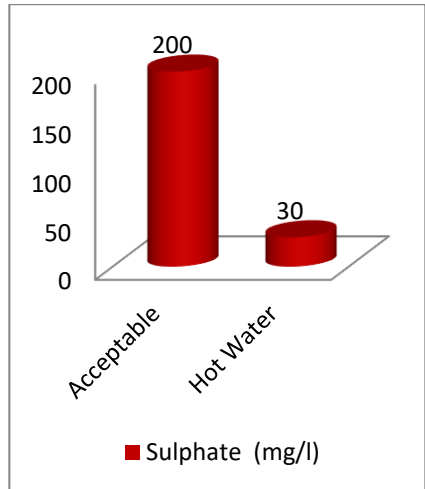
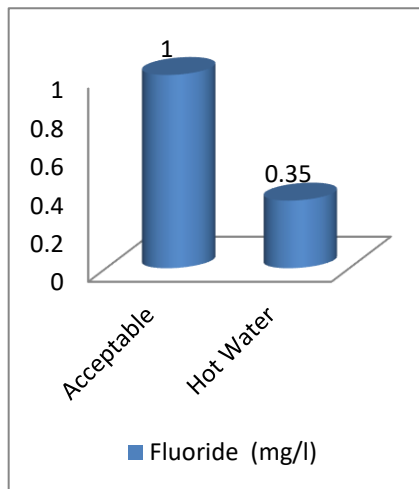
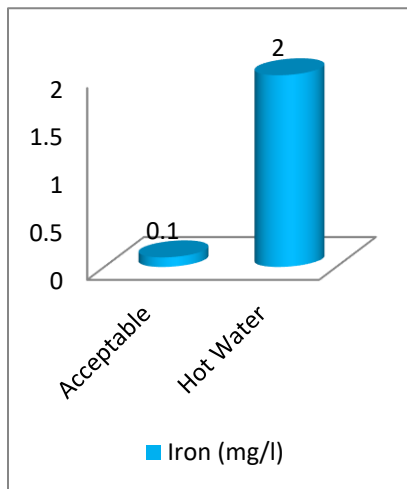
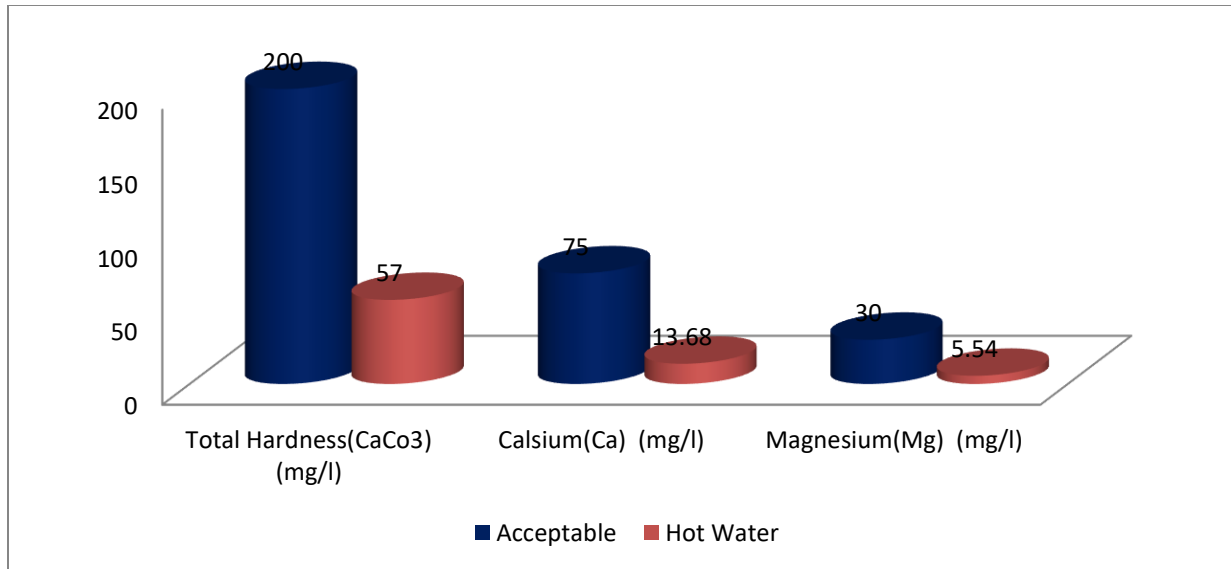
Physio-chemical properties	Unit	Acceptable	Well Water
Conductivity	Micro mhos/cm	3	1040
pH-Value	pH Scale	7	5.00
Total alkalinity	mg/l	200	
Chloride	mg/l	200	130
Nitrate	mg/l	45	
Total Hardness(CaCo3)	mg/l	200	57.00
Calsium(Ca)	mg/l	75	13.68
Magnesium(Mg)	mg/l	30	5.54
Iron(Fe)	mg/l	0.1	2.00
Fluoride	mg/l	1	0.35
Sulphate	mg/l	200	30.00
Turbidity	N.T.U.	1	1.25
Colour	Pt. Cobalt Scale	5.0	5.0

RESULT & DISCUSSION

The turbidity of the water coming out of Jhilmil Ghat is slightly higher than normal. The conductivity of the hot water found here is much higher than that of distilled water, the pH-value is much lower than

normal, so the water here would be acidic. The amount of chloride, nitrate, calcium carbonate and calcium is also much less than normal. Iron content is much higher than normal. Similarly, the amount of fluoride and sulphate is also less than normal.





The amount of water found here is high, so the use of this water- Staining: High concentrations of iron in home water will stain porcelain bathroom fixtures, laundry and dishes. Iron leaves unsightly reddish-brown marks that are difficult to remove. Metallic taste and smell: High iron concentrations often impart a metallic taste and smell to a home’s water. When you pour a glass of water to drink, you may notice that the water smells or tastes of iron. Larger water expenditures, such as taking a shower, may fill your whole bathroom or house with a metallic smell. Dry, itchy skin: Iron in the water we use to bath or shower can dry out the skin. Soap and iron don’t always mix well together, so washing with iron-laden water can sometimes leave excess soap residues on the skin that cause dryness and itching[10].

CONCLUSION

The conductivity of the hot water source found in Jhilmil Ghat is more than the conductivity of distilled water, which means that its water can be ionic. The pH-value of the water found here is less than 7, so the water would be acidic nature. Nitrate was not found in the source of hot water available in Jhilmil Ghat. That means there are no nitrates in the water here. The amount of iron found in this water is very high, so there is a possibility of magnetic properties in the water here.

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