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REVIEW OF PHYSICO-CHEMICAL PARAMETERS AND HEAVY METAL CONTENTS OF GROUND WATER

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Abstract: - The physico-chemical parameters of under ground water and soil water viz. pH, Electrical Conductivity, Total Hardness, Chloride, Nitrate, Sulphate, Calcium and Magnesium were assessed along with the levels of Fe, Zn and Mn. The contents of aforesaid subsurface water both in the urban as well as country districts have been assessed in the present paper. India is nation which heavily relies upon underground water for a variety of activities, ranging from agriculture to industries, along with residential utility. Else then major rivers and their tributaries, it does not have much of rivers and hence it mainly depends upon subsurface water for economic activities and quenching of thirst. The prime objective of this paper is to provide in-depth study on the quality of ground water, difficulties posed by the contamination and hence the relevant research work is focused on the nature of water samples present at subsurface level.

Keywords: - Groundwater, physico-chemical, anthropogenic.

I. INTRODUCTION

Water is fundamental requirement for sustenance of life on the earth. The utility varies from drinking to irrigation as well as industrialization, but the matter of worry is the level of contamination of potable water, which otherwise needs to be unadulterated and rich in minerals. A variety of channels viz. down pour, various well springs, rivers may although contain same chemical components (Hydrogen and Oxygen), but varies in biological as well as polluting factors. Besides these, sea water is also not fit for drinking and agriculture due to large amount of dissolved salts (3% NaCl) makes it unfit for use. Growing need of water due to excessive industrialization and urbanization along with pressure on the agri-sector to cater the demands of rising population, the accessibility of water has decreased to a level below 500 feet. Besides these, the impacts of chemically designed pesticides and insecticides have led to their percolation into ground water table. These chemicals may get added to the food chain and later to food web, causing diseases which affects the skin, metabolism and may even cause cancer. Keeping these points of importance in view, an investigation and comparatives literature review is presented and the physico-chemical parameters as well as level of substantial metal contents has been contemplated. Due to diminishing rivers, streams, irregular rains (which in facts are the outcomes of anthropogenic activities), the physico-chemical parameters needs to be immediately studied and cautious steps be taken over so as to prevent further damage to human life and other beings. Water quality checking has been the prime importance in World Health Organization (WHO, 2006) and in ecological assurances approach.

II. REVIEW OF LITERATURE

Water is very essential for both plants as well as human beings. Nobody can even consider existence without water. Water is fundamental in forming human, land and atmospheric life. During past few years, there is a huge demand of fresh water due to burst in population and increment in mechanical exercises because of development in modern progress. As indicated by a report distributed by World Health Organization (WHO), over 80% sicknesses are water borne. Reestablishing water to its unique structure in the wake of being contaminated is very time, vitality and cash expending. Studies of physico-chemical parameters of ground water or water quality index parameters are exceptionally basic to convey the nature of water to client. Along these lines, these parameters are basic for appraisal and legitimate administration and preservation of ground water. Most of pollutions in ground water as broke up minerals originate from minerals present in soil and sedimentary rocks. Significant constituents present in ground water are Calcium, Magnesium, Chloride, Nitrate, Sulphate, Phosphate, Iron, Copper, Zinc, Sodium, Bicarbonate and Fluoride. NO^{-}_{3} when present in lesser sum isn't a contamination however when present in overabundance sum it become a poison. Physico-Chemical parameters of ground water are extremely fundamental to characterize whether the water is fit for drinking and water system purposes. Certain rule for protected and clean drinking water has been flowed by ISO: 10500-2012.

Tyagi et al. (2013) have been revealed water quality parameters for example water quality record of ground water of Uttarakhand (India). She has announced diverse water treatment procedures for achieving water quality standard in drinking water with the goal that it becomes fit for drinking purposes.[11]

Kumar et al.(2013) have been performed physico-chemical parameters of ground water of Uttar Pardesh region Jhansi and contemplated the impact of rock mines in influencing the ground water nature of six unique locales of Jhansi region. The physico-chemical parameters of ground water that were explored by his group were disintegrated Oxygen, Electrical Conductivity, all out broke down solids, Turbidity, pH, Calcium Hardness , Magnesium Hardness, Total Hardness, Fluoride, Chloride, Iron and so forth. They saw that diverse water quality parameters were not as indicated by WHO guidelines.[6]

Srinivas et al. (2011) have been examined ground water quality parameters of Bidar city of Karnataka state. Thirty five private and modern regions were chosen for the investigation of physico-chemical parameters of ground water of Bidar city. They examined hardness, pH, Ca^{2+}, Mg^{2+}, Cl^{-}, NO^{-}_{3}, SO^{2}_{-4}, Total Dissolved Solids (TDS), F^{-}, Na^{+}, K^{+}, $Fe^{2+,}$ Alkalinity, Disintegrated Oxygen, Zn^{2+} and so on. Results were then proposed for execution on models for improving water nature of the region [10].

Gupta et al. (2010) have been explored physico-chemical parameters of ground water of 32 areas of Delhi city and its NCR locale. Gupta and his group researched various parameters like Total Hardness, pH, Calcium, Magnesium, Chloride, NO^{-}_{3}, SO_4^{2-}, Total Dissolved Solids (TDS), Fluoride, Sodium, Potassium, Iron, Alkalinity, broke up O_2, Zinc and so on.[4]

Sharma et al. (2010) have explored the ground water quality file of Urban Surat city in Gujrat by taking diverse water tests at various time interim. Fundamentally they have concentrated on five significant parameters (pH, TDS, Total Hardness, Chloride, and Electrical Conductivity) and saw that quick improvement in urban district is at the expense of condition and it seriously influence the nature of water [8].

Qureshimatva et al. (2015) have been studied physico-chemical properties of the western piece of Ahmedabad District to analyze the nature of water for open utilization, amusement and different purposes. They have centered the impact of ecological factors just as local exercises in influencing the water quality in the related territory of Ahmedabad City. They observed pH, Electrical Conductivity (EC), Total Hardness (TH), Chloride (Cl^{-}), Nitrites (NO_3^{-}), TDS, Magnesium (Mg^{2+}), Calcium (Ca^{2+}), Alkalinity, Dissolved Oxygen (DO) and Biochemical Oxygen Demand [7].

Dhawde et al. (2018) have been examined physico-chemical properties of savoring water 20 towns in the Pune and Satara regions of Maharashtra, with 15 falling in a low precipitation zone. Tests were gathered from waterways, open wells, and bore wells, multiple times in a time of a year covering all seasons. A sum of 206 water tests were broke down for their physical, chemical, and bacteriological properties. Physical and Chemical properties were communicated as a modified Water Quality Index (WQI) [2].

Sirajudeen et al. (2013) have been studied the ground water quality record of Ampikapuram region close Uyyakodan channel, Tiruchirappalli area by taking diverse water tests. They have explored ten parameters of ground water like pH, EC, TDS, Total Hardness, COD, BOD, Cl^{-}, NO^{-}_{3} and Mg^{2+}. They have seen that the ground water of the region needs some level of treatment before utilization [9].

III. CONCLUSIONS

The above literature review revels that although great dealog study has been carried out on water quality parameters in various part of country, yet no similar assay on variety of parameters have been performed for water sample collected from the region on various part of nation. These reveals that the various water quality parameters were not as those prescribed by WHO in it's standard. This situation is alarming and hence requisite steps should be taken so as to improve the standard of available water at all three levels naming surface, subsurface and underground.

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