

A Review On Physico-Chemical Parameters And Heavy Metal Contents Of Ground Water**Rajinder Kumar, Dr. Ashutosh Pathak****Research Scholar, Assistant Professor****Guru Kashi University****Talwandi Sabo****(Received:20July2020/Revised:11August2020/Accepted:22August2020/Published:28August2020)****Abstract**

Water is very essential for both plants as well as human being. No one can even think of life without water. Water is very essential in shaping human, land and climate life. During the past few years, there is a huge demand of large amount of fresh water due to burst in population and increase in industrial activities due to growth in industrial civilization. According to a study, 80% of diseases are water borne. A clean and pure water for drinking purpose is our basic requirement other than food, air and shelter. Hence, it is very essential to know quality of water to be supplied for drinking and irrigation purposes. We have observed that a few or none researchers have reported their work on studies on Physico-Chemical Parameters of Ground Water and their Seasonal Variation in Agricultural and Residential Areas of Sirsa (Haryana).

Keywords: Plants, Water, Diseases ,Ground Water**Introduction**

Water is very essential for sustaining life on the earth. Water used for drinking and irrigation purpose should be clean, pure and free from impurities. But due to large number of industrial and other developmental activities water available for drinking and agricultural purposes is being polluted constantly. There are different sources of water like rain water, river water, pond water, ground water, sea water etc. The quality of water (Physical and chemical) varies a lot depending upon source of water. Sea water is not fit for drinking and agriculture due to large amount of dissolved salts (3.0 % NaCl) make it unfit for use. The quality of ground water also varies a lot from place to place. Quantity of ground water is also decreasing day by day. Ground water level is going down day by day and in some places ground water is available below 500 feet. It is very essential to know the effects of addition of pesticides in the fields on the ground water quality, heavy metal contents in ground water and effects of industrial effluents on the quality of underground water in Sirsa district. Hence, a studies on Physico-Chemical parameters and heavy metal contents of ground water along with its seasonal variation in agricultural and residential areas of Sirsa district (Haryana) is essentially required. So this research topic, studies on Physico-Chemical parameters of ground water of Sirsa district (Haryana) is being studied.

Review Of Literature

During the past few years, there is a huge demand of large amount of fresh water due to burst in population and increase in industrial activities due to growth in industrial civilization. According to a report published by world health organization (WHO), more than 80% diseases are water borne^[1]. Restoring water to its original form after being polluted is very time, energy and money consuming. Studies on Physico-Chemical parameters of ground water or water quality index parameters are very essential to communicate the quality of water to user. Thus, these parameters are very essential for assessment and proper management and conservation of ground water. The majority of impurities in ground water in the form of dissolved minerals comes from minerals present in soil and sedimentary rocks. Major constituents present in ground water are calcium, magnesium, chloride, nitrates, sulphates, phosphates, iron, copper, zinc, sodium, bicarbonate, fluorides, etc. NO_3^- when present in lesser amount is not a pollutant but when present in excess amount it become a pollutant. Physico-Chemical parameters of ground water are very essential to define whether or not the water is fit for drinking and irrigation purposes. Certain guidelines for safe and clean drinking water has been circulated by ISO: 10500-2012.

Sweta et. al. have reported water quality parameters i.e. water quality index of ground water of Uttarakhand (India). She has reported different water treatment techniques for attaining water quality standard in drinking water so that it become fit for drinking purposes^[2].

Manjesh and his coworkers have performed Physico-Chemical parameters of ground water of Uttar Pradesh district Jhansi and studied the effect of granite mines in affecting the ground water quality of six different sites of Jhansi district. The Physico-Chemical parameters of ground water that were investigated by his team were dissolved oxygen, electrical conductivity, total dissolved solids, turbidity, pH, calcium, magnesium, hardness, fluoride, chloride, iron etc. They observed that different water quality parameters were not according to WHO standards^[3].

Shivasharanappa and his coworkers have investigated ground water quality parameters of Bidar city of Karnataka state. Thirty five residential and industrial areas were selected for the study of Physico-Chemical parameters of ground water of Bidar city. They investigated hardness, pH, Ca^{2+} , Mg^{2+} , Cl^- , NO_3^- , SO_4^{2-} , total dissolved solids (TDS), F^- , Na^+ , K^+ , Fe^{2+} , Alkalinity, dissolved oxygen, Zn^{2+} etc. Results were then suggested for implementation on models for improving water quality of the area^[4].

Gupta et. al. have investigated Physico-Chemical parameters of ground water of 32 locations of Delhi city and its NCR region. Gupta and his team investigated different parameters like Total Hardness, pH, Calcium, Magnesium, Chloride, NO_3^- , SO_4^{2-} , Total Dissolved Solids (TDS), Fluoride, Sodium, potassium, Iron, Alkalinity, dissolved O_2 , Zinc etc^[5].

Neeraj and Patel have investigated the ground water quality index of Urban Surat city in Gujrat by taking different water samples at different time interval. Basically they have focused on five major parameters and observed that rapid development in urban region is at the cost of environment and it badly affect the quality of water^[6].

Asadullah et. al. have investigated Physico-chemical properties of drinking water of different 490 educational institutes of Karachi city in Pakistan. They have investigated parameters like pH, total dissolve solids (TDS), turbidity, hardness and conductivity. The turbidity of water samples were varied from 3.2 to 8.7, 0.2 to 3.1 NTU^[7].

Kamal et. al. have investigated Physico-chemical properties of drinking water collected from six different point of the Mouri River Khulna, Bangladesh. A total of 22 different Physico-chemical parameters like minimum and maximum value of water temperature, Transparency, Turbidity, TSS, TDS, Electric Conductivity, pH, dissolve oxygen, free Carbon dioxide, Alkalinity, Acidity, Hardness, BOD, COD, Sulphate, Phosphate, Nitrite, Sodium, Calcium, Potassium, Manganese and Iron were calculated^[8].

Qureshimatva et. al. have investigated Physico-chemical properties of the western part of Ahmedabad District to examine the quality of water for public consumption, recreation and other purposes. They have focused the influence of environmental factors as well as domestic activities in affecting the water quality in the related area of Ahmedabad city^[9].

Abdulmutalib et. al. have investigated Physico-chemical properties of water of Bawashaswar Dam based on the physical and chemical parameters. Twelve water samples were taken from different locations within the dam's reservoir; then, analyzed for physical and chemical parameters such as pH, electrical conductivity (EC), total hardness (TH), chloride (Cl^-), sulphate (SO_4^{2-}), bicarbonate (HCO_3^-) nitrites (NO_3^-), total dissolved solids (TDS), magnesium (Mg^{2+}), calcium (Ca^{2+}), sodium (Na^+), and potassium (K^+)^[10].

Rutuja et. al. have investigated Physico-chemical properties of drinking water in 20 villages in the Pune and Satara districts of Maharashtra, with 15 falling in a low rainfall zone. Samples were collected from rivers, open wells, and bore wells, four times in a period of a year covering all

seasons. A total of 206 water samples were analyzed for their physical, chemical, and bacteriological properties. Physical and chemical properties were expressed in the form of a modified Water Quality Index (WQI)^[11].

J. Sirajudeen et.al. have investigated the ground water quality index of Ampikapuram area near Uyyakodan channel, Tiruchirappalli district by taking different water samples. They have investigated ten parameters of ground water like pH, EC, TDS, Total Hardness, DO, COD, BOD, Cl⁻, NO₃⁻, Mg.²⁺ The water quality index for the samples ranged between is 244 to 383.8. They have observed that the ground water of the area needs some degree of treatment before consumption^[12].

Nidhi Jain has investigated Physico-chemical properties of water in Alard College Campus, situated in Hinjewadi, Pune. Physico-chemical parameters viz., temperature, electrical conductivity (EC), pH, turbidity, total alkalinity (TA), total hardness (TH), total dissolved solid (TDS), dissolved oxygen (DO); chloride, potassium, Zinc, Copper, total Iron, BOD, COD have been investigated^[13].

Sunita Mittal and Sangita Sharma have investigated water quality parameters of ground water of Moga District of Punjab. Different water quality parameters like electrical conductivity (EC), pH, turbidity, total alkalinity (TA), total hardness (TH), total dissolved solids (TDS), dissolved oxygen (DO), Zinc, Copper, total Iron, BOD, COD have been investigated. Later, they have compared their results with WHO standard^[14]. After going through exhaustive literature survey, we observed that no researchers have reported their work on studies on Physico-Chemical Parameters of Ground Water and their Seasonal Variation in Agricultural and Residential Areas of Sirsa (Haryana). Hence studies on ground water quality index of Sirsa district (rural and Urban) is required. Parameters like Temperature, pH, Electrical conductivity, total dissolved solids, Ca²⁺, Mg²⁺, K⁺, Na⁺, CO₃²⁻, HCO₃⁻, chloride, SO₄²⁻, NO₃⁻, total hardness as CaCO₃, Fluoride, heavy metals ions, alkalinity, biochemical oxygen demand, chemical oxygen demand etc. needs to be estimated in rural and urban areas of sirsa district (Haryana).

Justification And Likely Benefits Of The Study

Quality of water has a very large impact on agriculture and human being. Hence, it is very essential to know quality of water to be supplied for drinking and irrigation purposes. We have observed that a few or none researchers have reported their work on studies on Physico-Chemical Parameters of Ground Water and their Seasonal Variation in Agricultural and

Residential Areas of Sirsa (Haryana). Hence, studies on ground water quality index of Sirsa district (rural and Urban) is required. Parameters like Temperature, pH, Electrical conductivity, total dissolved solids, Ca^{2+} , Mg^{2+} , K^+ , Na^+ , CO_3^{2-} , HCO_3^- , chloride, SO_4^{2-} , NO_3^- , total hardness as CaCO_3 , Fluoride, heavy metals ions, alkalinity, biochemical oxygen demand, chemical oxygen demand etc. needs to be estimated in rural and urban areas of sirsa district (Haryana).

Study will be directly beneficial to the farmers working in the field. They will know the quality of their water and what type of agriculture will be beneficial for them. Further our study will be beneficial to the people of the society in understanding quality of their drinking water whether their drinking water is fit for drinking purpose or not.

Objectives Of The Study

1. To study parameters like Temperature, pH, Electrical conductivity, total dissolved solids, Ca^{2+} , Mg^{2+} , K^+ , Na^+ , CO_3^{2-} , HCO_3^- , chloride, SO_4^{2-} , NO_3^- , total hardness as CaCO_3 , Fluoride, heavy metals ions, alkalinity, biochemical oxygen demand, chemical oxygen demand etc.
2. To estimate heavy metal ions present in the water samples.
3. To estimate pH, electrical conductivity and turbidity of ground water of Sirsa district.
4. To find the linear correlation coefficient of different Physico-chemical parameters.
5. To find out the water quality index parameters of different ground water samples collected from Sirsa district.

Hypothesis Of The Study

A research hypothesis is the statement created by researchers when they speculate upon the outcome of a research or experiments. In the present study of our proposed research that is Physico-Chemical Parameters and heavy metal contents of Ground Water along with its Seasonal Variation in Agricultural and Residential Areas of Sirsa (Haryana) in the systematic and scientific manner by using different chemical testing methods. Our proposed research work will be in the following manners:

1. Collection of different ground water samples from different rural and urban regions of Sirsa district.
2. To study parameters like Temperature, pH, Electrical conductivity, total dissolved solids, Ca^{2+} , Mg^{2+} , K^+ , Na^+ , CO_3^{2-} , HCO_3^- , chloride, SO_4^{2-} , NO_3^- , total hardness as CaCO_3 , Fluoride, heavy metal ions, alkalinity, biochemical oxygen demand, chemical oxygen demand etc.
3. Instruments like AAS, Flame photometry, elemental analyzer will be used for the estimation of heavy metal ions present in the water samples.

4. Instruments like pH meter, conductivity meter, turbidity meter will be used for the estimation of pH, electrical conductivity and turbidity of ground water of Sirsa district.

Statement Of The Problem

Quality of water has a very large impact on the life of human being. Impurities enters in to our body through water and get accumulated in the form of food chain. According to a study, 80% of diseases are water borne. A clean and pure water for drinking purpose is our basic requirement other than food, air and shelter. Hence, it is very essential to know quality of water to be supplied for drinking and irrigation purposes. We have observed that a few or none researchers have reported their work on studies on Physico-Chemical Parameters of Ground Water and their Seasonal Variation in Agricultural and Residential Areas of Sirsa (Haryana). Hence, studies on ground water quality index of Sirsa district (rural and Urban) is required. Parameters like Temperature, pH, Electrical conductivity, total dissolved solids, Ca^{2+} , Mg^{2+} , K^+ , Na^+ , CO_3^{2-} , HCO_3^- , chloride, SO_4^{2-} , NO_3^- , total hardness as CaCO_3 , Fluoride, Heavy metal ions, alkalinity, biochemical oxygen demand, chemical oxygen demand etc. needs to be estimated in rural and urban areas of sirsa district (Haryana).

Conclusion And Future Work

Water is very essential for sustaining life on the earth. Water used for drinking and irrigation purpose should be clean, pure and free from impurities. But due to large number of industrial and other developmental activities water available for drinking and agricultural purposes is being polluted constantly. There are different sources of water like rain water, river water, pond water, ground water, sea water etc. A research hypothesis is the statement created by researchers when they speculate upon the outcome of a research or experiments. In the present study of our proposed research that is Physico-Chemical Parameters and heavy metal contents of Ground Water along with its Seasonal Variation in Agricultural and Residential Areas of Sirsa (Haryana) in the systematic and scientific manner by using different chemical testing methods.

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