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EVALUATION OF PHYSICOCHEMICAL PARAMETERS OF WATER IN THE DIFFERENT PLACES OF PALI AT DISTRICT KORBA (C.G.) INDIA.

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ABSTRACT
The study was carried out to assess the ground water quality and its suitability for drinking purpose in most rural habitations. The drinking water quality was investigated in the suspected area of Pali district Korba, to ensure the continuous supply of clean and safe drinking water for public health protection. In this regard, a detailed chemical analysis of drinking water samples was carried out in different areas of the pali. A number of parameters such as pH, turbidity, conductivity, Hardness and heavy metals such as Ca, Mg and Cl, were analyzed for each water sample collected during winter periods. pH value in the study area found from 6.7 to 7.3. Turbidity value in the study area found from 32.4 to 78.4 NTU. Conductivity value in the study area found from 213 to 370 µS/cm. Hardness value in the study area found from 71.2 to 134 mg/L. Ca value in the study area found from 8.0 to 20 mg/L. Mg value in the study area found from 9.5 to 13.7. Cl value in the study area found from 7.0 to 8.1 mg/L. Fluoride value in the study area found from 0.123 to 0.159 mg/L. The obtained values of each parameter were compared with the standard values set by the World Health Organization (WHO). The values of each parameter were found to be within the safe limits set by the WHO.

Keywords– Drinking water, Heavy metals, Physicochemical analysis, Turbidity.

I.INTRODUCTION
The most important factor to take into account is that, in most communities, the principal risk to human health derives from faecal contamination. In some countries there may also hazards associated with specific chemical contaminants such as fluoride or arsenic, but the levels of these substances are unlikely to change significantly with time**.[1]** Thus, if a full range of chemical analysis is undertaken on new water sources and repeated thereafter at fairly long intervals, chemical contaminants are unlikely to present an unrecognized hazard. In contrast, the potential for faecal contamination in untreated or inadequately treated community supplies is always present. Major ions including calcium, magnesium, iron, and chloride were measured and their amounts compared with appropriate standards to reveal details about the water's composition.**[2]** At water quality monitoring stations, the following parameters are commonly measured: pH, electrical conductivity (EC), Total dissolved solids (TDS), Sulphate ions, bicarbonate ions, sodium, zinc, suspended solids, total nitrogen, total phosphorus, lead, chemical oxygen demand, chlorine, copper, dissolved phosphorus, and sodium adsorption ratio.

Since EC and TDS levels in water directly reflect the overall concentration of salt in the solution, they are two of the primary metrics used to determine the quality of agricultural and drinking water. Water used for irrigation should not have high EC and TDS values because salt inhibits plant growth through osmosis**.[3,4]**

Even in developing countries poorly served by roads and transportation, it is usually possible to devise a rational sampling and analytical strategy. This should incorporate carefully selected critical-parameter tests in remote (usually rural) locations using simple methods and portable water-testing equipment where appropriate. Wherever possible the community should be involved in the sampling process.**[5,6]**Where water is disinfected, primary health workers, school teachers, and sometimes community members can be trained to carry out simple chlorine residual testing. The same people could also collect samples for physicochemical analysis and arrange for their delivery to the regional laboratory. The use of community members in this way has significant implications for training and

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supervision but would be one way of ensuring more complete surveillance coverage the use of polluted drinking water can result in natural water contaminants caused by weathering of rocks, leaching of soil, etc., making it important to regularly verify the quality of drinking water. Water-borne diseases affect a large portion of the human population. The capacity to access clean water is essential for reducing illness and enhancing quality of life**[7]**

II.METHODOLOGY

1. Selection of Area- This is sampling point where Collected water sample, Near SECL Pali 2km, Kearajhariya 1.5 km, Budbud 200 m, Block-Pali, Dist- Korba (C.G.)

Fig -1 PALI 2 Km

Fig - 2 KERAJHARIYA 1.5 k

Fig – 3 BUDBUD 200 m

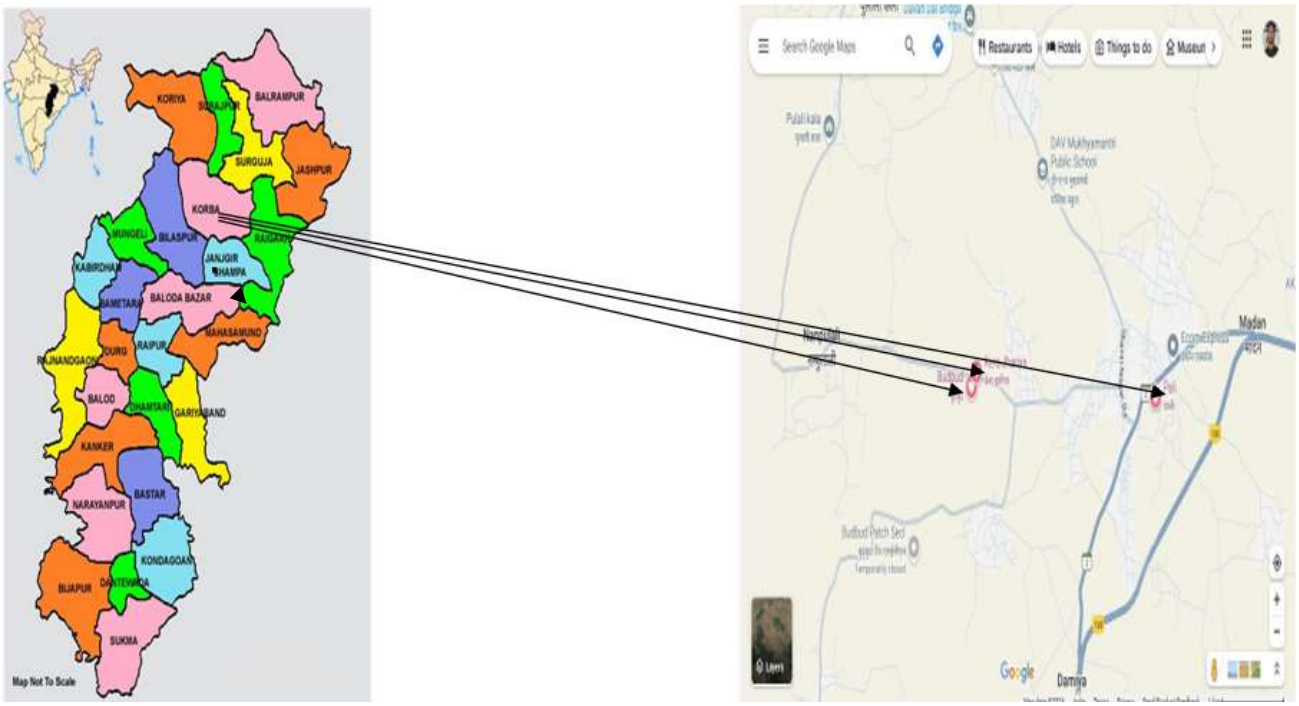

Fig 4 : Map of Chhattisgarh & Selected Area

2. **Collection of Water Sample**

Water samples were collected from the different sources within 2 km of three directions of SECL Area. Total 3 sample of water were collected. These samples were analyzed in the laboratory for the analysis of different physical and chemical parameter.

3. Physico-Chemical analysis

Water quality analysis is mainly depended on chemistry. Nowadays, it is very important and essential to examine the water quality before it is used for any purposes. Water quality is determined

by different physico-chemical parameters and the selection of parameters for testing of water quality is mainly depended upon for what purpose we are going to use that water. The following water quality parameters are considered Applying the use of an appropriate method of determining the quality of water is recommended and the practice can be done by pH Meter, Conductivity Meter, Turbidity Meter, Dissolved Oxygen Meter, Flame Photo Meter, Spectrophotometer, Karl Fischer Titrator, Colorimeter, And Melting Point Apparatus methods. The objective of this study has been to evaluate the suitability of the various applicable methods in the determination of water quality and possibly.

3.1 pH: - pH is one of the important parameters of water quality. It ranges between 0-14, in which pH 7 is said to be neutral and pH less than 7 is acidic and pH more than 7 is alkaline. The standard pH of drinking water according to WHO is 6.5-8.5. To analyze the pH of this sample Apparatus pH meter, which has a glass container and a saturated calomel reference electrode ideally with temperature compensation are used. The necessary warm-up time, standardize the device using a buffer solution with a pH close to the sample's, then compare the electrode to at least one more buffer of distinct pH level. Check the water's temperature and, if the device has temperature compensation, set it appropriately. Use a solution to gently wipe and rinse the electrodes.

3.2 Hardness: - Hardness of water is also an important characteristic to determine quality of water from different sources. The causes of hardness in fresh water mainly due to Carbonates,Bicarbonates, Chlorides and Sulphates of Calcium and Magnesium. Theoretically the total hardness of water is defined as the sum of Calcium and Magnesium hardness in mg/lit as $CaCO_3$**[8,9]** Determination of Hardness is analysis by Complex metric titration of Ca & Mg using Buffer Solution, Erichrome black T indicator solution, Standard EDTA solution First Standardization: Fill a porcelain basin with 25 mL of the standard calcium solution, then top it off with 50 mL of distilled water. Add one milliliter of buffer solution, one to two drop of indicator and gradually titrate while stirring constantly until the crimson tint goes away. Adding the final few drops every three to five seconds. The color is sky blue in the end. Pipette a 50 mL maximum aliquot of water sample into a 150 mL beaker or porcelain dish, then adjust the volume to roughly 50 ml. 1 mL solution of hydroxylamine hydrochloride is added. To get 10.0 to 10.1 pH solution 1 to 2 ml of buffer solution and 2 ml of Eriochrome black T indicator were added. Titrate using regular EDTA solution, whisking quickly at first and gradually as you approach the finish line, until all traces of red and purple color disappear and the solution takes on a clear, sky blue. For comparison, a blank titration performed in the same manner as the sample may be utilized.

3.3 Turbidity: -The turbidity of sample is the reduction of transparency due to the presence of particulate matter such as clay or slit, finely divided organic matter, plankton or other microscopic organisms. These cause light to be scattered and absorbed rather than transmitted in straight lines through the sample. The values are expressed in Nephelometric turbidity units (NTU). The method is applicable to drinking, surface and saline waters in the range of turbidity 0-40 NTU. Higher values may be obtained by dilution of the sample[10] **.** The Turbidity or transparency of water is analyzed by turbidity meter. In This process will verify the calibration accuracy if the instrument has previously been calibrated in standard turbidity units. To distribute the solids, shake the sample. Hold off until the air bubbles go away. Transfer the sample into the turbidity meter tube and use the instrument scale or calibration curve to determine the turbidity directly.

3.4 Conductivity:- Conductometer cell are used to analyze the solutions. The electrode will be standardized to 1.400 mS/cm. When using the cell, the solution must cover the “hole” in the conductivity cell body so that sample can reach the cell. The electrode can be easily raised and lowered to keep the solution in this zone. Read the conductivity on the display when the meter reading becomes stable to significant figures. Remember to record the unit of conductivity that the meter is displaying, as the meter will automatically change from µS/cm to mS/cm.

3.5 Alkalinity - To analyse alkalinity of the sample flame photometer are used. The compounds of the alkali and alkaline earth metals (Group II) dissociate into atoms when introduced into the

flame, these atoms emit radiations when returning back to the ground state. These radiations generally lie in the visible region of the spectrum. Each of the alkali and alkaline earth metals has a specific wavelength.[11]

Element	Emitted wavelength	Flame colour
Sodium	589	Yellow
Potassium	766	Violet
Calcium	622	Orange
Lithium	670	Red

The standard stock solution and sample solution are prepared in fresh distilled water. The flame of the photometer is calibrated by adjusting the air and gas. Then the flame is allowed to stabilize for about 5 min. Now the instrument is switched on and the lids of the filter chamber are opened to insert appropriate colour filters. The readings of the galvanometer are adjusted to zero by spraying distilled water into the flame. Distilled water is sprayed into the flame to attain constant readings of galvanometer. Then the galvanometer is readjusted to zero. Now each of the standard working solutions is sprayed into the flame for three times and the readings of galvanometer are recorded.

III. RESULT

The results of the chemical analysis are indicated in the Table. The value of these statistical parameters is first presented considering all the sampling points and then stratifying the data by the source categories.

Table- 1 The Standard Values of water quality by WHO parameters are depicted[12,13]

S.No	PARAMETER	WHO STANDERD
1	Ph	6.8- 8.5
2	Turbidity	1-5 NTU
3	Electrical Conductivity	200 - 800 µs/cm
4	Chloride	200-300 milligram /liter
5	Hardness [Calcium Chloride]	500 Mg/L
6	Calcium	<100 Mg/L
7	Magnesium	50 mg /liter
8	Fluoride	1.5mg/liter

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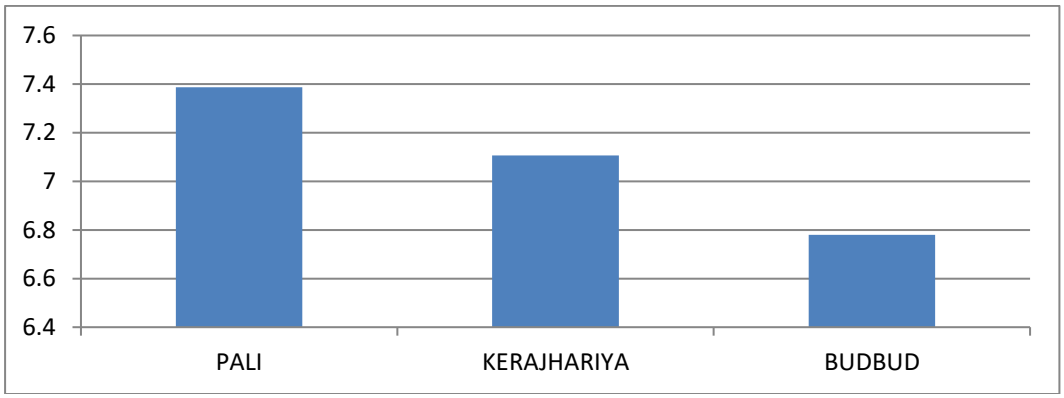
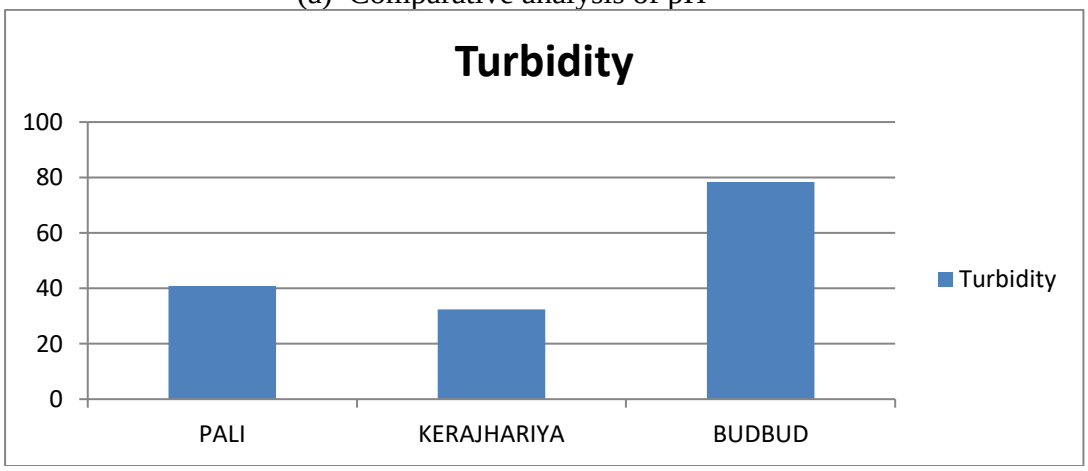
Table – 2 Distribution of the main chemical parameters in the samples

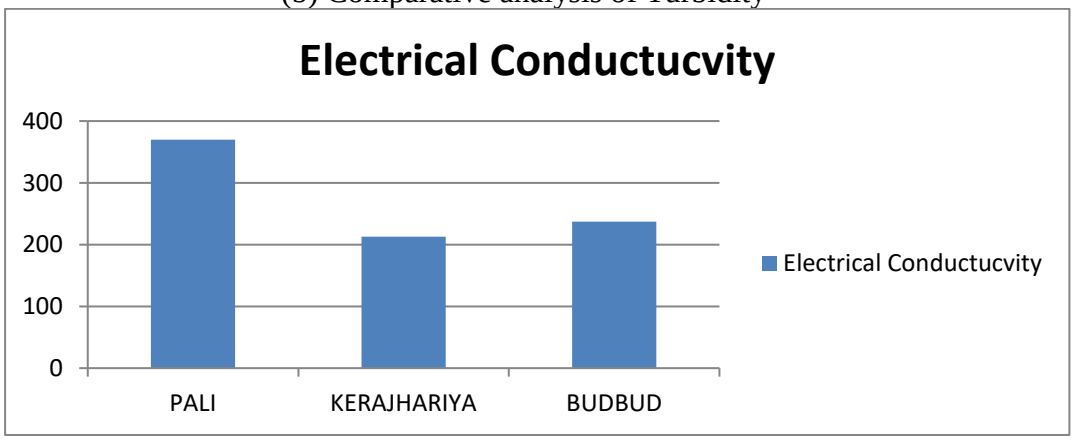
S.N.	PARAMETER	PALI	KERAJHARIYA	BUDBUD
1.	pH	7.387	7.106	6.780
2.	Turbidity	40.80	32.4	78.4
3.	Electrical conductivity	370	213	237
4.	Chloride	47.66	45.68	57.59
5.	Hardness[Calcium Chloride]	134.64	89.10	71.28
6.	Calcium	16.44	20.0	8.0
7.	Magnessium	13.78	9.50	12.36
8.	Fluoride	0.159	0.123	0.146



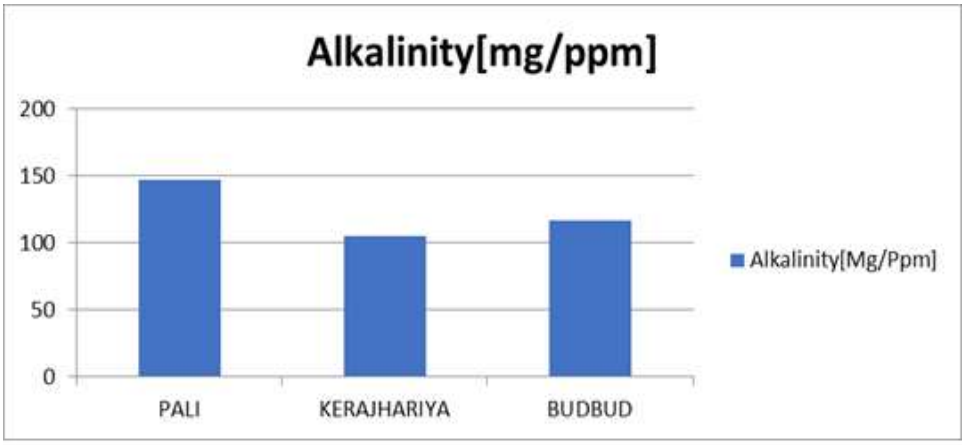
(a) Comparative analysis of pH



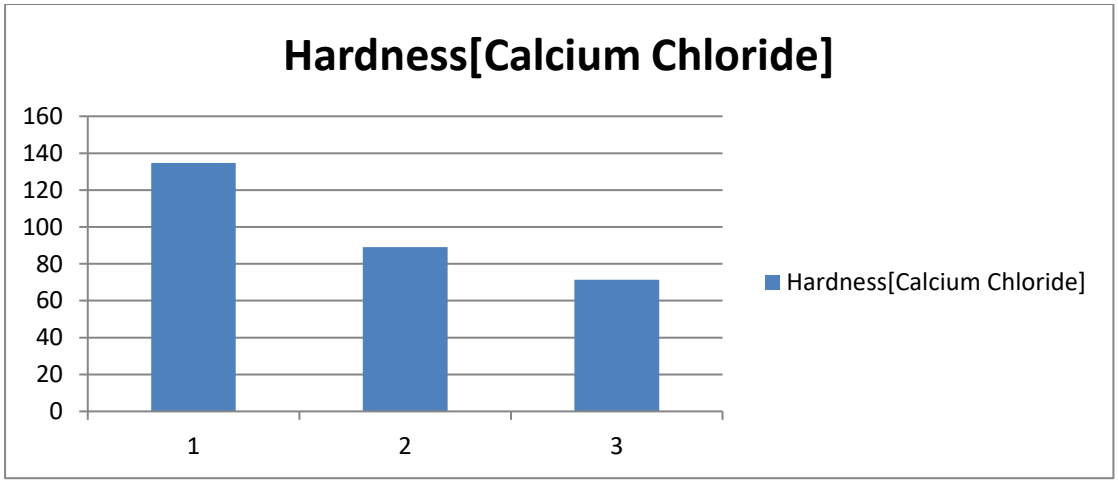
(b) Comparative analysis of Turbidity



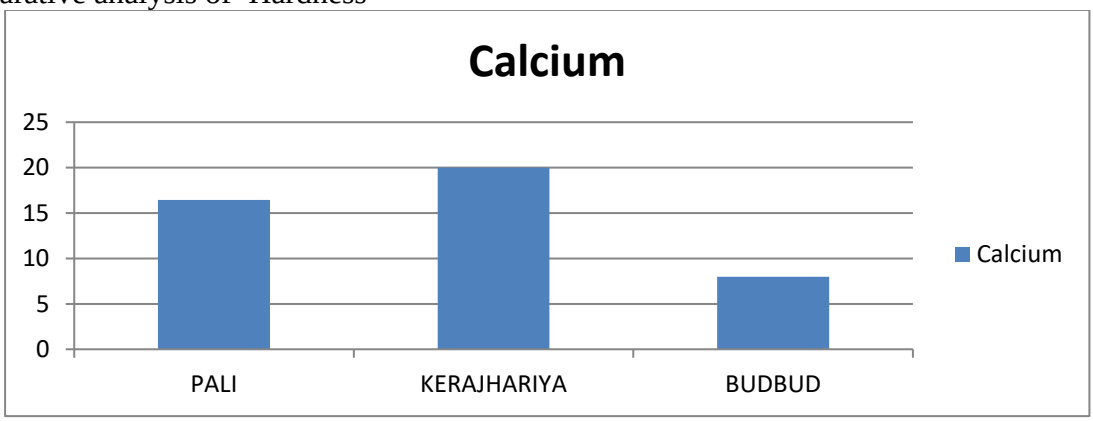
(c) Comparative analysis of Electrical Conductuctivity



(d) Comparative analysis of Alkalinity



(e) Comparative analysis of Hardness



(f) Comparative analysis of calcium

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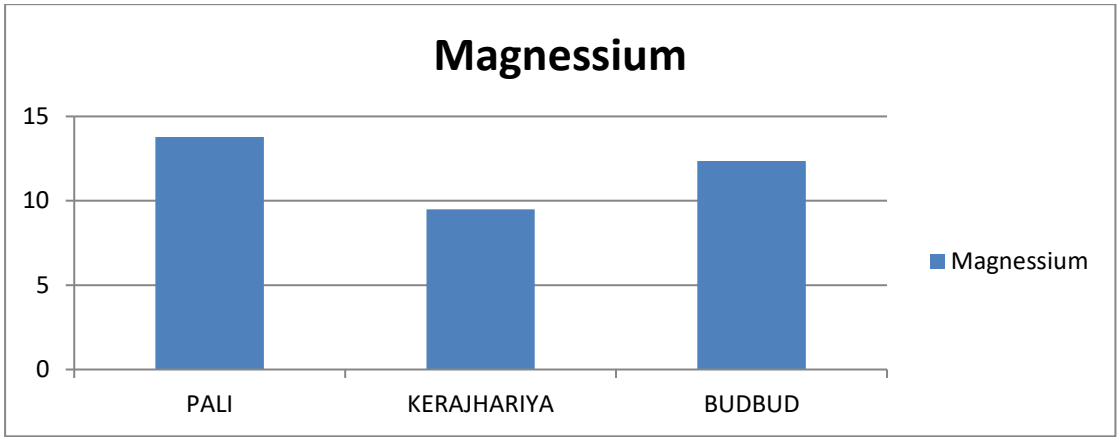
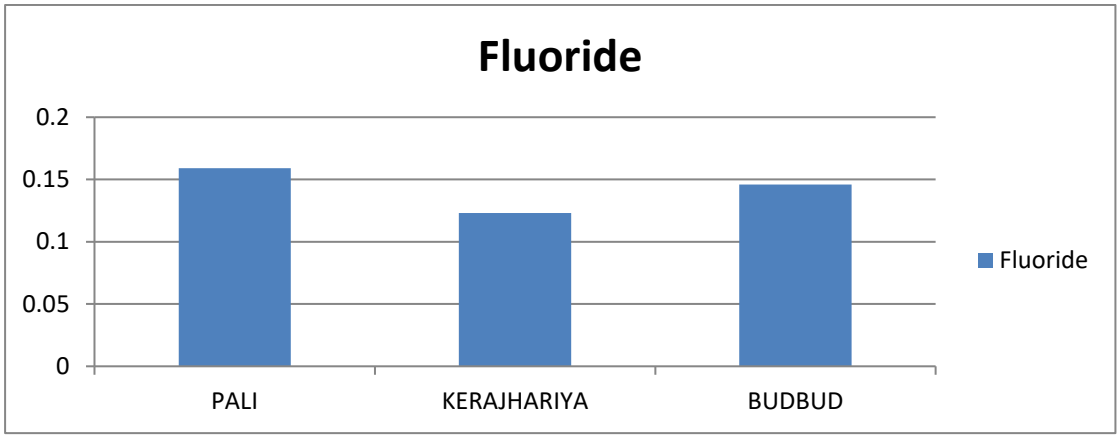


(g) Comparative analysis of magnesium



(h) Comparative analysis of Fluoride

IV DISCUSSION

- The pH of most drinking water lies within the range 6.5-8.5. pH of Pali, Keajhariya, Budbud is **7.387,7.106, 6.780.**
- Chloride level in unpolluted water are often below 10 mg/l and sometimes below 1 mg/L. Chloride level in Pali, Kerajhariya, Budbud is **47.66 , 45.68 , 57.59 mg/L.**
- Water containing calcium carbonate at concentration below 60-120 mg/L is generally considered as soft water, 60-120 mg/L is moderately hard 120-80 mg/L is hard and more than 180 mg/L is very hard. Calcium Carbonate level in Pali, Kerajhariya, Budbud is **134.64 , 89.10 , 71.28 mg/L.**
- Most spring water was found to an average of 21.8 mg/L which is relatively low calcium concentration. Purified water contains a negligible Calcium concentration.
- Level of fluoride in drinking water should not more than 2.4 mg/L. Fluoride level found in the sample of Pali, Kerajhariya, Budbud is **0.159, 0.123, 0.146 mg/L**.

V. CONCLUSIONS

As part of a survey carried out in different villages (PALI, KERAJHARIYA BUDBUD**)** The paper describes how different types of water sources are assessed for their chemical quality and their use as human drinking water. Consequently, this study provided data about water quality in the region. Moreover, it assisted in identifying the main concerns regarding the quality of ground level water, On the basis of chemical parameters, it was found that drinking water sources have relatively good chemical quality; The results of current study indicate that the water, used by the people residing in villages, is potable. But in future, the proper environment management plan must be adopted to

control water pollution immediately. Based on these results and analysis of water samples, it is also recommended to use water only after boiling and filtering to prevent adverse health effects.

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CONFLICT OF INTREST
I declayer that there is not conflict of interest in this article.

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