Available online at www.pelagiaresearchlibrary.com

Pelagia Research Library

Advances in Applied Science Research, 2015, 6(7):137-140

Pelagia Research Library

ISSN: 0976-8610
CODEN (USA): AASRFC

Analysis of electrical conductivity of ground water at different locations of Dildar Nagar of U.P, India

Salahuddin

P. D. M. College of Engineering, Bahadurgarh, Haryana, India

ABSTRACT

In this paper, we discuss about the recently collected sample of ground water at surrounding locations of Dildar Nagar village and its experimental analysis in laboratory for Electrical conductivity. Also, we represents the data graphically and interpreted the data using the method called analysis of variance. Further, we analyze our findings with the established results and concluded that electric conductivity depends on areas as well as months also.

Key words: Analysis of variance; Graphical representation, Electrical Conductivity.

INTRODUCTION

1.1 Electric Conductivity:

Electrical conductivity (EC) is a measurement of the dissolved material in an aqueous solution, which relates to the ability of the material to conduct electrical current through it. EC is measured in units called Seimens per unit area (e.g. mS/cm, or miliSeimens per centimeter), and the higher the dissolved material in a water or soil sample, the higher the EC will be in that material.

1.2 ANOVA:

It is a statistical tool used in several ways to develop and confirm an explanation for the observed data. It is an extension of the t-test, which is used in determining the no significance of difference of three or more group of values.

The calculations of ANOVA can be characterized as computing a number of means and variances, dividing two variances and comparing the ratio to a handbook value to determine statistical significance.

The F-test is used for comparisons of the components of the total deviation. For example, in one-way or single factor ANOVA, statistical significance is tested for by comparing the F test statistic

F=Variance between samples/ Variance within samples.

The textbook method of concluding the hypothesis test is to compare the observed value of F with the critical value of F determined from tables. The critical value of F is a function of the numerator degrees of freedom, the denominator degrees of freedom and the significance level

(α). If $F \geq F_{Critical}$ (Numerator DF, Denominator DF, α) then reject the null hypothesis.

Study Area

Dildarnagar is a village panchayat located in the Ghazipur district of UttarPradesh state,India. The latitude 25.4328495 and longitude 83.683076 are the geocoordinate of the Dildarnagar. Lucknow is the state capital for Dildarnagar village. It is located around 333.2 kilometer away from Dildarnagar. The other nearest state capital from

Dildarnagar is Patna and its distance is 146.7 KM. The other surrouning state capitals are Patna 146.7 KM., Ranchi 284.5 KM., Gangtok 534.6 KM.

Location map of the Study area

MATERIALS AND METHODS

3.1 Sample Collection:

The ground water samples were collected from different locations to evaluate the physico-chemical contamination. Samples were collected in plastic container to avoid unpredictable changes in characteristic as per standard procedure (APHA, 1998). The results were compared with WHO standard values (2003). The details of sampling locations are illustrated below the Table1

Table 1: Water sampling locations and sources

CODE	Sampling Station	Source
GW1	Usia	Bore well
GW2	Dildar nagar	Bore well
GW3	Karma	Bore well
GW4	Nirahukapura	Bore well
GW5	Bhadura	Bore well
GW6	Gorsara	Bore well
GW7	Baksara	Bore well
GW8	Sihani	Bore well
GW9	Arangi	Bore well
GW10	Bhaksi	Bore well

3.2 Instrument used:

Electrical conductivity was measured using a meter and probe as well. The probe consists of two metal electrodes spaced 1 cm apart (thus the unit of measurement is microSeimens or milliSeimens *per centimeter*). A constant voltage was applied across the electrodes resulting in an electrical current flowing through the aqueous sample.

3.3 Measuring EC :

1. Turn on the EC meter and calibrate the probe using a standard solution of known conductivity. Calibration procedures vary by instrument, so following the manufacturer's instructions is highly recommended.. EC meters should be calibrated before each use (before each series of samples, not between each sample itself) or when measuring a large range of EC.
2. Check calibration by measuring the EC of the standard solutions in measure rather than calibrate mode.
3. Collect sample water in a glass or plastic container. Collect enough so the probe tip can be submerged in sample; either rinse the probe with deionized water (and blot dry) or with sample before inserting the probe into the collection vessel.

4. Submerge the probe into the sample and wait until the EC reading on the meter stabilizes. Many meters have automatic temperature correction (ATC), which calculates the EC taking into account temperature, if your meter does not have this feature, you may need to adjust a knob on the meter to correct the EC for temperature. Record the measurement when the EC reading is stable.

The experimental analysis of electric conductivity of sampling locations are illustrated below the table 2 and graphically represented in fig 1 and the statistical analysis of the data are illustrated in table 3.

Table (2): Monthly variation in Electrical Conductivity (μmho/cm) of ground water at different sites

CODE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GW1	362.7	356.0	341.2	351.9	353.8	362.5	376.2	362.6	378.5	383.1	354.0	345.9
GW2	334.1	349.2	337.1	331.0	341.0	336.2	336.0	327.0	337.9	347.4	333.4	355.9
GW3	462.0	475.7	437.9	427.1	391.6	381.9	436.4	442.5	483.0	476.7	457.6	467.8
GW4	182.8	183.0	157.9	165.0	153.2	165.9	154.5	178.3	186.3	191.2	194.2	196.4
GW5	349.9	335.2	347.1	327.1	310.0	305.9	291.9	297.8	329.7	321.1	349.2	364.3
GW6	281.6	282.5	234.4	241.6	248.0	244.3	236.2	221.2	246.1	244.2	243.6	252.7
GW7	183.6	168.4	149.2	164.5	147.0	170.6	184.7	176.1	193.1	211.2	181.4	178.5
GW8	321.0	337.0	346.0	325.5	292.9	280.2	294.9	322.1	326.7	319.7	339.2	330.6
GW9	163.2	163.1	175.0	171.6	161.0	152.8	164.6	178.2	154.1	162.4	154.8	161.0
GW10	173.2	177.7	183.9	191.9	163.5	188.7	157.9	187.0	164.0	156.7	146.3	168.4

__GW1__= Usia, __GW2__ = Dildar Nagar, __GW3__ = Karma, __GW4__ = Nirahukapura, __GW5__ = Bhadaura, __GW6__ = Gorsara, __GW7__ = Baksara, __GW8__ = Sihani,__GW9__ = Arangi, __GW10__ = Bhaksi

Fig 1: Graphical representation of electric Conductivity

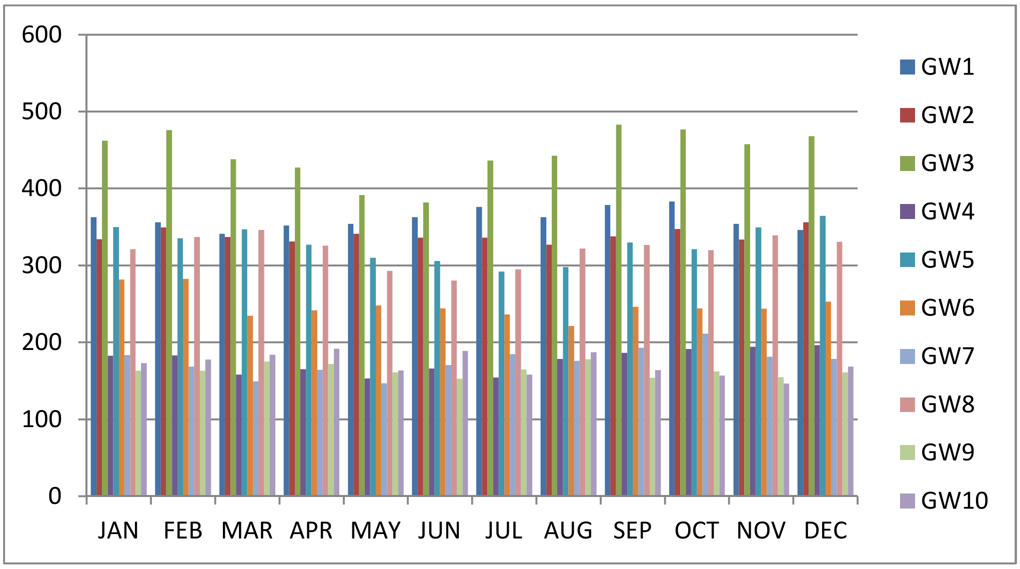

Table 3. Analysis the Data using two way nova

SUMMARY	Count	Sum	Average	Variance
GW1	12	4328.4	360.7	169.1836
GW2	12	4066.2	338.85	68.08818
GW3	12	5340.2	445.0167	1058.471
GW4	12	2108.7	175.725	246.9875
GW5	12	3929.2	327.4333	521.6824
GW6	12	2976.4	248.0333	315.9806
GW7	12	2108.3	175.6917	316.1445
GW8	12	3835.8	319.65	406.6936
GW9	12	1961.8	163.4833	64.33242
GW10	12	2059.2	171.6	210.5564
JAN	10	2814.1	281.41	10358.79
FEB	10	2827.8	282.78	11231.4
MAR	10	2709.7	270.97	10481.99
APR	10	2697.2	269.72	8910.32
MAY	10	2562	256.2	8838.722
JUN	10	2589	258.9	7482.693
JUL	10	2633.3	263.33	9934.72
AUG	10	2692.8	269.28	8887.317
SEP	10	2799.4	279.94	11744.66
OCT	10	2813.7	281.37	11115.88

NOV	10	2753.7	275.37	11100.84
DEC	10	2821.5	282.15	11071.68

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	1063026	9	118114	426.6897	5.08E-75	1.975806
Columns	9754.65	11	886.7863	3.203536	0.000928	1.886684
Error	27404.67	99	276.8148			
Total	1100186	119				

RESULTS AND DISCUSSION

The data is statistically analysed using two way analysis of variance and after analysis the result shows that electrical conductivity of ground water of these areas depends on locations as well as months also and it also shows that at Karma the electric conductivity is higher than any other areas.

CONCLUSION

It is concluded that the electric conductivity of ground water changes according to areas and months.

REFERENCES

[1] Chaudhary M. P., Salahuddin, Singh Sudhir Kumar and Singh Prafull, *International Journal of Mathematical Archive* , **2013**, 4, 35–37.
[2] David A Freedman, *Statistical Models: Theory and Practice*, Cambridge University Press, **2005**.
[3] Dildarnagar Village, Bhadaura Tehsil, Ghazipur District. (**2015**, February 20).
Retrieved from http://www.onefivenine.com/india/villages/Ghazipur/Bhadaura/Dildarnagar.
[4] D. R. Cox, Principles *of statistical inference*. Cambridge New York: Cambridge University Press, **2006**.
[5] Henry Scheffé, *The Analysis of Variance*. New York: Wiley, **1959**.
[6] Salahuddin, *International Journal for Pharmaceutical Research Scholars*, 2(4), 107-109,**2013**.
[7] Salahuddin, *Advances in Applied Science Research*, 5(5), 165-169,**2014**.
[8] Salahuddin and Khola , R. K, *International Journal for Pharmaceutical Research Scholars* , 2(4), 51-53, **2013**.
[9] Salahuddin, Khola , R. K, *Global Journal of Science Frontier Research (B)*, 14 (6),01-03,**2014**.
[10] Sirajudeen, M. Kadhar Mohidheen and R. Abdul Vahith, *Advances in Applied Science Research***,** 5(2),49–54, **2014**.
[11]Water and Soil Characterization pH and Electrical Conductivity. (**2015**, February 20).
Retrieved from http://serc.carleton.edu/ microbelife/research_methods/environ_sampling /pH_EC.html.