Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2014, 6(2):384-389

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

A study on the physico-chemical characteristics of the water of AVM canal in Kanyakumari district, Tamil Nadu, India

S. Betsy Bai and Y. Jinisha

Department of Chemistry, S. T. Hindu College, Nagercoil, Tamil Nadu, India

---

ABSTRACT

Water is one of the abundantly available substances in nature. It is available in rivers, lakes, ponds, ocean etc. Quantities of available surface water are dependant upon rainfall. So, there is a considerable variation in their parameters in different months of a year. Surface sources are generally found to be carrying a lot of suspended impurities, either organic or inorganic. A study was made on the assessment of physico-chemical parameters of the water of AVM canal and is presented here. The paper focuses on the variations in physico-chemical parameters. The parameters studied are Temperature, P^H, Electrical conductivity, Chlorinity, Dissolved oxygen content, Total hardness, and Total dissolved solids. The study reveals that there was an increase in all the parameters nearing the sea. It was observed that the main cause of deterioration in water quality was due to the lack of proper sanitation, unprotected canal sites, high anthropogenic activities, discharge of domestic effluents and intrusion of sea water.

Key words: Physico-chemical, AVM Canal, Kanyakumari.

INTRODUCTION

Kanyakumari district is situated at the southern tip of peninsular India. The Anantha Victoria marthanda Varma (AVM) canal was formed in 1960 for connecting Trivandrum with Kanyakumari. Nearly twenty coastal villages depended upon this source for most of their needs including navigation. But the purpose is no longer served. The canal is completely polluted through indiscriminate defecation on the banks, mixing up domestic effluents in the canal water and retting operations going on close to and in the canal itself. The present study aimed at assessing the water quality of AVM canal.

EXPERIMENTAL SECTION

Five different sites were selected, namely Vallavilai, Thatheyapuram, Eraviputhenthurai, Poothurai and Erayumanthurai. The last site, Erayamanthurai is located at the point of junction between the canal water and the Arabian sea. All the other sites are each 2 kms upstream from the last site (Erayumanthurai).

Water samples were collected fortnightly for four months from march 2013 to June 2013 and analysed using standard methods. [1]. The results are presented in tables.

RESULTS AND DISCUSSION

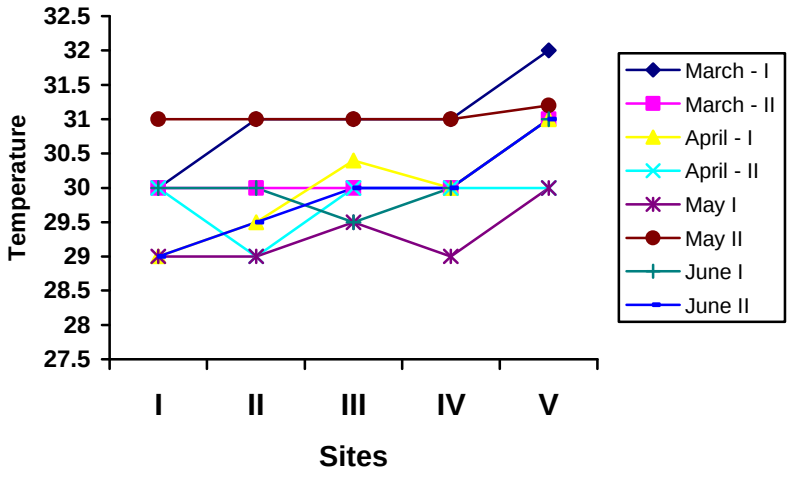
The physico-chemical conditions of a canal system are altered mainly by surface run off. Most riverine and canal systems have their flow regions, altered by man. The foremost cause is due to forest clearance.

1. Temperature:-

Changes in temperature of water may be helpful in detecting the unsuspected source of pollution. Multiplication of bacteria in water is more rapid at higher temperature. In the present study, the temperature of the AVM canal system never showed much variation. The minimum temperature of 29^{o}C was recorded in site I and II during may and the maximum temperature of 32^{o}C was recorded in site V during march, 2013.

TABLE: 1 Temperature [in ^{o}C]

Period	Sites				
	I	II	III	IV	V
March I	30	31	31	31	32
March II	30	30	30	30	31
April I	29	29.5	30.4	30	31
April II	30	29	30	30	30
May I	29	29	29.5	29	30
May II	31	31	31	31	31.2
June I	30	30	29.5	30	31
June II	29	29.5	30	30	31

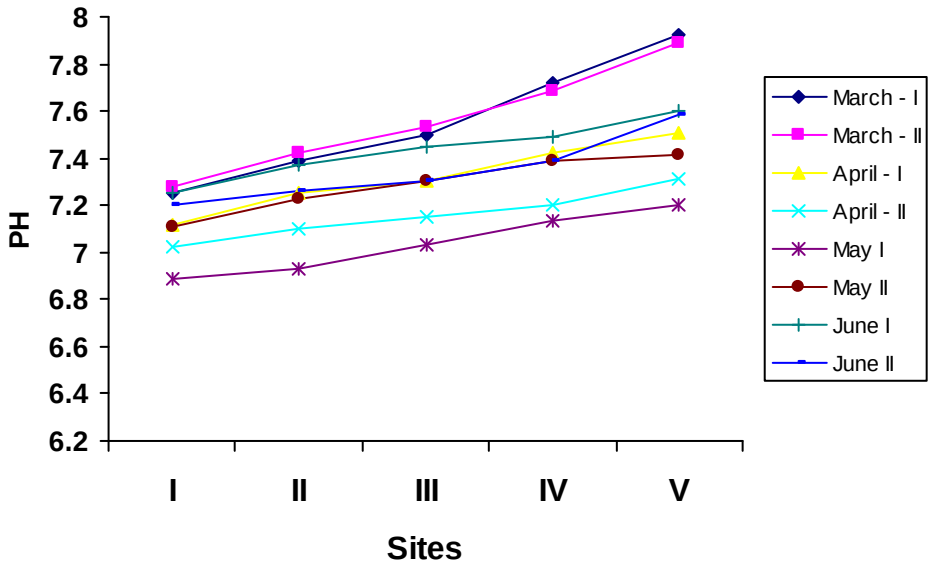


(ii) p^{H}:-

The P^{H} of water body indicated the degree of deterioration of water quality [2]. There was no significant change in the P^{H} value throughout the study period. There was a small decrease in P^{H} due to rainfall. Otherwise, the P^{H} ranged between 6.89 and 7.92 in all the five sites.

TABLE : 2 $_{P}$H

Period	Sites				
	I	II	III	IV	V
March I	7.25	7.39	7.50	7.72	7.92
March II	7.28	7.42	7.53	7.69	7.89
April I	7.12	7.25	7.30	7.42	7.51
April II	7.02	7.10	7.15	7.20	7.31
May I	6.89	6.93	7.03	7.13	7.20
May II	7.11	7.23	7.30	7.39	7.41
June I	7.25	7.37	7.45	7.49	7.60
June II	7.20	7.26	7.30	7.39	7.58



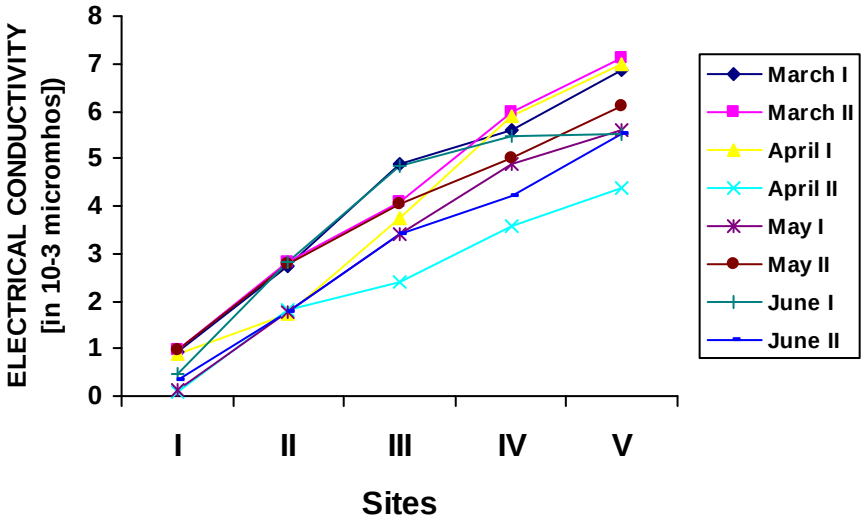
iii) Electrical Conductivity:

The high conductivity values indicate that the sea water contained high concentration of dissolved ionisable solids [3]

The electrical conductivity values were ranging between a minimum of 0.074 x 10^{-3} micromhos at site I during april and a maximum of 7.123x10^{-3} micromhos at site V during march. The reason for high EC was due to evaporation and intrusion of sea water at site V. Dilution due to rain decreases the conductity [4]

TABLE : 3 Electrical conductivity [in 10^{-3} micromhos]

Period	Sites				
	I	II	III	IV	V
March I	0.908	2.74	4.900	5.61	6.87
March II	0.980	2.810	4.080	5.990	7.123
April I	0.900	1.720	3.740	5.880	6.990
April II	0.074	1.825	2.421	3.581	4.370
May I	0.137	1.780	3.410	4.890	5.590
May II	0.980	2.780	4.030	5.030	6.120
June I	0.452	2.820	4.850	5.482	5.512
June II	0.320	1.750	3.420	4.21	5.50

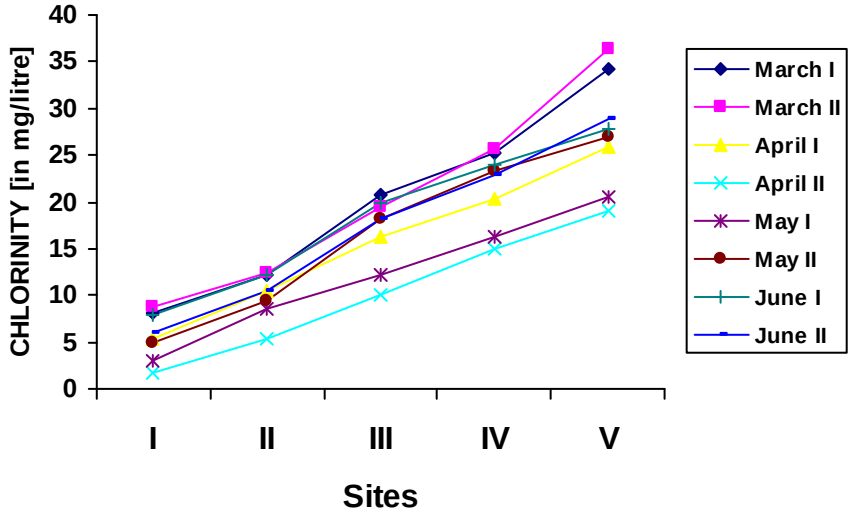


iv) Chlorinity:-

Water quality can be assessed by its chlorine content. Chlorinity was low at site I with a value of 1.772 mg/litre in April and maximum during March in site V with a value of 36.277 mg/litre . This was due to the mixing of sea water. The minimum value was due to dilution due to rainfall [5].

TABLE : 4 Chlorinity [in mg/litre]

Period	Date	Sites				
		I	II	III	IV	V
March I	04/03/2010	8.083	12.109	20.654	25.320	34.208
March II	19/03/2012	8.674	12.390	19.534	25.650	36.277
April I	02/04/2012	5.420	10.520	16.192	20.416	25.903
April II	18/04/2012	1.772	5.390	10.069	14.966	18.976
May I	01/05/2012	3.002	8.540	12.102	16.281	20.540
May II	16/05/2012	4.973	9.345	18.140	23.320	26.887
June I	03/06/2012	7.973	12.237	19.985	23.880	27.794
June II	17/06/2012	5.985	10.390	18.181	22.871	28.784

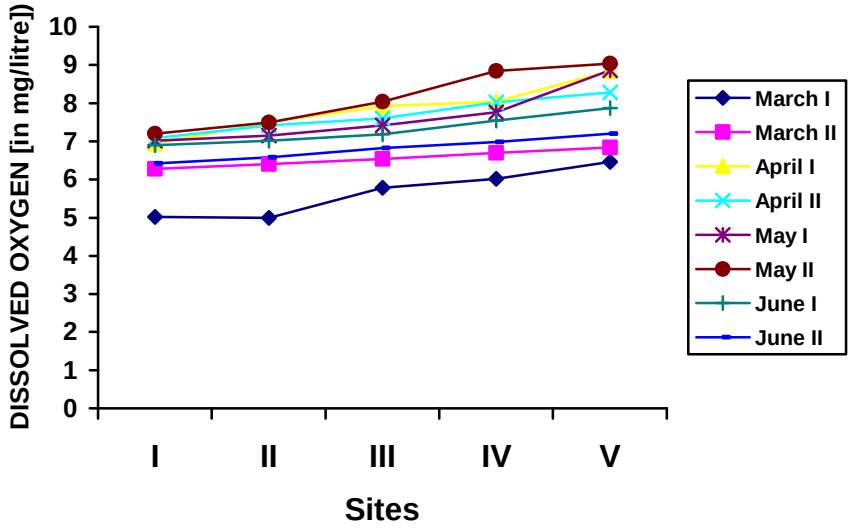


V) Dissolved Oxygen:-

Dissolved oxygen showed great fluctuations. The maximum dissolved oxygen content was 9.04 mg / litre and was recorded in site V during may. The minimum dissolved oxygen content of 5 mg / litre was recorded in site II during march. The low value of dissolved oxygen was due to the inflow of field water into the canal system and enhanced microbial activity

TABLE : 5 Dissolved oxygen [in mg/litre]

Period	Date	Sites				
		I	II	III	IV	V
March I	04/03/2010	5.02	5.0	5.78	6.02	6.46
March II	19/03/2012	6.28	6.4	6.54	6.7	6.84
April I	02/04/2012	6.94	7.50	7.92	8.04	8.84
April II	18/04/2012	7.08	7.42	7.60	8.02	8.84
May I	01/05/2012	7.02	7.15	7.42	7.76	8.86
May II	16/05/2012	7.2	7.49	8.04	8.84	9.04
June I	03/06/2012	6.9	7.02	7.18	7.54	7.87
June II	17/06/2012	6.42	6.58	6.82	6.98	7.20

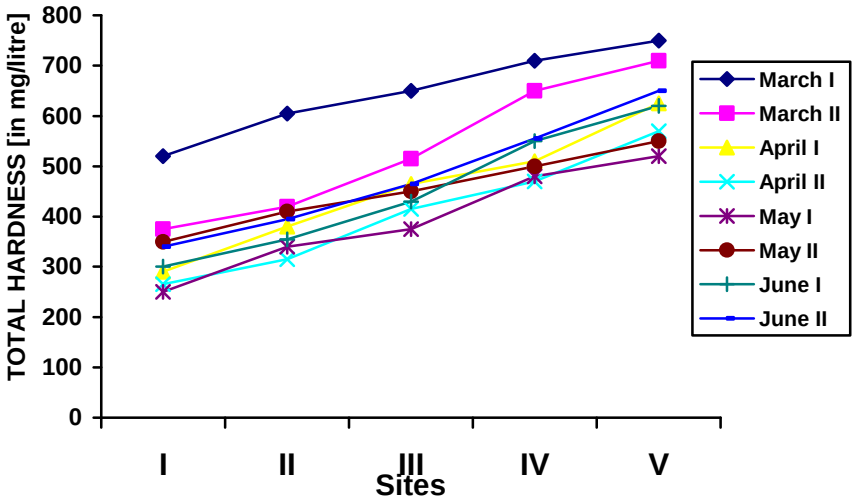


Vi) Total hardness:-

Usually total hardness of water increases as the volume decreases due to surface evaporation. Total hardness decreased during rainy season. In the present study, maximum hardness was observed in site V during march with a value of 750 mg / litre and the minimum value was recorded as 250 mg / litre in site I during may.

TABLE : 6 Total hardness [in mg/litre]

Period	Sites				
	I	II	III	IV	V
March I	520	605	650	710	750
March II	375	420	515	650	710
April I	290	380	465	510	625
April II	265	315	415	470	570
May I	250	340	375	480	520
May II	350	410	450	500	550
June I	300	355	430	550	620
June II	340	395	465	555	650

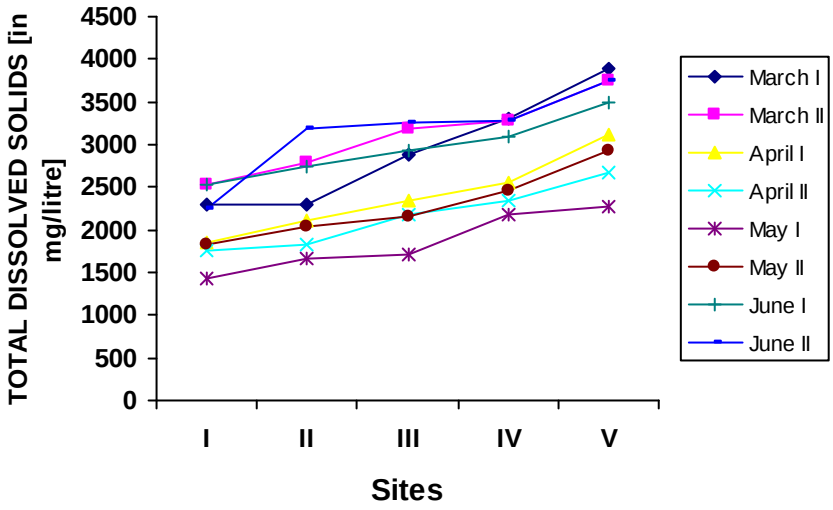


vii) Total Dissolved solids:-

TDS in water originates from natural sources, sewage, urban run – off, industrial waste water and chemicals used in the water treatment process. In the present study, maximum TDS was recorded in site V with a value of 3880 mg / litre and a minimum of 1430 mg / litre in site I during may

TABLE : 7 Total dissolved solids [in mg/litre]

Period	Sites				
	I	II	III	IV	V
March I	2290	2300	2880	3310	3880
March II	2520	2780	3180	3280	3760
April I	1850	2010	2340	2550	3120
April II	1750	1830	2170	2350	2670
May I	1430	1660	1700	2180	2270
May II	1830	2030	2150	2450	2930
June I	2530	2750	2930	3100	3500
June II	2250	3180	3250	3280	3760



CONCLUSION

The analysis of physico chemical parameters of the water of AVM canal reveals that the chlorinity, total hardness and total dissolved solids in site IV and V are very high. We cannot use water from sites IV and V for drinking and agricultural purposes. But water from sites I, II, and III can be used for drinking purpose after proper purification and can also be used for agricultural purposes.

Acknowledgement
The Authors are thankful to the principal and management of south Travancore Hindu college.

REFERENCES

[1] APHA, AWWA, WEF, standard Methods for the Examination of water and waste water, 20th Edn (**1998**).
[2] S.R.Verma, P.Sharma, A.Tyagi, S. Rani, A.K.Gupta and R.C.Dalela, Limnologica (Berlin), 15, 69 (**1984**).
[3] Suruchi Gupta, Mridula Bhatnagar and Rashmi Jain, *Asian J.Chem* 15, 727 (**2003**).
[4] Umayoru Bhagan. G.M.Ignatius Albert and C.Issac Sobana Raj, *Asian J.Chem Review*, 6, 7-12, **1995**.
[5] M.S Rajendra Nair, *J.Ecobiol* 12(1), 21 – 27, **2000**.