" ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षणप्रसार "

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Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's

DATTAJIRAO KADAM ARTS, SCIENCE & COMMERCE COLLEGE, ICHALKARANJI

Minor Research Project

On

"Studies on Panchaganga river pollution near Ichalkaranji area M.S.India."

Submitted By,

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Submitted to,

University Grants Commission

New Delhi India

"Studies on Panchaganga river pollution near ichalkaranji area M.S.India."

Introduction

The natural water bodies, both lotic and lentic are most important sources of water for sustainable life. These resources need special attention for conservation, development and management for optimal and sustainable utilization. The study of river ecology has gained immense importance because of multiple use of river water. Gross water pollution is clearly an immense hazard to aquatic environment the macro and micro communities in a natural water body play an important role in keeping the water clean and acceptable for various purpose. The life of an aquatic organism depends directly in physical and chemical character of aquatic environment. The change in physico-chemical composition of water may lead to drastic in the community of aquatic biota same of which may exploit the increased nutrients while others may diminish Such change in structure and Function of biota form the basic of water quality assessment. Assessment of pollution using both physico-chemical and biological method are more reliable than chemical or biological method alone. A good amount work has been carried out by many Indian Scientist on the ecology of the various rivers including polluted rivers. The prominent works are Venkateshwara (1969),Prasad and Saxena (1980),Gunale and Balkrishna(1981) Nandan and Patel (1985), Sengar and Sharma (1987), Trivedy (1988) and Kargupta and Siddhijul (1995) Biometry of pollution involves analysis of physico-chemical biological and microbiological parameters which reflect on biotic and abiotic status of the ecosystem. This in turn helps in utilizing the resource in the right manner. Check the pollution and conservation of scarce resource with this objective in view "the research project entitled" studies on Panchganga river pollution near Ichalkaranji area M.S. India has been undertaken.

Origin of the research problem

As we know that Panchaganga river is the tributaries of the Krishna river along with Koyana river which originates at Mahableshwar and Prayag Chikali respectively.The Panchaganga river joins Krishna river kurundwad of kolhapur district, here on the bank of Panchaganga there is a Datta temple at

Narsinhawadi. Thus on the bank of Panchaganga river various big and small cities has developed are located and among them is Kolhapur and Ichalkaranji city. And as we know that if any city has to develop the main resource is water and Ichalkaranji is called as Manchester of India. Large number of Textile Industries are established which produces huge amount industrial waste which is dumped into the Panchaganga river causing water pollution. In addition to this sugar industry and hospitals are is also present which produces large amount waste and its residues are transferred to the river which ultimately effects the biotic and a biotic factors of water and which in turn finally effects the human animals and plant life.

Interdisciplinary relevance

1) It has social relevance causing health damage, spreading endemic diseases like cholera, jaundice, typhoid   polio myelitis and other water born diseases.

2) It also effect the aquatic biota.

3) Long term effects on the common people are also seen.

4) Deterioration in agricultural soil quality due to Irrigation by polluted water is observed.

5) Accumulation of toxic substance in aquatic ecosystem and ultimately in humans.

6) Adverse effect on availability of safe clean water.

7) Loss of aquatic production like fishes prawns etc.

8) Long term psychological and social impact.

Review of research and developement in Subject

a)   International Status :

Earth's water resources are limited and erratic supply and pollution further restripes the availability of water for diverse human uses like drinking water cooking cleaning recreation aquaculture and industry. 70% if India's water resource are declared to be polluted (Agarwal et.al(1982) Millions of people either die or get de capacitated directly or indirectly due to water pollution , besides loss of man hours and aqua culture potential. Most of the rivers in the world more prominently in India are Full OF polluted water, almost every kind of stagnant water body is slowly becoming polluted and thousand of resources and reservoirs all over the world have either become extinct or are facing slow death and are getting extinct. Hence water pollution is one of the most investigation subject in past one hundred years with millions of scientist all over the world monitoring, controlling or carrying out research on water pollution.

b) National Status :-

Water covers about 70% of the earth surface but only 2.7% of total water is fresh water of which 1% is ice and the remaining free water is in the form of river , lakes atmosphere and biological water. If has been estimated that only 0.00192% of total water on the earth is available for human consumption (Trivedi 1998). India has rich fresh water resources in the form of reservoirs lakes and rivulets from all the resources in the India. The total available fresh water is estimated to be 1900 billion cubic meters per year. On the major rivers in India various big cities are located, because water is the main resource for the development and progress of that place. Cities like Kolhapur, Ichalkaranji are situated on the bank of Panchganga river that is why it is necessary to study the quality and quantity of the river which will help us to understand the status of water to avoid pollution and maintain the water quality according to WHO standards.

c) <u>**Significance of study :-**</u>

Since the Panchganga river is a major source potable and agriculture water for Ichalkaranji and adjacent villages the pollution level of rivers needs to be accessed. The Itchalkaranji city is known for its textile industries the major effluents from these industries are ultimate released in river .Sugar industries wastes are also dumped ,domestic sewage and agriculture wastes are also contributing lot in the pollution affect not only health but lives of people .Thus the present investigation is undertaken to access the pollution status of Panchganga river.

iii) <u>**Objectives :**</u>

1) To determine physical chemical and biological characteristics of water.

2) Evaluate the quality of surface water during different seasons of the year.

3) Detection in chemical and biological aspects.

4) Identification in chemical and biological aspects.

5) Establishing pattern in variation of water quality in any.

6) Reorganization microbial pollution if any.

7) Establishing pattern if any in over all conservation of water.

<u>**Methodology:**</u>

River water sample are to be collected from four different sites considering pollution sources A, B, C and D sites are to be selected. Water is to be collected directly in two liter capacity plastic container by gently wading the container in the upper layer of the water. The analysis of water temp.PH, dissolved O_2 all to be made at site as they are liable to change during transport. For the analysis of other parameter like electric conductivity transparency turbidity, alkalinity, chlorides, sulphates, hardness, BOD, COD etc. Samples are to be brought to laboratory and stored in refrigerator till the completion of analysis.

The analysis is to be completed in 72 hrs after collection on 300ml capacity B.O.D bottles is to be analyzed on the site. Analysis of all the parameters are to be analyzed in APHA (1989) Trivedi and Goel (1984) and Kodarkar (1992). Biological monitoring of water including plankton analysis. The two hundred liters water samples are to be filtered through the net numbers 25 bolting silk. The samples are to collected and concentrated to a 50ml volume and preserved it to 4% formalin. Each replicate of phyto and zooplankton samples are to be identified under research microscope using suitable keys, standard texts and monographs given by Pennak (1978), APHA(1985) Battice etc .

Year wise plan of work and target to be achieve :-

A)   First Year:

        1)   To locate important sources of pollution.

        2)   Monthly analysis of water quality pertaining to physico-chemical analysis

        3)   Monthly analysis of zoo and phytoplankton's.

B)   Second year:

        1)   Seasonal analysis of river water.

        2)   Effect of water quality on biota.

        3)   To find out control measures of pollution in river.

Details of collaboration if any:

        "Nikhil Analytical Laboratory M.S.India, Sangli.

OBSERVATION

Table No.1

Title : Monthly variation of air temperature at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	25.1	25.2	25.0	25.1	L/ S
2	May 13	28.2	28.1	28.2	28.2	26.6
3	June 13	25.8	26.3	25.4	25.8	25.2
4	July 13	25.1	25.4	25.3	25.2	
5	Aug13	24.2	24.3	24.6	24.3	
6	Sept 13	24.1	24.6	24.6	24.6	
7	Oct 13	23.8	23.6	23.8	23.8	22.5
8	Nov 13	23.1	23.0	23.1	23.1	
9	Dec 13	21.1	21.2	21.5	21.3	
10	Jan 14	22.0	22.1	22.1	22.1	
11	Feb 14	23.1	23.2	23.1	23.1	E/S
12	Mar 14	24.1	24.1	24.3	24.1	23.6

Note : L/S-Late Summer, E/S-Early Summer

Table No.2

Title : Monthly variation of air temperature at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	27.2	27.1	27.0	27.1	L/ S
2	May 14	26.4	26.3	26.4	26.4	26.7
3	June 14	25.9	26.4	25.8	25.7	25.0
4	July 14	25.4	25.8	25.5	25.6	
5	Aug14	24.5	24.5	24.8	24.5	
6	Sept 14	24.4	24.9	24.4	24.4	
7	Oct 14	24.0	24.1	24.1	24.1	22.8
8	Nov 14	23.4	23.1	23.2	23.3	
9	Dec 14	21.4	21.6	21.8	21.6	
10	Jan 15	22.1	22.2	22.3	22.2	
11	Feb 15	23.3	23.5	23.4	23.4	E/S
12	Mar 15	24.4	24.3	24.4	24.4	23.9

Note : L/S-Late Summer, E/S-Early Summer

Table No.3

Title : Monthly variation in water temperature at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	24.1	24.8	24.5	24.4	L/ S
2	May 13	25.8	25.8	25.7	25.8	25.1
3	June 13	23.8	23.7	23.8	23.8	
4	July 13	24.4	24.3	24.4	24.4	23.7
5	Aug13	23.5	23.4	23.5	23.5	
6	Sept 13	23.4	23.2	23.5	23.3	
7	Oct 13	23.1	23.1	23.2	23.1	
8	Nov 13	22.6	22.5	22.4	22.5	22.4
9	Dec 13	21.8	21.8	21.6	21.8	
10	Jan 14	22.1	22.2	22.3	22.2	
11	Feb 14	23.1	23.1	23.3	23.1	E/S
12	Mar 14	23.4	23.6	23.7	23.5	23.6

Note : L/S-Late Summer, E/S-Early Summer

Table No.4

Title : Monthly variation in water temperature at three different sites of Panchganga river from April 2014 to March 2015.

Sr. No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	24.4	24.9	24.7	24.6	L/ S
2	May 14	25.8	25.9	25.8	25.8	25.2
3	June 14	24.1	24.1	24.2	24.1	
4	July 14	24.8	24.6	24.6	24.6	24.0
5	Aug14	24.6	23.8	23.8	23.8	
6	Sept 14	23.8	23.7	23.8	23.8	
7	Oct 14	23.6	23.5	23.4	23.5	
8	Nov 14	22.8	22.7	22.6	22.7	22.7
9	Dec 14	22.0	22.0	22.1	22.0	
10	Jan 15	22.4	22.6	22.6	22.6	
11	Feb 15	23.6	23.5	23.4	23.5	E/S
12	Mar 15	23.7	23.8	23.8	23.8	23.6

Note : L/S-Late Summer, E/S-Early Summer

Table No.5

Title : Monthly variation in pH of water at three different sites of Panchganga river from

April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	7.8	7.7	7.8	7.8	L/ S
2	May 13	7.9	7.7	7.8	7.7	7.7
3	June 13	7.7	7.6	7.7	7.7	
4	July 13	7.6	7.5	7.6	7.6	7.6
5	Aug13	7.6	7.6	7.6	7.6	
6	Sept 13	7.8	7.7	7.7	7.7	
7	Oct 13	7.7	7.8	7.6	7.7	
8	Nov 13	7.7	7.6	7.5	7.6	7.6
9	Dec 13	7.7	7.6	7.5	7.6	
10	Jan 14	7.6	7.4	7.5	7.5	
11	Feb 14	7.7	7.5	7.5	7.5	E/S
12	Mar 14	7.7	7.7	7.5	7.7	7.6

Note : L/S-Late Summer, E/S-Early Summer

Table No.6

Title : Monthly variation in pH of water at three different sites of Panchganga river from April 2014 to March 2015.

Sr. No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	7.8	7.7	7.7	7.7	L/ S
2	May 14	7.8	7.7	7.8	7.8	7.7
3	June 14	7.7	7.6	7.7	7.7	
4	July 14	7.6	7.6	7.5	7.6	7.7
5	Aug14	7.7	7.6	7.8	7.7	
6	Sept 14	7.8	7.8	7.6	7.8	
7	Oct 14	7.7	7.7	7.6	7.7	
8	Nov 14	7.7	7.7	7.5	7.7	7.6
9	Dec 14	7.6	7.6	7.5	7.6	
10	Jan 15	7.6	7.4	7.6	7.6	
11	Feb 15	7.7	7.5	7.6	7.6	E/S
12	Mar 15	7.7	7.7	7.4	7.7	7.6

Note : L/S-Late Summer, E/S-Early Summer

Table No.7

Title : Monthly variation in Alkalinity in mg/lit of water at three different sites of Panchganga river from   April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	162	164	160	162.0	L/ S
2	May 13	168	170	166	168.0	165
3	June 13	139	143	136	139.3	
4	July 13	140	152	142	144.6	144
5	Aug13	142	154	150	148.6	
6	Sept 13	140	144	148	144.0	
7	Oct 13	137	140	144	140.3	
8	Nov 13	139	137	135	137.0	139
9	Dec 13	137	135	133	135.0	
10	Jan 14	146	145	148	146.3	
11	Feb 14	150	148	151	149.6	E/S
12	Mar 14	158	154	156	156.0	152

Note : L/S-Late Summer, E/S-Early Summer

Table No.8

Title : Monthly variation   in Alkalinity in mg/lit of water at three different sites of Panchganga river from April 2014 to March 2015.

Sr. No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	152	156	158	155.3	L/ S
2	May 14	146	150	152	149.3	152
3	June 14	140	144	138	140.6	
4	July 14	142	154	147	147.6	146
5	Aug14	144	156	152	150.6	
6	Sept 14	142	146	150	146.0	
7	Oct 14	138	142	146	142.0	
8	Nov 14	142	140	138	140.0	138
9	Dec 14	138	141	137	138.6	
10	Jan 15	136	135	134	135.0	
11	Feb 15	135	139	138	137.3	E/S
12	Mar 15	142	146	144	144.0	140

Note : L/S-Late Summer, E/S-Early Summer

Table No.9

Title : Monthly variation in Conductivity in µmho/cm of water at three different sites of Panchganga river from   April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	1775	1780	1776	1777	L/ S
2	May 13	1810	1818	1820	1816	1796
3	June 13	1780	1764	1750	1764	
4	July 13	1700	1700	1650	1683	1690
5	Aug13	1640	1646	1642	1642	
6	Sept 13	1672	1669	1674	1671	
7	Oct 13	1672	1670	1674	1672	
8	Nov 13	1678	1674	1674	1675	1682
9	Dec 13	1672	1670	1673	1671	
10	Jan 14	1710	1712	1714	1712	
11	Feb 14	1715	1714	1716	1715	E/S
12	Mar 14	1725	1724	1726	1725	1720

Note : L/S-Late Summer, E/S-Early Summer

Table No.10

Title : Monthly variation   in Conductivity in µmho/cm of water at three different sites of Panchganga river from April 2014 to March 2015.

Sr. No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	2010	2016	2020	2016	L/ S
2	May 14	2015	2020	2025	2020	2018
3	June 14	1778	1768	1754	1766	
4	July 14	1760	1710	1658	1709	1700
5	Aug14	1648	1650	1650	1649	
6	Sept 14	1678	1672	1680	1676	
7	Oct 14	1676	1674	1677	1675	
8	Nov 14	1680	1678	1676	1678	1731
9	Dec 14	1674	1672	1676	1674	
10	Jan 15	1898	1896	1897	1897	
11	Feb 15	2260	1990	2160	2136	E/S
12	Mar 15	1994	2020	2010	2008	2072

Note : L/S-Late Summer, E/S-Early Summer

Table No.9

Title : Monthly variation in Conductivity in µmho/cm of water at three different sites of Panchganga river from   April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	1580	1574	1580	1580	L/ S 1581
2	May 13	1584	1580	1582	1582	
3	June 13	1018	1020	1014	1017	1129
4	July 13	1185	1182	1150	1170	
5	Aug13	1170	1172	1144	1162	
6	Sept 13	1174	1180	1152	1168	
7	Oct 13	1250	1256	1260	1255	1286
8	Nov 13	1278	1280	1284	1280	
9	Dec 13	1268	1270	1274	1270	
10	Jan 14	1468	1470	1472	1470	
11	Feb 14	1498	1497	1500	1498	E/S 1538
12	Mar 14	1578	1580	1576	1578	

Note : L/S-Late Summer, E/S-Early Summer

Table No.10

Title : Monthly variation   in Conductivity in µmho/cm of water at three different sites of Panchganga river from April 2014 to March 2015.

Sr. No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	1582	1578	1584		L/ S 2018
2	May 14	1592	1586	1590		
3	June 14	1020	1024	1020		1700
4	July 14	1188	1186	1160		
5	Aug14	1180	1178	1150		
6	Sept 14	1178	1186	1158		
7	Oct 14	1254	1260	1264		1731
8	Nov 14	1280	1286	1288		
9	Dec 14	1278	1284	1286		
10	Jan 15	1566	1560	1568		
11	Feb 15	1576	1578	1575		E/S 2072
12	Mar 15	1580	1582	1580		

Note : L/S-Late Summer, E/S-Early Summer

Table No.11

Title : Monthly variation in Total Dissolved Solids at different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	1580	1574	1580	1578	L/ S 1580
2	May 13	1584	1580	1582	1582	
3	June 13	1018	1020	1014	1018	1130
4	July 13	1185	1182	1150	1172	
5	Aug13	1170	1172	1144	1162	
6	Sept 13	1174	1180	1152	1168	
7	Oct 13	1250	1256	1260	1255	1758
8	Nov 13	1278	1280	1284	1280	
9	Dec 13	1268	1270	1274	1270	
10	Jan 14	1468	1470	1472	1470	
11	Feb 14	1498	1497	1500	1498	E/S 1538
12	Mar 14	1578	1580	1576	1578	

Note : L/S-Late Summer, E/S-Early Summer

Table No.12

Title : Monthly variation of air temperature at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	1582	1578	1584	1581	L/ S 1585
2	May 14	1592	1586	1590	1589	
3	June 14	1020	1024	1020	1020	1135
4	July 14	1188	1186	1160	1178	
5	Aug14	1180	1178	1150	1169	
6	Sept 14	1178	1186	1158	1174	
7	Oct 14	1254	1260	1264	1259	1347
8	Nov 14	1280	1286	1288	1284	
9	Dec 14	1278	1284	1286	1282	
10	Jan 15	1566	1560	1568	1564	
11	Feb 15	1576	1578	1575	1576	E/S 1578
12	Mar 15	1580	1582	1580	1580	

Note : L/S-Late Summer, E/S-Early Summer

Table No.13

Title : Monthly variation in Turbidity in NTU at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	18.0	16.0	17.0	17	L/ S
2	May 13	20.0	18.0	22.0	20	18
3	June 13	40.0	42.0	38.0	40	
4	July 13	48.0	42.0	38.0	42	36
5	Aug13	36.0	38.0	47.0	40	
6	Sept 13	26.0	20.0	21.0	22	
7	Oct 13	20.0	20.0	18.0	20	
8	Nov 13	18.0	19.0	20.0	19	19
9	Dec 13	19.0	18.0	21.0	19	
10	Jan 14	21.0	20.0	19.0	20	
11	Feb 14	24.0	23.0	22.0	23	E/S
12	Mar 14	20.0	18.0	19.0	19	21

Note : L/S-Late Summer, E/S-Early Summer

Table No.14

Title : Monthly variation in Turbidity at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	40.0	38.0	42.0	40	L/ S
2	May 14	42.0	40.0	44.0	42	41
3	June 14	42.0	44.0	40.0	42	
4	July 14	50.0	45.0	42.0	45	38
5	Aug14	38.0	40.0	50.0	42	
6	Sept 14	28.0	22.0	24.0	24	
7	Oct 14	21.0	22.0	20.0	21	
8	Nov 14	19.0	20.0	21.0	20	23
9	Dec 14	21.0	20.0	24.0	21	
10	Jan 15	30.0	32.0	35.0	32	
11	Feb 15	42.0	40.0	41.0	41	E/S
12	Mar 15	38.0	36.0	38.0	38	
						39`

Note : L/S-Late Summer, E/S-Early Summer

Table No.15

Title : Monthly variation in Hardness   in mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	650	654	656	653	L/ S
2	May 13	698	682	702	694	673
3	June 13	642	650	646	646	
4	July 13	696	664	664	664	61
5	Aug13	680	678	682	680	
6	Sept 13	680	678	682	680	
7	Oct 13	680	678	679	679	
8	Nov 13	672	670	671	671	668
9	Dec 13	668	662	664	664	
10	Jan 14	662	660	661	661	
11	Feb 14	668	665	664	665	E/S
12	Mar 14	665	662	664	663	664

Note : L/S-Late Summer, E/S-Early Summer

Table No.16

Title : Monthly variation in Hardness in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	658	660	656	658	L/ S
2	May 14	699	684	704	695	676
3	June 14	644	654	648	648	
4	July 14	697	666	646	670	82
5	Aug14	648	652	654	661	
6	Sept 14	682	680	684	682	
7	Oct 14	684	682	683	683	
8	Nov 14	676	674	675	675	672
9	Dec 14	670	668	665	667	
10	Jan 15	668	665	664	665	
11	Feb 15	664	662	666	664	E/S
12	Mar 15	660	658	662	660	662

Note : L/S-Late Summer, E/S-Early Summer

Table No.17

Title : Monthly variation in Chlorides mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	126	128	124	126	L/ S
2	May 13	128	130	126	128	127
3	June 13	286	282	284	284	
4	July 13	272	262	265	266	273
5	Aug13	265	262	265	265	
6	Sept 13	276	280	282	279	
7	Oct 13	278	276	280	278	
8	Nov 13	280	278	282	280	214
9	Dec 13	278	280	282	280	
10	Jan 14	130	128	126	128	
11	Feb 14	128	130	125	127	E/S
12	Mar 14	230	231	128	226	176

Note : L/S-Late Summer, E/S-Early Summer

Table No.18

Title : Monthly variation in Chlorides in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	128	130	136	131	L/ S
2	May 14	130	132	128	130	130
3	June 14	288	284	286	286	
4	July 14	276	264	268	269	276
5	Aug14	268	266	268	268	
6	Sept 14	278	282	284	281	
7	Oct 14	280	282	284	282	
8	Nov 14	284	286	288	286	245
9	Dec 14	282	283	286	283	
10	Jan 15	132	130	128	130	
11	Feb 15	130	132	128	130	E/S
12	Mar 15	132	134	130	132	
						131

Note : L/S-Late Summer, E/S-Early Summer

Table No.19

Title : Monthly variation in Sulphates mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	128	126	127	127	L/ S
2	May 13	118	120	116	118	122
3	June 13	120	126	128	124	
4	July 13	120	122	108	116	116
5	Aug13	105	100	102	102	
6	Sept 13	127	124	120	123	
7	Oct 13	130	132	134	132	
8	Nov 13	132	135	136	136	129
9	Dec 13	140	142	144	142	
10	Jan 14	105	108	110	107	
11	Feb 14	110	112	114	112	E/S
12	Mar 14	124	122	124	124	118

Note : L/S-Late Summer, E/S-Early Summer

Table No.20

Title : Monthly variation in Sulphates in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	130	128	130	130	L/ S
2	May 14	120	122	120	120	125
3	June 14	122	128	130	126	
4	July 14	124	126	110	120	120
5	Aug14	110	110	108	110	
6	Sept 14	130	128	122	126	
7	Oct 14	134	137	139	136	
8	Nov 14	139	140	142	140	134
9	Dec 14	144	148	147	146	
10	Jan 15	110	116	118	114	
11	Feb 15	118	120	122	120	E/S
12	Mar 15	126	128	126	126	
						73

Note : L/S-Late Summer, E/S-Early Summer

Table No.21

Title : Monthly variation in Biological Oxygen Demand in mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	10.4	10.6	10.2	10.4	L/ S
2	May 13	10.2	8.2	7.1	8.5	9.4
3	June 13	4.1	2.2	1.4	2.5	
4	July 13	2.1	4.2	2.4	2.9	2.2
5	Aug13	2.1	2.2	4.2	2.8	
6	Sept 13	0.9	0.8	0.9	0.9	
7	Oct 13	0.1	0.1	0.2	0.1	
8	Nov 13	0.1	0.2	0.1	0.1	0.1
9	Dec 13	0.1	0.2	0.1	0.1	
10	Jan 14	11.2	11.6	11.8	11.5	
11	Feb 14	12.8	12.6	12.5	12.6	E/S
12	Mar 14	11.6	10.8	11.4	11.6	12.1

Note : L/S-Late Summer, E/S-Early Summer

Table No.22

Title : Monthly variation in Biological Oxygen Demand in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	13.8	14.1	15.2	14.2	L/ S
2	May 14	11.6	12.0	12.2	11.9	13
3	June 14	4.2	2.4	1.8	2.8	
4	July 14	2.4	4.6	2.6	3.2	2.5
5	Aug14	2.6	2.4	4.4	3.1	
6	Sept 14	0.9	1.2	0.9	0.9	
7	Oct 14	0.1	0.1	0.1	0.1	
8	Nov 14	0.1	0.2	0.2	0.2	0.5
9	Dec 14	0.2	0.2	0.2	0.2	
10	Jan 15	1.8	1.9	1.8	1.8	
11	Feb 15	18.0	16.0	20.0	14.6	E/S
12	Mar 15	14.2	13.2	16.1	14.5	
						14.5

Note : L/S-Late Summer, E/S-Early Summer

Table No.23

Title : Monthly variation in Chemical Oxygen Demand in mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	30.2	36.2	34.2	33.5	L/ S
2	May 13	30.2	35.2	28.2	31.2	32.3
3	June 13	20.0	18.0	28.0	22.0	
4	July 13	24.0	36.0	12.0	24.0	18.2
5	Aug13	15.0	9.0	22.0	15.3	
6	Sept 13	12.0	7.0	16.0	11.6	
7	Oct 13	12.0	6.0	12.0	10.0	
8	Nov 13	15.0	14.0	16.0	15.0	18.8
9	Dec 13	18.2	16.0	15.2	16.4	
10	Jan 14	34.2	32.2	35.2	33.8	
11	Feb 14	37.4	39.2	34.6	37.0	E/S
12	Mar 14	34.2	38.2	32.4	34.9	35.9

Note : L/S-Late Summer, E/S-Early Summer

Table No.24

Title : Monthly variation in Chemical Oxygen Demand in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	42.0	40.0	42.4	41.4	L/ S
2	May 14	38.0	36.0	35.0	36.3	38.8
3	June 14	22.0	20.0	29.0	23.6	
4	July 14	28.0	38.0	14.0	26.6	20.7
5	Aug14	18.0	20.0	24.0	18.0	
6	Sept 14	16.0	10.0	18.0	14.6	
7	Oct 14	14.0	8.0	16.0	12.6	
8	Nov 14	16.2	18.2	18.4	17.6	21.1
9	Dec 14	20.2	16.2	18.2	18.0	
10	Jan 15	36.2	34.2	38.2	36.2	
11	Feb 15	39.2	40.2	41.6	40.3	E/S
12	Mar 15	38.4	40.1	42.2	40.2	40.2

Note : L/S-Late Summer, E/S-Early Summer

Table No.25

Title : Monthly variation in Dissolved Oxygen in mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	6.8	6.6	6.4	6.6	L/ S
2	May 13	7.2	7.4	7.6	7.4	7.0
3	June 13	7.2	7.4	6.8	7.1	
4	July 13	5.7	5.1	6.2	5.6	5.4
5	Aug13	5.7	5.4	6.4	5.8	
6	Sept 13	4.2	3.9	4.7	4.2	
7	Oct 13	3.9	3.2	3.7	3.6	
8	Nov 13	4.2	4.2	4.5	4.2	4.7
9	Dec 13	5.0	4.6	4.8	4.8	
10	Jan 14	6.2	6.4	6.1	6.2	
11	Feb 14	6.8	6.6	6.7	6.7	E/S
12	Mar 14	6.9	6.5	6.6	6.6	6.6

Note : L/S-Late Summer, E/S-Early Summer

Table No.26

Title : Monthly variation in Dissolved Oxygen in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	7.2	7.4	7.6	7.4	L/ S
2	May 14	7.4	7.8	7.9	7.7	7.5
3	June 14	7.4	7.6	7.7	7.5	
4	July 14	5.8	5.4	6.4	5.8	5.9
5	Aug14	6.0	5.6	6.6	6.0	
6	Sept 14	4.4	4.1	4.9	4.4	
7	Oct 14	4.0	3.4	3.9	3.9	
8	Nov 14	4.8	4.6	4.7	4.7	4.9
9	Dec 14	5.1	4.8	5.0	4.9	
10	Jan 15	6.4	6.5	6.3	6.4	
11	Feb 15	6.9	6.8	6.8	6.8	E/S
12	Mar 15	7.1	7.2	6.8	7.0	
						6.9

Note : L/S-Late Summer, E/S-Early Summer

Table No.27

Title : Monthly variation in Dissolved Carbon Dioxide in mg/lit at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	0.2	0.2	0.2	0.2	L/ S
2	May 13	0.2	0.2	0.2	0.2	0.2
3	June 13	0.2	0.2	0.2	0.2	
4	July 13	0.2	0.2	0.2	0.2	0.2
5	Aug13	0.2	0.2	0.2	0.2	
6	Sept 13	0.1	0.1	0.1	0.1	
7	Oct 13	0.3	0.3	0.4	0.3	
8	Nov 13	0.3	0.3	0.4	0.3	0.3
9	Dec 13	0.4	0.4	0.4	0.4	
10	Jan 14	0.2	0.2	0.2	0.2	
11	Feb 14	0.2	0.2	0.2	0.2	E/S
12	Mar 14	0.2	0.2	0.2	0.2	0.2

Note : L/S-Late Summer, E/S-Early Summer

Table No.28

Title : Monthly variation in Dissolved Carbon Dioxide .in mg/lit at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	0.1	0.1	0.1	0.1	L/ S
2	May 14	0.1	0.1	0.1	0.1	0.1
3	June 14	0.3	0.2	0.2	0.2	
4	July 14	0.2	0.2	0.2	0.2	0.2
5	Aug14	0.2	0.2	0.2	0.2	
6	Sept 14	0.1	0.1	0.2	0.1	
7	Oct 14	0.2	0.3	0.3	0.3	
8	Nov 14	0.3	0.3	0.4	0.3	0.3
9	Dec 14	0.4	0.4	0.4	0.4	
10	Jan 15	0.3	0.3	0.4	0.3	
11	Feb 15	0.1	0.1	0.1	0.1	E/S
12	Mar 15	0.1	0.1	0.1	0.1	0.1

Note : L/S-Late Summer, E/S-Early Summer

Table No.29

Title : Monthly variation in M.P.N /100ml at three different sites of Panchganga river from April 2013 to March 2014.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 13	52	46	40	49	L/ S
2	May 13	56	48	42	48	48
3	June 13	54	58	49	53	42
4	July 13	65	24	32	41	
5	Aug13	35	44	64	47	
6	Sept 13	28	26	27	27	
7	Oct 13	16	18	20	18	20
8	Nov 13	14	14	15	14	
9	Dec 13	18	20	22	20	
10	Jan 14	29	27	28	28	
11	Feb 14	30	32	28	30	E/S
12	Mar 14	54	46	48	56	43

Note : L/S-Late Summer, E/S-Early Summer

Table No.30

Title : Monthly variation in M.P.N /100ml at three different sites of Panchganga river from April 2014 to March 2015.

Sr.No.	Month	Site A	Site B	Site C	Average	Seasonal Average
1	Apr 14	60	58	54	57	L/ S
2	May 14	62	58	66	62	59
3	June 14	58	62	62	62	46
4	July 14	68	26	38	44	
5	Aug14	38	46	66	50	
6	Sept 14	24	28	28	28	
7	Oct 14	18	20	22	21	23
8	Nov 14	16	15	17	16	
9	Dec 14	20	24	26	23	
10	Jan 15	30	32	34	32	
11	Feb 15	50	48	54	50	E/S
12	Mar 15	64	54	58	58	54

Note : L/S-Late Summer, E/S-Early Summer

SUMMARY AND CONCLUSION

The present research work entitled ''Hydrobiological studies on Panchaganga river near Ichalkaranji M.S. India'' embodies the biotic and a biotic factors of panchaganga river near Ichalkaranji from Kolhapur District. The Physico-Chemical parameters recorded includes Atmospheric temperature, Temp. of water, pH, turbidity, conductivity, total dissolved solids, dissolved oxygen, free CO_2,Totalalkalinity,chlorides,hardness,sulphates,BOD,COD,MPN, Phyto planktons, Zooplanktons, and Macrophytes. All these Physiochemical and biological parameters have been assessed for two times in a month for 24 months. (April 2013 to March 2014 and April 2014 to March 2015.)The seasonal study of Panchaganga reveals that,

The turbidity values varied from 16 to 64 and minimum value was 16mg/lit.   and highest value was 64mg/lit.

The Electric conductivity showed wide annual variation of $1320^{o}C$ to $2260^{o}C$.The minimum value was $1320^{o}C$ and Maximum value was $2260^{o}C$.The conductivity values were high in summer this may be due to contamination of water by sewage domestic and Industrial waste.

 The Chloride varied from 124 to 384mg/lit. In the Panchaganga river the chloride were maximum in rainy and winter season which may be due to addition of considerable amount of domestic sewage. Lower values of chloride were seen in summer this may be due to their deposition in the soil In contrast the chloride values were more or less similar throughout the year except in the month of May where it showed little rise.

The total hardness ranged from 430mg/lit and 720mg/lit. Maximum hardness was found to 720mg/lit and minimum was 430mg/lit.

The Sulphate value was ranging from 60 to 148mg/lithe minimum. The highest value was 148mg/lit. and lowest was 60mg/lit. The higher values of Sulphate during summer may be due to attributed to the evaporation of water.

The BOD varied from 0.1 to 20mg/lit. The lowest value was 0.1 and highest was 20mg.lit.BOD values were higher in summer due to high rate of organic decomposition. The lower BOD values were seen in monsoon and winter may be due to decrease in Temp. which in turn retarded the microbial activity.

COD values varied from 6 to 42.6mg/lit. It was the highest value was 42.6mg/Lit. and lowest was 6mg/lit. The COD values were higher in summer and lower in winter and rainy season.

The bacterial population was studied in the form of MPN. The MPN value was less contaminated with highest population (68/100ml).

The Zooplanktons studies include Rotifers, Cladocerans, and Copepods. Rotifers was found in large number in extremely polluted water. The Panchaganga river shows high population of Zooplanktons in the month of summer.

The Panchaganga river has been highly polluted due to contamination of microbes, human wastes along with pathogens. The river is also highly polluted due to sewage, dumping of industrial wastes and other debries.

Conclusively in the present studies various abiotic and biotic characteristics of river were pointed out and there pollution status including indicators, along with micro-zootic fauna, analyzed qualitatively as well as quantatively.

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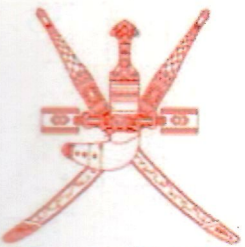
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Title""Human Impact causes for Eutrofiering Rivers of India with special reference to Panchaganga Black river near Ichalkaranji area, an attempt for Restoration" M.S.India

Kamble .S.P.* & Hujare.M.S

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's Shikshan Maharshi Dr Bapuji Salunkhe College Miraj Maharashtra State India.

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Abstract

The process by which a body of water acquires a high concentration of nutrients especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish. Eutrophication is a natural, slow-aging process for a water body, but human activity greatly speeds up the process." - Art, 1993 Water is said as a liquid of life and is essence of all living organism. Water is universal solvent as it dissolves more substance than any component of nature has played an important role in life from molecules to man, hence since the time great civilization has originated evolved and flourished around the water resources. As we know that the water covers about 72% of the earth but only 2.7% of the total water is fresh water of which 1% is Ice free water in rivers lakes atmospheres and as biological water. It has been estimated that only 0.00192% of total water on earth is available for human consumption [Trivedi 1998]. The Panchaganga River of Ichalkaranji Maharashtra State India is an Important source of water supply to agriculture and to industries and most Importantly for Human Usage. The urban and Industrial and Hospital load of the city has increased many folds due to which the wastes and pollutants are being realized directly into the river making the river unfit every purpose.This has resulted into eutrophication of the river,reduced agricultural products, salty fields,and health harzards. Physico-Chemical and Biological aspects of water pollution of Pancha ganga River was analyzed seasonally with respect to following parameters from July 2014 to May 2015. 1) Water Temp. 2) Ph. 3) Dissolved solids 4) Dissolved oxygen 5) Free carbon Di oxide 6) Acidity 7) Alkalinity 8) Chloride content 9) Nitrates 10) Phosphates 11) Biological oxygen Demands (BOD) 12) Chemical Oxygen Demand (COD), etc. The water samples for analysis were collected from three sample stations in winter, summer and monsoon located at Shiradwade, Shirdone and Abdul Lat, near Pancha ganga river in Ichalkaranji area. The paper highlights alarming the condition of this Eutrofiering river in various seasons with respects to the parameters and if no quick action is not taken for restoration of the river it will have deadly effect on not only the human habitat surrounding the river but also on the flora ,Fauna,and agricultural land,hence report is to be submitted to WHO,UNESCO-IHE, IWWA, SIDA, University grant commission of India,etc for restoration HELP.

Keywords: Indian Rivers - Human Impact - Pollution - Eutrofiering