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Reuse of Waste Water from Laboratories and Hostels of Aurangabad City Maharashtra (M.S.)

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Abstract

This particular paper emphasizes on the human waste pollution and laboratory waste's from different college laboratories and hostels in Aurangabad city, Maharastra (M.S.)

The laboratory waste samples are investigated by conducting number of tests that has given in tabular form below giving the indication of a sizable pollution of waste which must be seriously thought over, because heavy range of pollution and large use of chemicals in laboratory gives pollution on remarkable range's in case of human waste pollution which is also an important aspect.

In short combination of laboratory waste samples and samples of hostels of various colleges and university were extensively studied. There is good scope to minimize the pollution of these waters not only the pollution is minimized but also the re-utilization of these waste waters can be done and used for at least washing the clothes and washing the kitchen ware.

This is an important achievement with an effort carried out by doing extensive research work. Due to tremendous downfall in rain every season, it is a need of time to think the re-utilization of water.

Key Words : Waste water recycle, reuse, LAS, Anionic, Cationic, Non Ionic Surfactants.

Introduction

In living organisms, various living processes take place, part of it is to get rid of the unwanted materials otherwise it may cause harm to the organisms due to the toxins present in the wastes. The biological process for getting rid of the body wastes is termed as excretion and occurs in the manner in all living organisms. In humans it can be explained as man eliminates unwanted water, salts and gases like carbon dioxide through skin, lungs respectively and also some other wastes like bile wastes, wastes from the kidney etc., are also expelled out.

In spite of that daily waste through the bathroom and sanitation is also one of the important factor to be considered in waste water pollution out of that as the hostel samples were checked from laboratories and hostels and investigated there are good possibilities of reutilizing waste water coming bathroom specially. In this waste water main problem is of detergent contains due to heavy use of detergents, soaps etc., by human beings in uses like washings, bathing etc.,

So detergents have attracted special attention because variety of pollution problems involving their presence. A Detergent may be defined as anything that behaves as cleaning agent. This includes materials like old-fashioned lye soap, alkaline dish washing compounds, solvent cleaners, etc.

The surfactants, which are responsible to provide much of the cleaning power, are present in detergent. Surfactants are surface active agents, also increase the wetting and cleaning power of water they are the ingredients in bath various other detergents and cleaning agents of various kinds, so we can say that there is large use of Surfactants in household.

Surfactants generally consist of polar or hydrophilic groups such as CO3--or NH4+ Some Surfactants under different conditions act as members of other first few groups.

Anionic Surfactants in which negative ions is surface active. The most Common Surfactants are Alkyl Benzene Sulphonates or Linear Alkyl Sulphonates (LAS).

Cationic Surfactants in which positive ions are Surface Active. These are usually quaternary ammonium salts.

Non-Ionic Surfactants in which whole molecule is surface active.

Materials and Methods

All regular Techniques were carried out as described in literature and books on environmental pollution and encyclopedia of environment pollution. For purification of water samples some parameters were checked from

MPCB, Aurangabad. MPHL, Aurangabad. DDS, Aurangabad. Forensic Laboratories, Aurangabad.

The technique of phosphate removal is by giving the treatment with lime CaCO3 to waste water samples. 500ml of waste water sample and 50gms of CaCO3 was taken. The mixture given heat to about 600C with reflux. Then the total mixture was given settling time of about 1 ½ hrs in setting tank. The ppt of calcium phosphate was obtained thus phosphate was removed successfully that was separated and the water quantity was distilled and purified. Even alum i.e.

Aluminium potassium phosphate (Al K (SO4)2. 12 H2O) can also be used for this purpose for technical removal of phosphate.

The excess presence of Alkyl Benzene Sulphonate or Linear Alkyl Sulphonate (LAS) was also removed off by calculating the excess concentration to study what exact amount is to be removed and to know what exact concentration was present more than the permissible limit. it was determined by Methylene Blue

indicator. After the excess quantity as determined then 500ml of sample was taken to which 5gm quantity of CuO was added. The total reaction mixture was refluxed for 3 hours. Some quantity of LAS was decomposed to CuSo4 and linear alkyl sulphonate near permissible limit. Because we are not removing the total quantity of LAS. Taking this factor into Consideration very less quantity of CuO is added which is not converting total LAS to CuSO4 it is converting near about 25-35 % Approx.

Due to more and more use, the surfactants interfere with waste treatment process by stabilizing small particles in colloidal suspension and reducing the activity of biological filter beds and activated sludge and providing the stable foam.

Considering all these above given points and factors the investigation and experimental analyzation was carried out and also the samples were given treatment which has been discussed further.

Samples were collected of known quantity from different college laboratories, hostels of Aurangabad City.

Various parameters were checked and analyzed which has been given in the tabulated data further. Various methods like PH-metry, Conductometry, Colorimtry, Distillation, Volumetric methods, etc were used to ascertain the parameters.

Results and Disucssions

Data of Detergent content before Treatment

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
Alkyl Benzene Sulphonate or (LAS) (Mg./Lit.) Permissible Limit 0.50	1.36	1.26	1.11	1.39	1.40	1.31	0.87	0.78	0.72
Phosphate (Mg./Lit) Permissible Limit 0.55	1.34	1.29	1.21	1.19	1.22	1.27	0.85	0.78	0.73
Arsenic (Mg./Lit.) Permissible Limit 0.04 Max.	1.20	0.067	0.07	0.09	--	--	--	--	0.04

(Table-1)

Data of Detergent content after Treatment

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
Alkyl Benzene Sulphonate or (LAS) (Mg./Lit.) Permissible Limit 0.50	0.91	0.87	0.78	1.05	1.07	0.91	0.47	0.42	0.37
Phosphate (Mg.Lit) Permissible Limit 0.55	0.97	0.84	0.79	0.76	0.87	0.97	0.42	0.41	0.40
Arsenic (Mg./Lit.) Permissible Limit 0.04 Max.	0.06	0.03	0.04	0.05	--	--	--	--	0.02

(Table-2)

Data of Metals Before Treatment

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
Fe (Mg./Lit.) Permissible Limit (0.07 Max)	0.162	0.167	0.168	0.170	0.221	0.205	0.083	0.085	0.078
Fluoride (Mg./Lit) Permissible Limit (1.02 Max)	1.62	1.73	1.82	1.86	2.21	1.92	1.26	0.93	1.43
Copper (Mg./Lit) Permissible Limit (0.02-10)	10.2	11.3	9.6	10.01	12.1	9.2	10.6	6.8	4.3

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
Cyanide (Mg./Lit.)	--	--	--	--	--	--	--	--	--
Chromium (Mg./Lit.) Permissible Limit (0.02 Max)	0.11	0.08	0.12	0.10	--	--	--	--	--

(Table-3)

Data of Metals After Treatment

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
Fe (Mg./Lit.)	0.121	0.123	0.124	0.126	0.161	0.150	0.040	0.043	0.041
Fluoride (Mg./Lit.)	1.27	1.32	1.37	1.41	1.60	1.43	0.87	0.46	0.93
Copper (Mg./Lit.)	7.2	8.4	6.9	7.2	8.4	6.9	4.2	3.7	1.2
Cyanide (Mg./Lit.)	--	--	--	--	--	--	--	--	--
Chromium (Mg./Lit.)	0.08	0.04	0.07	0.06	--	--	--	--	--

(Table-4)

The experimental data of the parameters checked are tabulated below

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
PH	6.04	5.29	7.25	7.80	5.20	5.70	5.20	4.98	5.11
Conductivity	1.0	2.0	3.7	1.80	8.60	1.4	1.70	1.10	1.30
Disscolved Oxygen Permissible Limit (2.5) (Mg./Lit)	0.42	0.56	0.38	0.41	0.47	0.60	0.48	0.39	0.37

Samples Test	Univ. Lab.	S.B. College Lab.	MAC Lab.	MACPG Lab.	Jai Bhavani	Micro-biology School Lab.	IHM Hostel Lab	Univ. Hostel	MIM Hostel
BOD (Mg./Lit.) Permissible Limit (10 Mg/Lit. Min)	17.40	15.45	13.45	16.46	13.87	10.85	4.82	3.97	5.29
COD (Mg./Lit.) Permissible Limit (0.5 Mg./Lit.Min)	0.22	0.26	0.29	0.24	0.34	0.36	0.39	0.36	0.31
Total Hardness (Mg./Lit.)	0.780	0.625	0.672	0.725	0.891	0.712	0.490	0.424	0.412
Permanent hardness Permissible Limit (0.5) (Mg./Lit.)	0.432	0.467	0.378	0.601	0.467	0.352	0.319	0.402	0.378
Temporary Hardness(Mg./Lit.)	0.043	0.037	0.040	0.063	0.036	0.032	0.041	0.039	0.043
Nitrite (Mg./Lit.)	0.03	0.029	0.032	0.0.39	0.037	0.029	0.027	0.029	0.033
Sulphate	0.467	0.489	0.510	0.605	0.612	0.412	0.144	0.167	0.172
Total Dissolves Solids Permissible Limit (0.400 Mg./Lit. (Max.)	0.567	0.482	0.519	0.612	0.618	0.637	0.352	0.287	0.297
Temp. (Degree Celsius)	21	19	20	22	21	20	18	25	20
Taste & Odour (TON)	1.7	1.9	1.5	1.6	1.8	2.1	1.9	2.2	2.7
Turbidity	0.27	0.37	0.61	0.48	0.23	0.67	0.58	0.54	0.51

(Table-5)

Conclusion

The quantity which we got for specially hostel samples that has given very hopeful result to reutilize this water for domestic uses like gardening, washing clothes and kitchenware's. Considering the range that are obtained by means of carrying out lab techniques.

The main constituents in detergents such as phosphates, LAS, Arsenic are technically removed off.

Thus the ranges shown in data after treatment shows that definitely the waste water of hostels can definitely used for gardening washing Clothes and washing Kitchen wares this may be the one of the important achievement of this research work.

As day by day the water level and rainfall in every season is less and one has to think about the management of water for future or we will have to struggle for a s ingle drop of water.

The conclusion of this paper is that according to the data of all the samples shows that the Department of Chemistry and various other laboratories are giving the maximum polluted water obviously due to various practical's done using number of chemicals.

One should see that the use of detergents be minimized and used only the required amount. And also clothes shouldn't be washed or bathing shouldn't be done near water bodies like rivers & lake as this may contaminate whole of it.

The use of chemicals should be minimized as much as possible.

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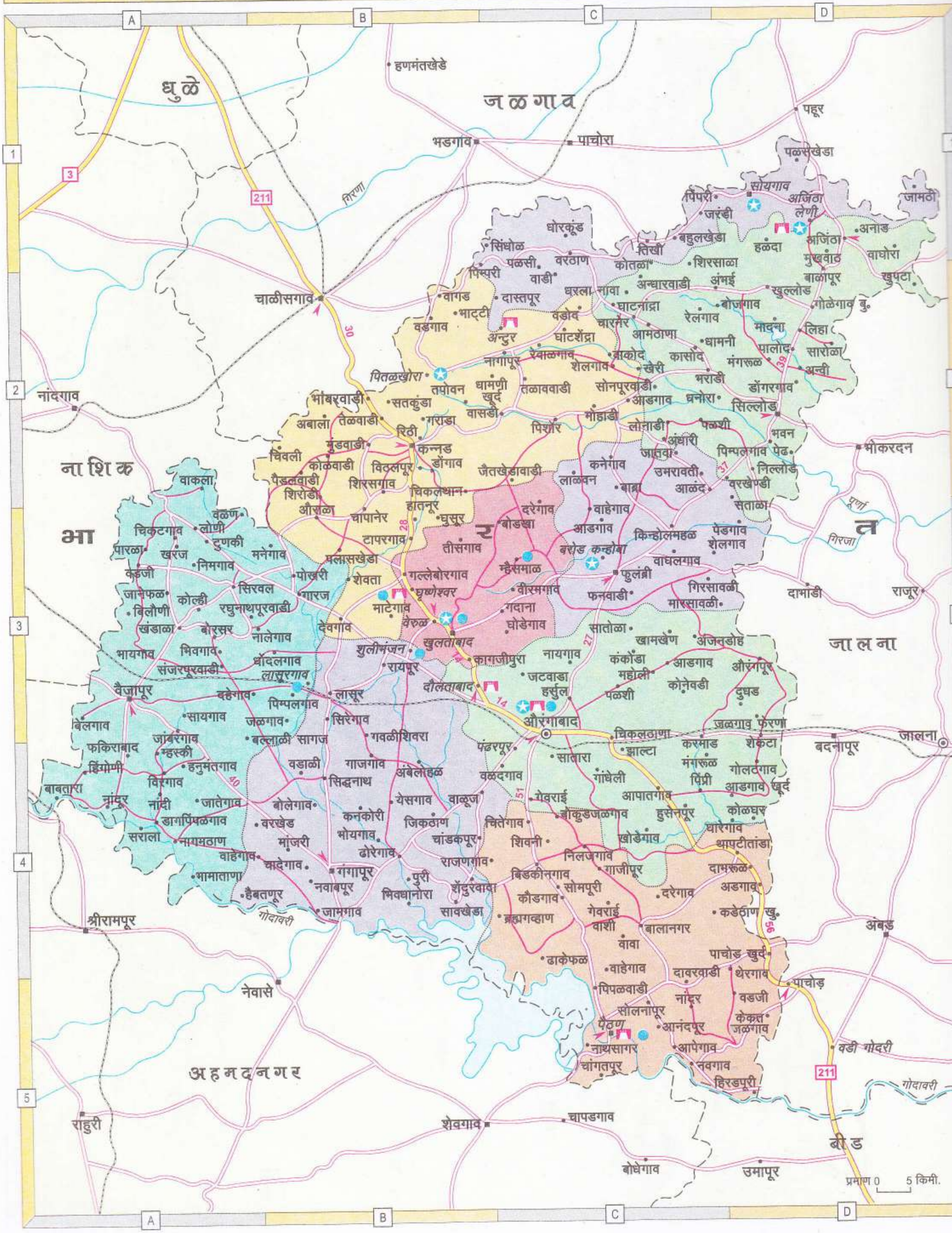

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