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WATER QUALITY ANALYSIS OF "MORNA RIVER" AT AKOLA

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Abstract: The River Morna is flowing through the center of the Akola city. Approximately 44 MLD wastewater of Akola is flowing through the drainage system to the river water. Major part of the waste water is directly discharged into the river "Morna" and further many villages on the down stream side are using the river water for drinking and for irrigation purposes. Akola is growing industrial city and also the pilgrim place in Vidharbha region of Maharashtra State, spreading on an area of 54.31 Sq.km. The higher BOD, COD and other chemical and biological contents are polluting the river water and affecting quality of soil by lowering its fertility and health effect to people living on the bank of river Morna. It was intended to carry out the analysis of pollution in "River Morna" due to waste water of Akola. The five sampling points were decided for collection of Polluted water from the "River Morna" and analysis is carried out and the results are discussed in the paper

Keywords- Morna River, Akola

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INTRODUCTION

Akola is growing industrial city and also the pilgrim place in Vidarbha region of Maharashtra State, spreading on an area of 54.31 sq.km. It is situated on the bank of river "Morna" and the subtropical zone at the latitude of 22.42^0 North and longitude of 77.02^0 East, at an altitude of 282 meters above the mean sea level and the population of city is approximately 5 laces The highest temperature of the city in summer is 44.4^0C and minimum is 20.1^0C in rainy season. Water supplied to Akola city by Akola Municipal Corporation from the source "Mahan Dam". People in the city are also habitual of using ground water to meet their daily water demand. More than 54 MLD water is supplied by Akola Municipal Corporation to Akola city through supply network. Approximately 44 MLD wastewater is flowing through the drainage system. Major part of the waste water is directly discharged into the river "Morna" and further many villages on the downstream side are using the river water for drinking and for irrigation purposes. The municipal wastewaters of Akola city directly discharge into Morna River without any treatment. Now a day due to short fall in rains and change in climatic conditions the water level in the river is reduced considerably and ample water with current in the flow is not available and thereby this waste water discharge is polluting the river water. The farmers in the vicinity of river use this river water for irrigation of vegetable farming. The hazardous waste containing in the water may create ill effect in the vegetables and there by human health. The waste water contains various dissolved impurities which is responsible for the infertility of the land, it has also seen that major communicable diseases are spreading up in the environment due to the polluted water of Morna, Mosquito breeding due to rising of plants and weeds in the stream of Morna River is the common problem in Akola.

Therefore, it is necessary to analyze the wastewater qualitatively and quantitatively in order to have comprehensive evaluation of

Polluted water of "River Morna"

SAMPLE COLLECTION

Sample is obtained to meet the requirements of sampling programme and so that it does not deteriorate or become contaminated before it reaches the laboratory. Depending on analyses to be performed, the containers were filled fully (most organic analyses) and space for aeration, mixing etc. (microbiological analyses) was left of about half inch. Representative samples from the sources were obtained only by making composites of samples collected over a period of time. The details of collection vary with local conditions that no specific recommendations

would be universally applicable. Sometimes it is more informative to analyses numerous separates sample instead of one composite.

Various sampling points were decided according to the procedure of "STANDARD METHOD".

The sampling point of all five drainage systems meeting to the river Morna were equally distributed with special attention to different disposal points. The representative samples were collected from the different five major drainage point locations, the samples were collected at regular interval of seven days each, once the sample was collected it was transported to the laboratory within half an hour. About 1 lit - 5 lit of the sample was collected in the plastic bottles and then transported to the laboratory for the analysis; the samples were then preserved at a constant temp in the incubator for maintaining the ideal conditions for the COD and BOD Test and the other microbial activities. The analysis was carried out in Environment Engg. Lab of civil dept. at COET Akola. The various tests (physical, chemical and biological) were performed on water samples to know its various characteristics, are as shown in the Table no. 1

TABLE NO. 1

SR. NO.	Sampling Location	Luxury Bus Stand	Harihar Peth	Behind fort Asadgadh	Ganesh Ghat	Gulzarpura
		1	2	3	4	5
	Description	Value	Value	Value	Value	Value
Physical parameters						
1	Temp at site (^{0}C)	26.5	27	28	30	26
2	Tempe at lab (^{0}C)	27	28	29	31	27
3	Colour and odor	Muddy, odorless	Pale yellow, odorless	Pale black, Bad odor	More black, bad odor	black, bad odor
I.	Chemical parameters	II.	III.	IV.	V.	VI.
4	Turbidity (NTU)	33.6	34.6	38.8	53.7	53.7
5	pH	7.4	6.8	6.4	5.1	5.0
6	Conductivity	2.5	2.7	2.7	2.8	2.8
7	Total solids (mg/l)	1490	1700	2010	3020	3520
8	Dissolved solids (mg/l)	980	990	1100	1500	2000
9	Suspended solids mg/l	500	700	900	1500	1500
10	Volatile solids (mg/l)	10	10	10	20	20
11	Total hardness (mg/l)	230	232	250	255	256
12	Chloride content (mg/l)	123	125	136	159	270
13	Sulphate contents (mg/l)	231	255	259	271	298
14	Nitrites as (N)	Nil	Nil	Trace	0.75	0.75
15	Iron (Fe)	0.06	0.06	0.1	0.1	0.1
16	Fluoride (as F)	0.11	0.18	0.13	0.19	0.21
17	Chemical oxygen demand (COD) (mg/l)	150	155	173	190	220
Biological parameters / Test						
18	Biochemical oxygen demand (BOD) (mg/l)	190	220	220	220	265
19	Thermo tolerant	0.00	04	06	09	Above 16
20	Colliform	Above 16 counts	Above16 counts	Above 16 counts	Above 16 counts	Above 16 counts
21	MPN	Microbes detected	Microbes detected	Microbes detected	Microbes detected	Microbes detected

RESULTS AND DISCUSSION

Turbidity

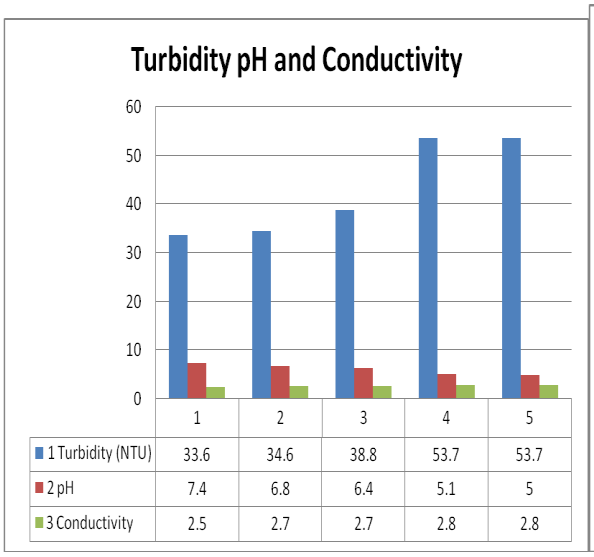
There is variation in turbidity value with respect to sampling Turbidity varies between 33.6 to 53.7 NTU this may be because of strong sewage meet at that point

Ph

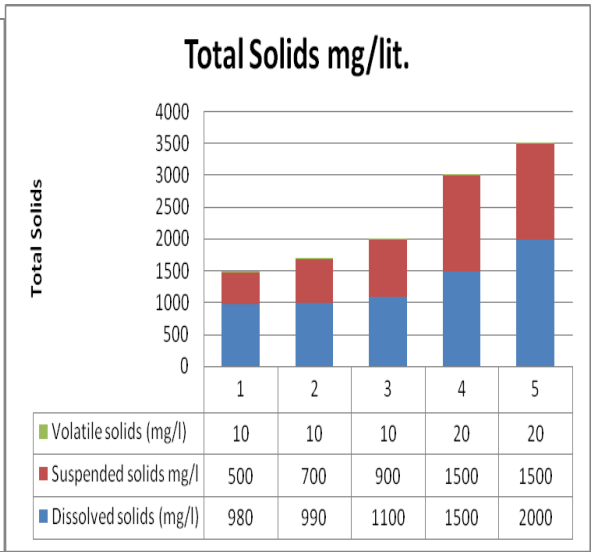
There is variation in pH, throughout the sampling locations except few points. pH varies from 7.4 to 5.0 Near the end points of all five nallas, the pH was found to be acidic; this might be due to high concentration waste disposal in the nallas from slum area and from small scale industries or from the hospitals.

Conductivity

The conductivity variation with respect to sampling points shows a continuous changing pattern through out the length of nalla, samples from the locations shown conductivity increases in the range of 2.5 to 2.9 mho/m



	1	2	3	4	5
1 Turbidity (NTU)	33.6	34.6	38.8	53.7	53.7
2 pH	7.4	6.8	6.4	5.1	5
3 Conductivity	2.5	2.7	2.7	2.8	2.8



	1	2	3	4	5
Volatile solids (mg/l)	10	10	10	20	20
Suspended solids mg/l	500	700	900	1500	1500
Dissolved solids (mg/l)	980	990	1100	1500	2000

Total solids

Total solid varies form 1000 to 3500 m/l from sampling location. At the sampling location no.5 the total solids found to be 3500 mg/L. This might be due to disposal of concentrated domestic waste from the city.

Dissolved solids

Dissolved solids vary from 980 to 2000 mg/l.

Suspended solids

Suspended solids vary from 500 to 1500 mg/l. An increase value of 1500 mg/l observed at sampling location no (4) and (5). The domestic waste disposal from the slum area along with the disposal from fish and meat market may be the reason of same.

Volatile solids

10 mg/L to 20 mg/L is the increase in the value of volatile solids observed from starting point to sampling point No. 5.

Hardness

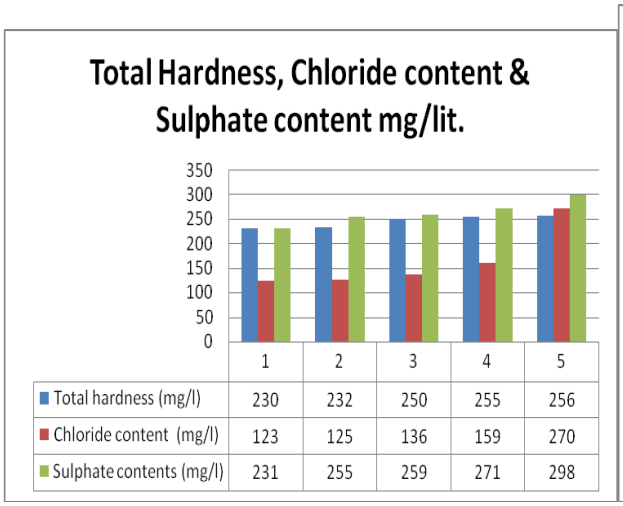
Hardness varies from 230 to 256 mg/l from sample no. (1) to sample no.(5).

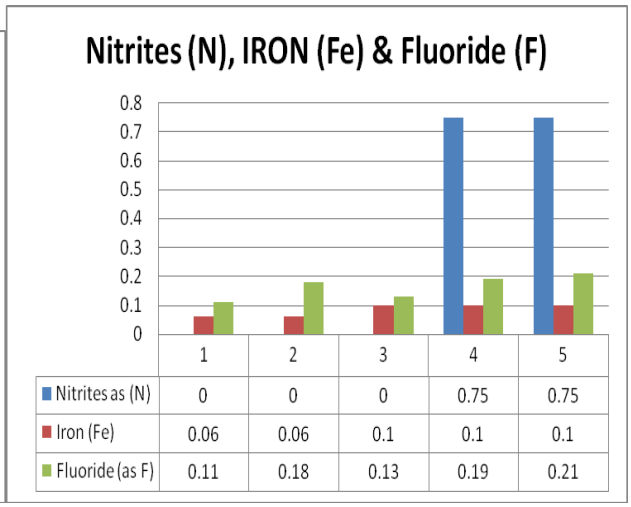
Chloride content

In sample taken from location No. 5 chloride content in waste water was found to be 270 mg/l. The large amount of chloride was detected might be due to disposal of waste water from ice-cream plant near to sample location No. 4

Sulphate content

Sulphate content varies from 231 to 298 mg/l from sample no. (1) To sample no. (5). Sulphates were form due to decomposition of various sulphur containing substances present in sewage.





Nitrites

The nitrite value is within 0.1 mg/l to 0.75 mg/l

Iron

Iron content is within 0.06 mg/l to 0.1 mg/l

Chemical oxygen demand (COD)

There is less variation in chemical oxygen demand (COD) found in the waste water sample. Chemical oxygen demand was found in sampling no. (1) to sampling No. (5) Within range 150 to 220 mg/l.

Biochemical oxygen demand (BOD)

Biochemical oxygen demand varies from 190 to 265 mg/l. from sample no. (1) to sample No. (5).

Thermotolerant

It varies with respect to sampling no. (1) to sampling no. (5). It varies from 0.00 to 16 from sample no. (1) to sample no. (5).

Colliform

The bacteria's are found in the waste water will cause the serious outbreak of fatal water born diseases if mixed directly with the river water. This colliforms shall make the river water unfit for humans and could cause sudden death of cattles and fishes. The presence of pathogenic bacteria's may be because of the open latrines from the slum area and also because of the discharge of waste water from septic tank of Government District Hospitals.

MPN

Microbes were detected from all the sampling location No. from (1) to sampling location No. (5).

CONCLUSION

All the results obtained were compared with different references taken for the analysis. The quality of sewage water is moderately danger for human health. From the results following conclusions observed to be justified.

The maximum value of BOD and COD are 265 mg/l and 220 mg/l respectively and can easily be lowered down by any conventional sewage treatment process, and treated water can be used for irrigation purpose.

The level of contamination due to various factors like sulphate content, chloride content, COD etc. is comparatively lesser, as it is purely a domestic waste.

The water shortage problems of the city and farmers as well living in and around the city can efficiently solved by treating such a large quantity of water mass available easily.

Farmers for irrigation purposes can directly use treated water. Also, if the treated water disposed off in any water body or on land, it possesses no harm to it.

The water samples from all the sampling stations are free from contamination like heavy metals, harmful chemicals etc. as there is industrial waste disposal.

There is a variation in the values of various parameters observed due to self-purification of the sewage, as it flows for long distance.

Due to self-purification of the stream, any low cost conventional treatment plant can prove efficient.

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