ISSN No:-2456-2165

Govt. V.Y.T.P.G. Autonomous College Durg (C.G.)

Department of Chemistry

Year – 2018

Project Report

ON

"Water Analysis of KORBA DISTRICT C.G."

Under Supervision of
Dr. Anil Kashyap
Professor of Chemistry

Submited by
Deepak Kumar
B.Sc. Final Year

ISSN No:-2456-2165

I. INTRODUCTION

There is no enough on the earth for every one's need not need not for every one's greed.

This statement of gandhiji is the about our water sources too. According to experts, most of social conflicts are the future are going to be water based and pure water will be heavily priced commodity. In order to minimize the negative impacts of population growth, & development in coming decades we need to treat water as on endangered resource water conservation & Management should be come part our culture part of our culture rather than our technique. The analysis of water is extremely important as is contains a large no. of impurities and pollutants, which are necessary to be checked before water is used for any specific purposes for example- In municipal water, it is necessary to determine color , turbidity, dissolved solids, hardness, alkalinity, iron, manganese etc. because this water is used for drinking purpose. The analysis of water is needed to assess the suitability of water for some subsequent usage as the criteria of quality applied to water intended to support fish differs from water that water to be used as public supply. It means a complete mineral examination as well as bacteriological examination is also necessary for various application of water analysis is usually expressed in parts per million (ppm). It must be emphasized that acquisition of meaningful data demand correct sampling & storage procedure, which may be quite different for different water constituents.

II. AREA & LOCATION

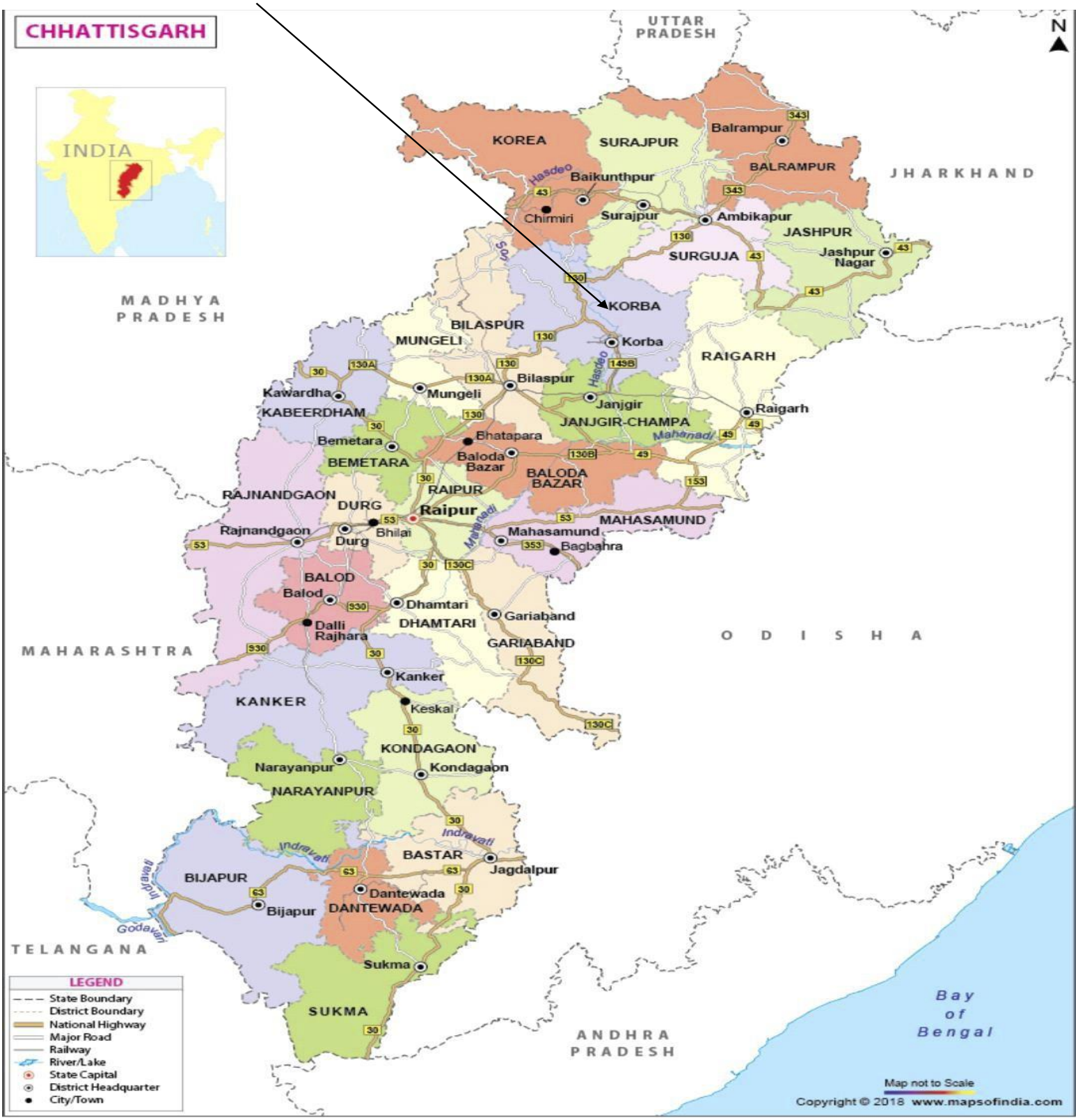
Korba district is situated in C.G. state. The Korba district is surrounded by Korea, Surajpur, Surguja, Raigarh, Janjgir-Champa and Bilaspur districts. Korba city is situated in national highway No. 149B. Water samples are collected by various locality of Korba.

Area	Source
• CSEB East 1st canal	Canal
• Balco Plant	Canal
• CSEB East 2nd canal	Canal
• CSEB West	Canal
• NTPC 3 No. Gate	Canal
• NTPC Bypass canal	Canal
. CSEB West hydral Plant	Canal

Different samples were collected in month of June 2018 & various parameters like color, hardness, Dissolved oxygen, pH value, Conductivity, TDS, Salinity etc. are evaluated.

ISSN No:-2456-2165

Korba District Map



ISSN No:-2456-2165

III. SAMPLING

- *Taking the sample:* - Water samples are collected by various canals of Korba.
- *Quantity of sample:*- Generally 2 litter of sample is sufficient for most of chemical & physical examination for certain special determination, larger volume of sample are necessary.
- *Sample container:*- for most of the purposes the ordinary Stoppard Winchester quartz bottle of 2.5 liter's capacity is enough. Generally glass containers are preferable to those made of polythene of other plastic materials polythene container are used in circumstances, when the bring examined extracts substances from the glass or some of constituents of sample adhere to the glass.
- *Labeling of samples:*- The sample container have to be labeled with the following information – Sample number, Date and Time of Sample, Source of sample.
- *Preservation of samples:* - No single method of preservation is entirely satisfactory and the preservation should be chosen with due regard determination that are to be made keeping the sample in the dark at low temperature is the best possible preservation.
- *Time interval between collection & Analysis:* - In general the shorter time between collection and analysis, the more accurate will be result. No specific time interval between collection and analysis can be generalized this depends upon the nature of the sample, constituents to be determined and conditions of storage.

IV. DISSOLVED OXYGEN

Introduction: - Oxygen is dissolved in varying concentrations. Solubility of oxygen is depends on temperature, pressure and salinity of water.

Test for Dissolved Oxygen is generally not carried out for unpolluted waters. It is applied mainly for determining the DO of polluted waters and industrial effluents and constituents a means of controlling pollution of water courses.

Reagents:-

- Mangenous sulphate solution - 40 g. in 100 ml of water.
- Alkaline Iodine soln - 15 gm.KI + 50 gm NaOH + 2 gm $NaNH_3$ (Sodium Azide) in 100 ml distilled water.
- Conc. H_2SO_4 - 2 ml in 250 ml distill water
- (N/100) $Na_2S_2O_3$ - 2.48 gm + 1000 ml distilled water.

Chemical Equations:-

$2KOH + MnSO_4 \longrightarrow Mn(OH)_2 + K_2SO_4$

$2Mn(OH)_2 + O_2 \longrightarrow 2MnO(OH)_2$

(Oxygen- carrier) Basic Mangenous Oxide

$MnO(OH)_2 + H_2SO_4 \longrightarrow MnSO_4 + 2H_2O + [O]$

$2KI + H_2SO_4 + [O] \longrightarrow K_2SO_4 + H_2O + I_2$

Starch+ I_2 ⟶ Starch-Iodine (blue)

Procedure:-

- Collect 250 ml sample then add 2ml of Mangenous Sulphate solution then add 2ml of alkaline iodine solution. Stopper the bottle and shake it thoroughly. Allow the ppt to settle half way & mix again.
- Repeat this process of shaking and setting at least three times. Then add 2ml of conc. H2SO4 Insert the stopper & shake the bottle again.
- Allow the yellow soln to stand for 5 minutes. Take 50ml of soln and titrate it against N/100 sodium thiosulphade soln using freshly prepared starch as indicator end point is disappearance of blue color.

Area	Reading (Source:- Canal)
CSEB East 1st Canal	20.5ml 20.4ml 20.4ml
Balco Plant	20ml 19ml 19ml
CSEB East 2nd Canal	17.8ml 17.7ml 17.7ml
CSEB West	18.9ml 18.8ml 18.8ml
NTPC 3 No. Gate	23.9ml 23.8ml 23.8ml
NTPC Bypass Canal	25ml 24ml 24ml
CSEB Hydral Plant	23.7ml 23.6ml 23.6ml

Calculation:-

Strength of Dissolved Oxygen = 8V ppm.
Here,
V = Volume of $Na_2S_2O_3$ used for titration

CSEB East 1st Canal:-
Strength of Dissolved Oxygen = 8 V ppm
= 8 x 20.4
= 163.2 ppm

Balco Plant:-
Strength of Dissolved Oxygen = 8 V ppm
= 8 x 19 = 152 ppm

CSEB East 2nd Canal:-
Strength of Dissolved Oxygen = 8 V ppm
= 8 x 17.7 = 141.6 ppm

CSEB West:-
Strength of Dissolved Oxygen = 8 V ppm
= 8 x 18.8 = 150.4 ppm

NTPC 3 No. Gate:-

Strength of Dissolved Oxygen = 8 V ppm
= 8 x 23.8 = 190.4 ppm

NTPC Bypass Canal:-
Strength of Dissolved Oxygen = 8 V ppm
= 8 x 24 = 192 ppm

CSEB West Hydral Plant:-
Strength of Dissolved Oxygen = 8 V ppm
= 8 x 23.6
= 188.8 ppm

*Result***: -** By the test of Total Dissolved Oxygen in the water samples, the result obtained is that the water sample of CSEB East 2nd Canal has minimum oxygen dissolved in the water.

V. HARDNESS

Introduction: - Hardness is deemed to be the capacity of water for reducing and destroying the lather of soap. Hardness in water is due to the natural accumulation of salts from contact with soil geological formations or it may enter from direct pollution by industrial effluents. Calcium and magnesium are the principle cations causing hardness.

The term "Total Hardness" indicates the concentration of calcium and magnesium ions only.
The total hardness is expressed in terms of calcium carbonate.

Reagents –

EDTA Soln	- 4gm of EDTA + 0.1gm $MgCl_2$ in 1 liter of soln.
Buffer Soln	- 16.9gm in 143ml of NH_3 & dilute in 250ml.
Indicator	- 0.5gm EBT in 100ml of alcohol.

➢ *Procedure*

A. Standarization of EDTA soln –

- 50ml of standard hard water is taken in conical flask. Then 10-15ml of buffer soln is added to it.
- 4-5 drops of EBT indicator is also added and then this is titrated against EDTA soln till wine red color changes to clear blue. The volume of EDTA used in this titration is taken as V1 ml.

B. Titration of unknown hard water –

- 50ml of water sample is taken in flask and add buffer soln as above & 4-5 drops indicator is also added.
- Then this is titrated against EDTA soln. The volume of EDTA used is V2 ml .

C. Titration of permanent hardness –

- 250ml of water sample is taken a large beaker.
- Then this is boiled & volume is reduced about 50ml.[When all the bicarbonates are decomposed to insoluble $CaCO_3$ +Mg $(OH)_2$].
- This is filtrate & the ppt is washed with distilled water.
- Then filtrate is collected in a beaker volume is maked up to 250ml with distilled water.
- Then this is boiled and titrated against EDTA just as in previous procedure. The volume of EDTA is used in this titration is taken as V3 ml.

ISSN No:-2456-2165

Observation Table
Unknown Hard Water

Area	**Reading of titration (Source :- Canal)**		
CSEB East 1st canal	7.3ml	7.2ml	7.2ml
Balco Plant	7.6ml	7.5ml	7.5ml
CSEB East 2nd canal	10.6ml	10.5ml	10.5ml
CSEB West	7.6ml	7.5ml	7.5ml
NTPC 3 No. Gate	3.5ml	3.4ml	3.4ml
NTPC Bypass canal	3.9ml	3.8ml	3.8ml
CSEB West Hydral Plant	3.2ml	3.0ml	3.0ml

Permanent Hardness

Area	Reading of titration (Source :- Canal)		
CSEB East 1st canal	3.3ml	3.2ml	3.2ml
Balco Plant	2.2ml	1.9ml	1.9ml
CSEB East 2nd canal	2.2ml	1.9ml	1.9ml
CSEB West	2.5ml	2.2ml	2.2ml
NTPC 3 No. Gate	1.4ml	1.2ml	1.2ml
NTPC Bypass canal	2.2ml	2.1ml	2.1ml
CSEB West Hydral Plant	2.3ml	2.2ml	2.2ml

VI. CALCULATION

50ml of standard hard water = V_1 ml of EDTA
50 x 1 mg of $CaCO_3$ = V_1 ml of EDTA
1 ml of EDTA = $50/V_1$ mg of $CaCO_3$ eq
50ml of given hard water = V_2 ml of EDTA
= $(V_2 \times 50)/ V_1$ mg of $CaCO_3$ eq
1 L (1,000ml) of given hard water = $1,000\ V_2/ V_1$ mg of $CaCO_3$
Total hardness of water = $1,000\ V_2/ V_1$ mg/L
= $1,000\ V_2/ V_1$ ppm
50ml of boiled water = V_3 ml of EDTA
= $(V_3 \times 50)/ V_1$ mg of $CaCO_3$ eq
1 L (1,000ml) of boiled water = $1,000\ V_3/ V_1$ mg of $CaCO_3$ eq
Permanent Hardness = $1,000\ V_3/ V_1$ ppm
And temporary hardness = [Total – Permanent hardness]
= $1,000[(V_2/ V_1) – (V_3/ V_1)]$ ppm
= $1,000\ (V_2 - V_3) / V_1$ ppm

Here,

V_1 = Volume of Soap solution
V_2 = Titrate value of Soap solution
V_3 = Titrate value of Soap solution

CSEB East 1st Canal:- V_1 = 15ml V_2 = 7.2ml V_3 = 3.1ml

Total hardness of water = $1,000\ V_2/ V_1$ ppm
= 1,000 x 7.2/15
= 480 ppm
Permanent hardness = $1,000\ V_3/ V_1$ ppm
= 1,000 x 3.1/15
= 206.66 ppm
Temporary hardness = $1,000\ (V_2 - V_3) / V_1$ ppm
= 1,000 (7.2 – 3.1)/15
= 273.33 ppm

Balco Plant:- V_1 = 15ml V_2 = 7.2ml V_3 = 3.1ml

Total hardness of water = $1,000\ V_2/ V_1$ ppm
= 1,000 x 7.5/15
= 500 ppm

Permanent hardness = $1,000\ V_3/ V_1$ ppm
= 1,000 x 2.4/15 = 160 ppm
Temporary hardness = $1,000\ (V_2 - V_3) / V_1$ ppm
= 1,000 (7.5 – 2.4)/15
= 340 ppm

CSEB East 2nd Canal:- V_1 = 15ml V_2 = 10.5ml V_3 = 1.9ml
Total hardness of water = $1,000\ V_2/ V_1$ ppm
= 1,000 x 10.5/15
= 700 ppm
Permanent hardness = $1,000\ V_3/ V_1$ ppm
= 1,000 x 1.9/15
= 126.66 ppm
Temporary hardness = $1,000\ (V_2 - V_3) / V_1$ ppm

= 1,000 (10.5 – 1.9)/15
= 573.33 ppm

CSEB West:- V_1 = 15ml V_2 = 7.5ml V_3 = 2.2ml
Total hardness of water = 1,000 V_2/ V_1 ppm
= 1,000 x 7.5/15
= 500 ppm
Permanent hardness = 1,000 V_3/ V_1 ppm
= 1,000 x 2.2/15
= 146.66 ppm
Temporary hardness = 1,000 (V_2 - V_3) / V_1 ppm
= 1,000 (7.5 – 2.2)/15
= 353.33 ppm

NTPC 3 No. Gate:- V_1 = 15ml V_2 = 3.4ml V_3 = 1.2ml
Total hardness of water = 1,000 V_2/ V_1 ppm
= 1,000 x 3.4/15
= 226.66 ppm
Permanent hardness = 1,000 V_3/ V_1 ppm
= 1,000 x 1.2/15
= 80 ppm
Temporary hardness = 1,000 (V_2 - V_3) / V_1 ppm
= 1,000 (3.4 – 1.2)/15
= 146.66 ppm

NTPC Bypass Canal:- V_1 = 15ml V_2 = 3.8ml V_3 = 2.1ml
Total hardness of water = 1,000 V_2/ V_1 ppm
= 1,000 x 3.8/15
= 253.33 ppm

Permanent hardness = 1,000 V_3/ V_1 ppm
= 1,000 x 2.1/15
= 140 ppm
Temporary hardness = 1,000 (V_2 - V_3) / V_1 ppm
= 1,000 (3.8 – 2.1)/15
= 113.33 ppm

CSEB West Hydral Plant:- V_1 = 15ml V_2 = 3.0ml V_3 = 2.2ml
Total hardness of water = 1,000 V_2/ V_1 ppm
= 1,000 x 3.0/15
= 200 ppm
Permanent hardness = 1,000 V_3/ V_1 ppm
= 1,000 x 2.2/15
= 146.66 ppm
Temporary hardness = 1,000 (V_2 - V_3) / V_1 ppm
= 1,000 (3.0 – 2.2)/15
= 53.33 ppm

Result :- By the test of hardness of various water samples it is concluded that water sample of CSEB East 2nd Canal has maximum hardness.

ISSN No:-2456-2165

VII. PH VALUE

Introduction: - pH is term used universally to express the intensity of the acid or alkaline condition of a soln. It is a measure of a hydrogen ion concentration, or it more precisely, the hydrogen ion activity.

pH is defined as the " logarithm (base10) of the reciprocal of the hydrogen-ion concentration".

Thus if [H+] =10-6 moles per liter, then pH=6. pH is an important factor in water chemistry, since it enters into the calculation of acidity and alkalinity and processes such as coagulation, softening and corrosion control .

Reagents required: -

1. Buffer soln of pH 4
2. Buffer soln of pH 7
3. Buffer soln of pH 9.2 - To prepare this 0.95 gm of Borax is dissolved in 250ml distill water.

Principle:- Phenolphthalein and methyl are indicators commonly used for alkalinity titration. pH meters are the widely employed instruments for the electrometric measurement of pH . A pH meter is highly- impedance electrometer calibrated in terms of pH. In principle electrometric determination of pH involves the measurement of the electromotive force (emf) of a cell comprising an indicator electrode responsive to hydrogen ions and reference electrode both immersed in the test – soln. The indicator electrode commonly used is glass electrode and the reference electrode is calomel electrode. Measurement of pH values above 10 and at high temperature is best made with special glass electrodes designed for such purposes.

Procedure: -

1. The glass electrode is well washed with distilled water.
2. The electrode is filled with KCl & it is connected with pH meter.
3. Before the measurement of pH of sample pH meter should standardized with standard buffer soln of pH 4, pH 7 and pH 9.2. Set the temperature at room temperature.
4. Then 50ml of water sample is taken in a beaker and electrodes are dipped in it & pH reading is taken at pH meter.
5. Then electrode is washed with distilled water & sane procedure is repeated for each water sample.

Observation Table

Area	pH Value
CSEB East 1st canal	7.7
Balco Plant	7.6
CSEB East 2nd canal	7.6
CSEB West	7.8
NTPC 3 No. Gate	7.8
NTPC Bypass canal	8.0
CSEB West Hydral Plant	7.6

Result: - By the test for pH for various water samples it is concluded that the water sample of NTPC Bypass Canal has the maximum pH Value (Basicity) and the the water sample of CSEB East 2nd canal has the minimum pH value (Acidity).

ISSN No:-2456-2165

VIII. CONDUCTIVITY

Introduction: - Conductivity is a measure of water capability to pass electric flow. This ability is direct related to the concentration of ions in the water. This conductive come from dissolved salts and inorganic materials such as alkalis, chlorides, sulfides and carbonate compounds. Compounds that dissolved into ions are also known as electrolyte. The more ions that are present the higher conductivity of water. Likewise, the fewer ions that are in the water the less conductive it is. Distilled or deionized water can act as insulator due to its very low (if not negligible) conductivity value. Sea water on the other hand has a very high conductivity.

Conductivity Unit: - Conductivity is measured in Micro Siemens per Centimeter (µS/cm). µS/cm is standard unit for fresh water measurement. Reports on sea water conductivity use micro-, mili- and sometimes even just Siemens/mho per centimeter depending on publication.

Measure the conductivity: - Measure the conductance of each water sample using the conductivity meter. Between samples wash electrodes with clean water and carefully wiped them dry. If a sample contains debris, allow the practical to settle. If a meter has separate electrodes, be sure that they are kept the same distance from other in each sample and as still as possible.

Observation Table

Area	Conductivity (in µS/cm)
CSEB East 1st canal	186.3
Balco Plant	296.2
CSEB East 2nd canal	350
CSEB West	188
NTPC 3 No. Gate	95.02
NTPC Bypass canal	137
CSEB West Hydral Plant	122.1

Result: - By the test of conductivity of various water samples it is concluded that the water sample of CSEB East 2nd canal has maximum conductivity and water sample of NTPC 3 No. Gate has minimum conductivity.

IX. TDS

Introduction: - "Total Dissolved Solids (TDS) is the concentration of the dissolved chemicals in sample water. Before dissolving, these could have been a solids or a liquid.

Principle: - The TDS meter is used for calculate a value of sample. TDS meter are popular because they are easy to use. To find the TDS of a water sample we took TDS meter in water sample and note the reading shown in meter. After the value of water sample wash the electrodes of TDS meter. We repeat this process for each water sample.

Observation Table

Area	Value of TDS (in ppm)
CSEB East 1st canal	93.16
Balco Plant	148.7
CSEB East 2nd canal	174.6
CSEB West	93.96
NTPC 3 No. Gate	47.43
NTPC Bypass canal	68.64
CSEB West Hydral Plant	61.03

ISSN No:-2456-2165

Result: - By the test of TDS of various water samples it is concluded that the water sample of CSEB East 2nd canal ha s maximum TDS and water sample of NTPC 3 No. Gate has minimum TDS.

X. SALINITY

Introduction: - Salinity refers to the total concentration of all dissolved salts in water. Since salts from ionic particles when dissolved, salinity is the strong component of conductivity. Salinity is a important water measurement as it affects the basic chemistry of water as well the biological processes that occur within it. Salinity affects dissolved oxygen solubility.

Unit: - Salinity is measured in parts per million (ppm).

Process: - We take a water sample in small beaker and put the Salinity Meter that has a water sample and note the reading of salinity meter. After read & note the reading of salinity meter we wash the electrodes of salinity meter with clean water. We repeat this process for each water samples.

Observation Table

Area	Value of Salinity (in ppm)
CSEB East 1st canal	10
Balco Plant	70
CSEB East 2nd canal	90
CSEB West	10
NTPC 3 No. Gate	0.0
NTPC Bypass canal	0.0
CSEB West Hydral Plant	0.0

Result: - By the test of Salinity of various water samples it is concluded that the water sample of CSEB East 2 nd canal has maximum salinity and the water of NTPC 3 No. Gate, NTPC Bypass canal and CSEB West Hydral Plant has minimum salinity (=0.0).

XI. FINAL RESULT

The result of the analysis may conviently be reported in separate form as shown below:

Result of examination of sample of water
Name of source - Canal
Received from - CSEB East 1st canal

Dissolved Oxygen	-	163.2 ppm
Hardness	-	480 ppm
pH Value	-	7.7 pH
Conductivity	-	186.3 µS/cm
TDS	-	93.16 ppm
Salinity	-	10 ppm

ISSN No:-2456-2165

The result of the analysis may conviently be reported in separate form as shown below.

Result of examination of sample of water

Name of source - Canal

Received from - Balco Plant

Dissolved Oxygen	-	152 ppm
Hardness	-	500 ppm
pH Value	-	7.6 pH
Conductivity	-	296.2 µS/cm
TDS	-	148.7 ppm
Salinity	-	70 ppm

The result of the analysis may conviently be reported in separate form as shown below:

Result of examination of sample of water

Name of source - Canal

Received from - CSEB East 2nd canal

Dissolved Oxygen	-	141.6 ppm
Hardness	-	700 ppm
pH Value	-	7.3 pH
Conductivity	-	300 µS/cm
TDS	-	174.6 ppm
Salinity	-	90 ppm

ISSN No:-2456-2165

The result of the analysis may conviently be reported in separate form as shown below:

Result of examination of sample of water

Name of source - Canal
Received from - CSEB west

Dissolved Oxygen	-	150.4 ppm
Hardness	-	498 ppm
pH Value	-	7.8 pH
Conductivity	-	188 µS/cm
TDS	-	93.96 ppm
Salinity	-	10 ppm

The result of the analysis may conviently be reported in separate form as shown below:

Result of examination of sample of water

Name of source - Canal

Received from - NTPC 3 No. Gate

Dissolved Oxygen	-	190.4 ppm
Hardness	-	226.66 ppm
pH Value	-	7.8 pH
Conductivity	-	188 µS/cm
TDS	-	95.02 ppm
Salinity	-	0.0 ppm

The result of the analysis may conviently be reported in separate form as shown below:

Result of examination of sample of water

Name of source - Canal

Received from - NTPC Bypass canal

Dissolved Oxygen	-	192 ppm
Hardness	-	253.33 ppm
pH Value	-	8.0 pH
Conductivity	-	137 µS/cm
TDS	-	68.64 ppm
Salinity	-	0.0 ppm

The result of the analysis may conviently be reported in separate form as shown below:

Result of examination of sample of water

Name of source - Canal

Received from - CSEB West Hydral Plant

Dissolved Oxygen	-	188.8 ppm
Hardness	-	200 ppm
pH Value	-	7.6 pH
Conductivity	-	122.1 µS/cm
TDS	-	61.63 ppm
Salinity	-	0.0 ppm

XII. RECOMMENDATION

There is a close relationship between environment and health. Pollution has become a necessary evil in the present age and it has become a must to efforts by bacteria, viruses, protozoa's, nematodes, tramatodes, arthropods etc.

Banking on public health concern by water pollution following recommendations are notable: -

- Immediate steps should be taken to store all water of urban areas into a series of holding tanks which can be treated for reuse in irrigation, laundry, fish ponds etc.
- Laundry should be banned in urban ponds and such water bodies should protect.
- Monitoring of urban water resources should be carried out especially for the bacteriological characteristics of urban ponds and water sources to check the spread of water born diseases.
- Strict enforcement of pollution control / prevention law must be applied by Government. Restoration of already polluted waters of ponds and rivers should be taken at top priority basis.
- Treatment plants should be established in cities where actual pollution of water bodies has been repeated through industrial effluents.
- Involvement of local experts, student participation and setting up of regional water analysis centers are urgency.
- Environment clubs and social organizations should take a leading step to educate people living in both urban and rural areas to refrain from polluting water through open defecation, laundry, sewage-dump and soil wastes.

XIII. CONCLUSION

Korba district covers an area of 7145.44 sq.km. It consists of 717 number of villages. The entire area of Korba district is drained by river Hasdeo except small area in eastern part.

The water samples collected from canal in various locations during the month of MayJune 2018, were analyzed to determine the quantity of surface water in the Korba district. The analysis shows that in all most all samples major ions are as per the limit of Bureau of Indian Standards (BIS) except one sample from CSEB East i.e. sample no. 2 .

During water sample analysis parameters like colour, hardness, dissolved oxygen, pH value, conductivity, total dissolved solids (TDS) and salinity were analyzed. Sample no.2 collected from CSEB East minimum oxygen dissolved in surface water because of the presence of less DO, Bioaquation life is affected and the small animals like fish, frog, earth warms and others are sometimes died. Actually all these animals need oxygen for their respiration which is dissolved in surface water. This depletion of DO in canal water is mainly due to the presence of pollutants. These pollutants create a thin film on upper surface of water bodies and due to this thin film natural oxygen is unable to enter in the canal water and depletion of oxygen in canal water starts. So there is a need to check pollutants before throwing it into canal water. Similarly, due to the presence of total dissolved solids in canal water sample no.2 again shows maximum hardness of water i.e. 700ppm total hardness. This hard water is also not suitable for drinking and other domestic purposes. There are two types of hardness of water i.e. Calcium and Sulphate hardness. Our human digestive system is unable to digest water which contents Sulphate in it.

As mentioned earlier total dissolved solids are more (174.6 ppm) in quantity in water sample no.2 CSEB East, therefore this sample shows maximum conductivity i.e. 350 µS/cm amongst all other water samples. Various salts are also responsible for high conductivity.

Due to total dissolved solids (TDS) in greater in water sample no.2, colour of water also changed from colorless to turbid as compared to other water samples. The taste of water is also changed due to higher TDS and presence of salts. The same phenomenon is applied in case of salinity two. Due to presence of various water salts salinity of water sample no.2 is found higher (90 ppm) then the other locations. From the water samples analysis of canal water in Korba district, it can be concluded that the quantity of water of CSEB East 2nd canal is not within the limits of Bureau of Indian Standards (BIS) and needs prior treatment of incoming effluents and other things to present water pollution. Responsible authorities from administration as well as from industries should have to take preventive measures to minimize pollution. With the help of this environment as well as health of nearby residents can be protected.