EXPREMENTAL ANALYSIS OF GROUND WATER QUALITY IN MANNAMPANDAL

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ABSTRACT

Due to increase in industry and life style changes cause the environmental pollution. These pollution create direct and indirect effects on human, animals and plants. Especially, water contamination is the major crisis now a days. Rather than surface water contamination, institutions, domestic place, etc. To know the reason behind these pollution we have to find the pollutant present in the water. Our project deals with "ANALYSIS AND EXPERIMENTAL TEST OF GROUND WATER QUALITY IN MANNAMPANDAL". This the live project which should be going to compare with the past year result. The common physical characteristics are color, taste, odour, turbidity, temperature and electrical conductivity. The chemical characteristics are P^H, total solids, dissolved oxygen, hardness, chlorine content and other major element. The biological characteristics are plate count test, E-coli test. Mannampandal has three colleges for engineering, arts and polytechnic. Here we are conduct eight test for this campus ground water and reported the detailed result.

KEYWORDS: Environmental pollution, water contamination, colour, taste, odour, turbidity, temperature, electrical conductivity, pH, total solids, dissolved oxygen, hardness, chlorine content, plate count test, E-Coli test.

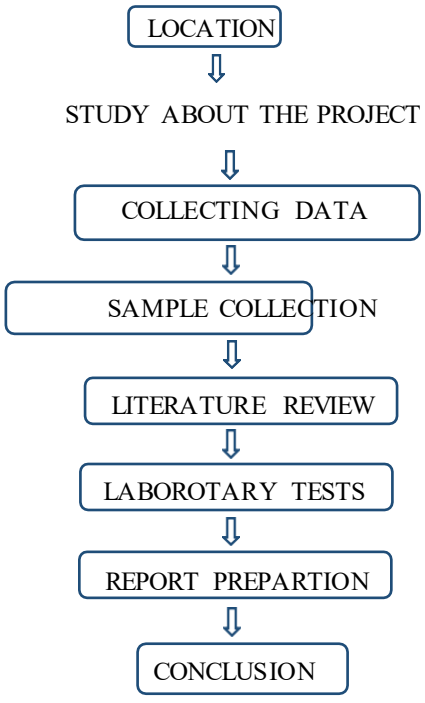
1. INTRODUCTION

Water is the one of the important factor for all the living things. It makes a shape to Earth's surface. About 71% of Earth is covered by water in that 96.5% of water belongs to ocean, 2.5% of water belongs to fresh water (in liquid state) and 1% are in ice forms. Fresh water (in liquid state) are in the form of lake, stream, pond, river, etc. The fresh water is characterized as surface water, sub-surface water and ground water. Due to increase in industries and changes in human life style causes pollution in water. The study of WHO says 80% of disease caused by water pollution.

Ground water is a most common abundant drinking water. The rain water flows in the land, lake, pond and river get penetrate through the soil and maintains the ground water table.

There is a standard for ground water on according to the Central Board of Ground Water Standard. The tests are made in the basis of CBGW and IS10500:1991. Our research work carried out at Mannampandal village, Mayiladuthurai (Taluk).

2. METHODOLOGY



3. LOCATION

The samples are collected in the village of Mannampandal, in the town of Mayiladuthurai, in the coastal district of Nagapattinam within the Indian state of Tamilnadu.

AVC arts college is considered to be center and the samples are taken 2km apart from centre at east and west direction.

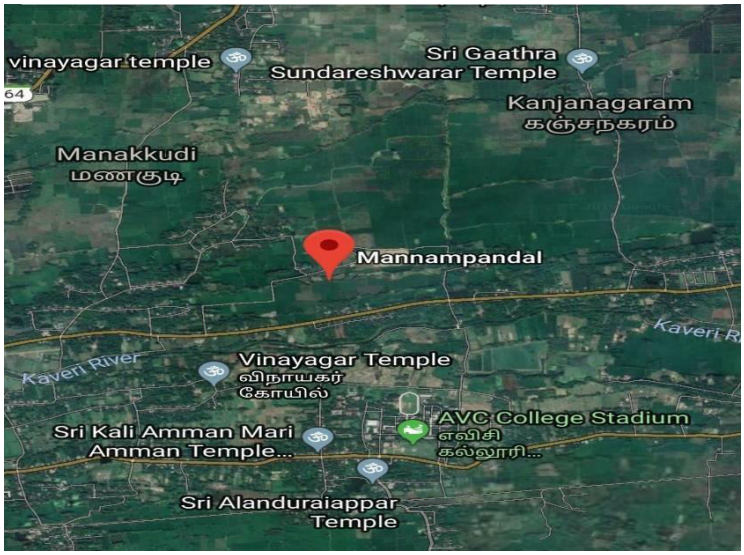
4. STANDARD TEST

According to CBGW standard (Central Board of Ground Water), the following test are conducted to determine the quality of ground water. The chemical characteristics of pH, TDS, total hardness, calcium, potassium, sodium, total alkalinity. The physical characteristics of turbidity and electrical conductivity. The desirable and permissible limitations are followed by IS 10500-2012 is tabulated below

PARAMETERS	UNIT	DESIRABLE LIMIT	PERMISSIBLE LIMIT
Turbidity	NTU	1	5
Electrical conductivity	mS/cm	0	2
pH	-NIL-	6.5-8.5	No relaxation
Total Hardness	mg/lit	200	600
Dissolved Oxygen	mg/lit	4	10
Total Dissolved Solids	mg/lit	500	2000
Sodium	mg/lit	30	60
Calcium	mg/lit	75	200
Potassium	mg/lit	30	100
Total Chloride	mg/lit	250	1000
Total Alkalinity	mg/lit	200	600

5. LOCATION DETAILS

The samples are collected in all over Mannampandal. AVC arts college is considered to be centre and the samples are taken 2km from east and west of AVC arts college.

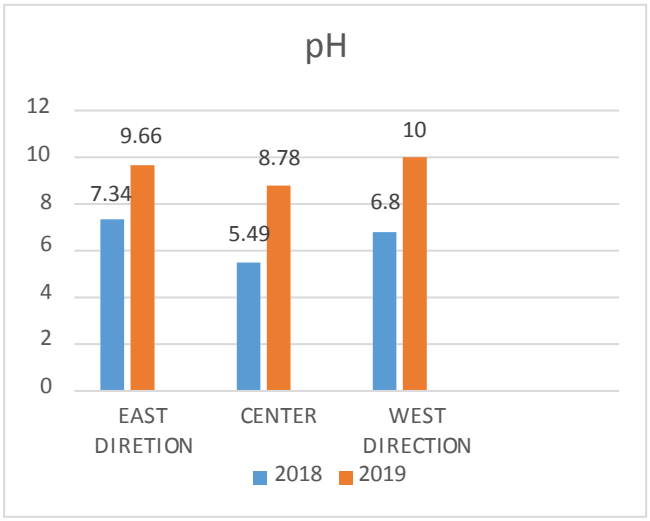


6. TESTAND RESULT

6.1 pH

pH is determine to know the hydrogen ion concentration. It determines the acidic and alkalinity nature of the water. As per IS10500-2012 the desirable limit is 6.5-8.5.

pH is measured by p^H digital meter using a glass electrode which generate a potential varying linearly with the pH of the solution in which it is inversed.

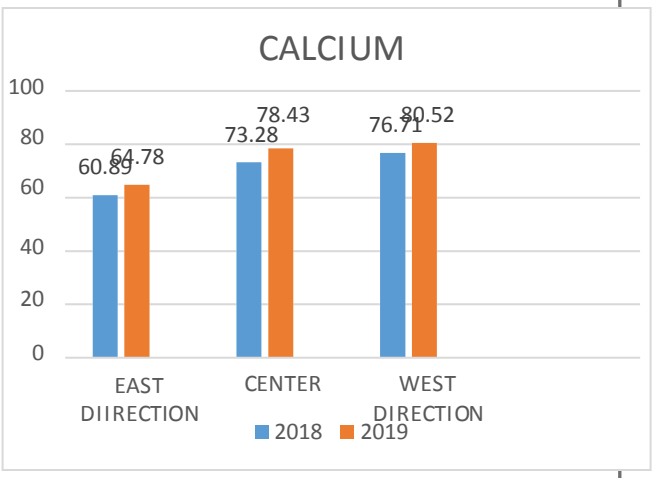


GRAPH (1) – pH GRAPH

6.2 CALCIUM CONTENT

Calcium is a mineral contains in water. It is one of the hardness content mineral. Excessive calcium may affect the metals and lack of

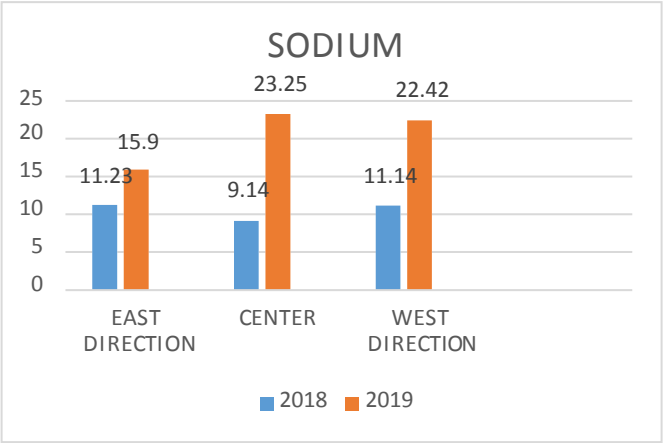
Calcium is unfit for drinking purpose. It is measured by flame photometer. Its desirable limit is 75mg/lit and the permissible limit is 200mg/lit.



GRAPH (2) – CALCIUM

6.3 SODIUM CONTENT

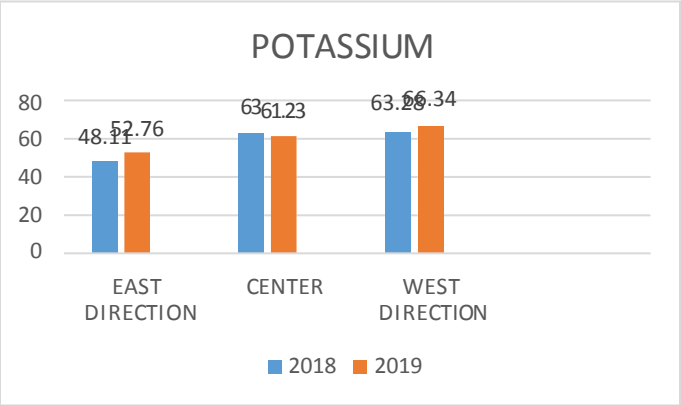
Sodium is essential mineral for water. It is has no smell but it can be tasted when its concentration is high. Its desirable limit is 30mg/lit and permissible limit is 60mg/lit.



GRAPH (3) – SODIUM CONTENT

6.4 POTTASIUM CONTENT

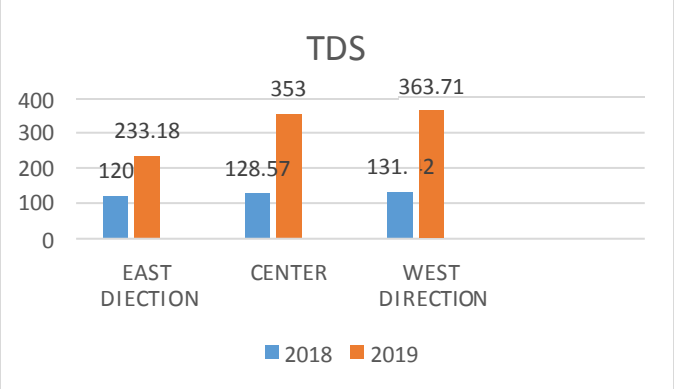
Potassium is a mineral which is more evenly distributed than the sodium. It is measured by flame photometer. Its desirable limit is 30mg/lit and the permissible limit is 100mg/lit.



GRAPH (4) - POTTASIUM

6.5 TOTAL DISSOLVED SOLIDS

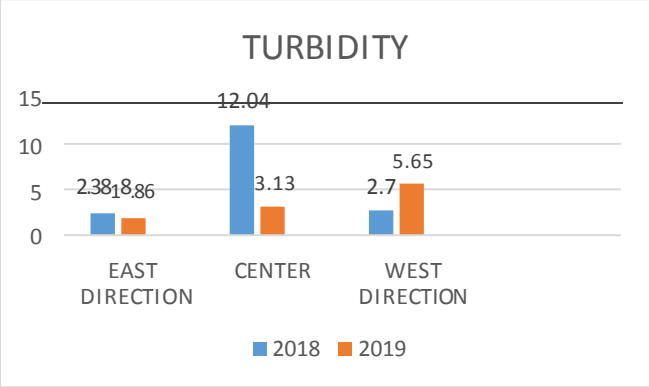
The minute solid particles which suspended, volatile, fixed and settled solids in water is known as TDS. Its desirable limit is 500mg/lit and permissible limit is 2000mg/lit.



GRAPH (5) – TDS

6.6 TURBIDITY

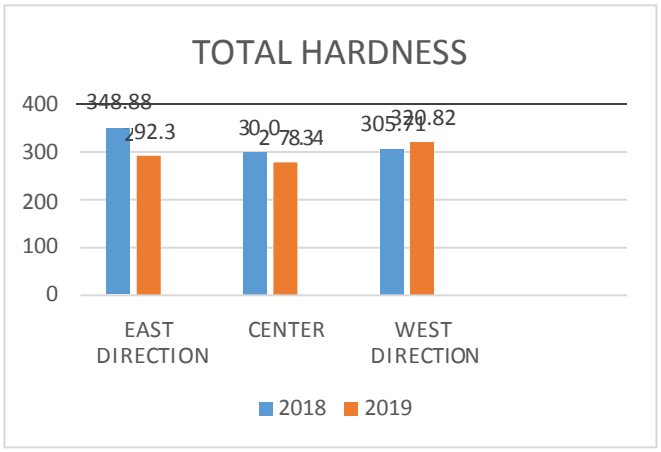
Turbidity is caused by the presence of colloidal particles which can be determined by passing the light through the water. It is measured by nephelometric turbidity meter. Its desirable limit is 1NTU and the permissible limit is 5NTU.



GRAPH (6) - TURBIDITY

6.7 TOTAL HARDNESS

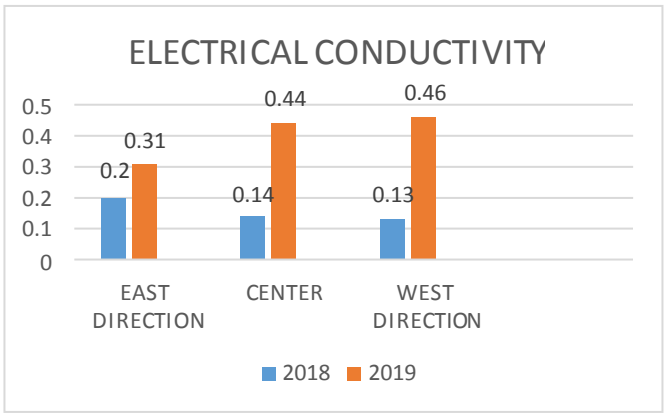
Total hardness is defines as the presence of sulphate, nitrates and chlorides of calcium and magnesium. It's also due to presence of carbonates and bicarbonates. It is measured by volumetric titration of EDTA solution against water sample. Its desirable limit is 200mg/lit and the permissible limit is 600mg/lit.



GRAPH (7) – TOTAL HARDNESS

6.8 ELECTRICAL CONDUCTIVITY

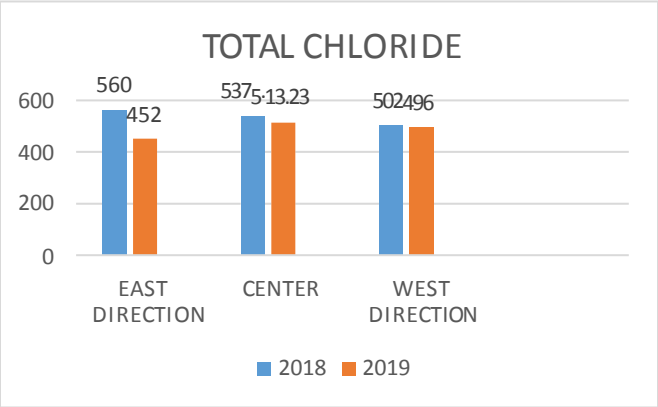
Electrical conductivity defines the ions present in the water sample. It determines the ions conducting the current passing through it. It is measured by conductivity meter. Its desirable limit is 0 mS/cm and permissible limit is 2mS/cm.



GRAPH (8) – ELECTRICAL CONDUCTIVITY

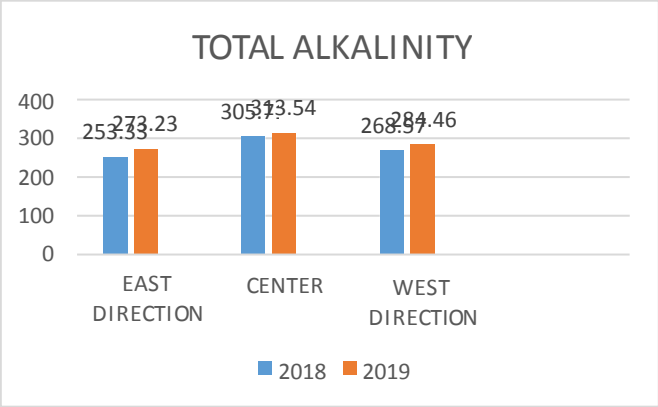
6.9 TOTAL CHLORIDE

Chloride is a mineral which present naturally in the form of sodium Chloride. It is determined by the titration method which colour may changes. From yellow to milk white and then brick red. The desirable limit is 250mg/lit and the permissible limit is 1000 mg/lit.



6.10 TOTAL ALKALINITY

Total alkalinity is defined as the presence of hydroxide, carbonate and bicarbonate. It is also determined by the titration method by using phenolphthalein and methyl orange as indicator. The desirable limit is 200mg/lit and the permissible limit is 600mg/lit.



7. CONCLUSION

Monitoring of water quality of ground water is done by collecting representative water samples and analysis the physical and chemical characteristics of water samples at different places in the village. The results of water quality assessment showed that most of the water quality parameters are all fit for drinking. This research compares the quality value of present and past year. It justifies that due to heavy rainfall there causes many variations in the quality.

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