

## **THE TOXICITY OF DAIRY EFFLUENT ON NEIGHBOURING ECOSYSTEM**

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RECEIVED : 29 January, 2015

A study has been carried out to determine the quality of effluent of milk dairy of Adaspur (Odisha). The study was conducted during the month of January to December (2014). Nearly nineteen physico-chemical and biological parameters were studied and result have been presented in table-1, which shows that the water is totally unfit for irrigation, fish culture, cloth washing and drinking purpose for animals because this waste water contains high level of inorganic salt and coliform.

**KEY WORDS:** Waste water, water quality, total solid and coliform.

### **INTRODUCTION**

**M**an is damaging the earth in various ways; one of which is through environmental pollution. Product of erosion, sewages, industrial wastage, deforestation, agricultural practices, uses of pesticides, insecticides and chemical fertilizers causes water pollution [10].

Even water a precious natural resources is not exempted from this damage. Sadly this wonderful gift of nature is now under threat, from none other than man himself in its totality. But the product of human activities such as sewage, industrialization, deforestation, construction, agricultural practices may sum up to the pollution caused over long period [4].

The present study was conducted keeping this fact in mind to determine the quality of waste water of milk dairy of Adaspur, which is used for irrigation, washing and drinking purposes for animals. Milk dairy is a major industry of the Cuttack. It supplies the milk for three distt., *i.e.* Cuttack, Bhubaneswar and Puri. This industry is situated on the Cuttack- Puri By-pass. It discharge the effluents into a Nallaha, which reaches the field. This contaminated water is absorbed by the soil and thus the ground water is also pollution.

The farmers use this water for irrigation purposes and grow the vegetables by this water and this contaminated vegetables are sold in the market. These vegetables causes various diseases and this waste water has very foul smell which causes problem to the residents nearby.

Taking all these things into consideration the author has investigated some physico-chemical and biological parameters of the effluent coming out such as pH, EC., chloride, fluoride, nitrate, total hardness, Ca-hardness, Mg-hardness, alkalinity, dissolved oxygen,

biological oxygen demand, chemical oxygen demand, total dissolved solids, total suspended solid, total solid, iron, arsenic and total coliform by standard method [1].

## EXPERIMENTAL

**(A) SAMPLE COLLECTION** : Samples were collected in polythene bottles of good quality of half litre capacity and brought to the laboratory without adding any preservative. To avoid contamination the sample was collected directly in rinsed bottles. Monitoring was done during the first week of every month for a period of one year.

**(B) ANALYTICAL** : Only highly pure (Analar grade) chemicals were used for analysis pH, dissolved oxygen and electrical conductance were determined within six hours of collection. The other physico-chemical and biological parameters were estimated by the standard procedures. The estimated parameters and methods used are listed in Table 1.

**Table 1. Estimation of various physico-chemical and biological parameters by different methods.**

S. No.	Parameter	Method Used
1.	pH	pH-Metry
2.	Electrical Conductance	Conductometry
3.	Chloride	Argentometric method
4.	Nitrate	Nitrate Ion Meter
5.	Fluoride	Fluride Ion Meter
6.	Total hardness	EDTA Titration
7.	Ca-Hardness	EDTA Titration
8.	Mg-Hardness	EDTA Titration
9.	Alkalinity	Titrimetry
10.	Sulphate	Titration Method
11.	Total dissolved solid	Conductometry
12.	Total suspended solid	Filtration method
13.	Total solid	Addition method
14.	Dissolved Oxygen	Titration Method
15.	Biological oxygen demand	Titration Method
16.	Chemical oxygen demand	Chlorimetric Method
17.	Iron	Double layer method
18.	Arsenic	Double layer method
19.	Coliform (MPN/100 mL)	Multiple tube dilution method

It is totally unfit for irrigation, fish culture, washing and drinking purposes for animals. pH values were always greater than 7.0 implying that the water remains in the alkalinity range throughout the year. Chloride values varied from 980 mg/l to 390 mg/l. Chloride values are higher than the Indian standards. Similarly fluoride values varied from .2 PPM to 1.8 PPM and these values are also higher than the Indian standard. Total hardness values varies from 170 mg/l to 270 mg/l. Nitrate values were also high in the month of the September, *i.e.*, .35 mg/l and these values varied from 5 mg/l to 50 mg/l. Sulphate values varies from 15 mg/l to 36 mg/l. Total dissolved solid and total suspended solid values were very high and varied from

1226 mg/l to 2446 mg/l and 68 mg/l to 98 mg/l. Total solids values changes according to TSS and TDS values. Dissolved oxygen values varied from 6.1 mg/l to 7.1 mg/l and biological oxygen demand values varied 291 mg/l to 437 mg/l. Chemical oxygen demand ranged between 849 mg/l to 1317 mg/l. Both values shows that the water is highly polluted and electrical conductance values varied from 1680 micromhos/cm to 3540 micromhos/cm and this waste water contains high coliform above 2380 MPN/100 mL from January to December. Iron and Arsenic are totally absent in the waste water.

Table 2

Sl. No.	Name of Parameters	Jan	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1.	pH	7.0	7.21	7.63	7.88	8.3	8.1	7.9	7.7	7.68	8.1	8.2	8.3
2.	EC	1760	1680	2000	3180	2940	2780	1690	1760	3430	3200	3220	3540
3.	Chloride	180	190	240	260	200	210	180	150	330	320	390	270
4.	Fluoride	0.5	0.7	1.2	1.4	0.2	0.3	0.4	0.8	1.1	1.7	1.6	1.8
5.	Total Hardness	190	180	270	200	220	240	260	250	180	200	210	220
6.	Ca-Hardness	110	100	80	120	130	110	140	70	80	110	190	140
7.	Hg-Hardness	100	80	90	70	80	70	90	90	90	90	110	130
8.	Nitrate	15	20	20	5	15	15	25	30	35	25	30	36
9.	Sulphate	23.1	20.6	21.4	21.2	20.8	29.4	31.5	35	34.4	14.3	31.8	31.6
10.	Total dissolved solid	1500	1226	1423	1554	2250	2342	1268	1360	2486	2300	2350	2446
11.	Total suspended solid	68	67	64	76	81	92	93	82	87	9.8	97	88
12.	Total solids	1540	1383	1556	2403	2408	2393	2118	1890	1493	1480	2404	2556
13.	Alkalinity	1220	1210	1200	1230	1240	1200	1250	1220	1230	980	960	990
14.	Dissolved oxygen	6.7	6.8	6.9	6.1	6.4	6.4	6.7	6.8	7.1	6.9	6.6	6.9
15.	B.O.D.	437	441	439	401	306	400	436	361	445	335	291	356
16.	C.O.D.	1250	1220	1317	1005	843	1197	1207	987	1357	943	987	1203
17.	Iron	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18.	Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
19.	Coliform(MNP/100ml)	2380	2380	2380	2380	2380	2380	2380	2380	2380	2380	2380	2380

B.O.D. - Biological oxygen demand, C.O.D. - Chemical oxygen demand, ND - Not Detectable, EC - Electrical Conductance.

When the values of milk dairy waste water's parameters are compared with the recommended standard for drinking purpose for animals, irrigation, fish culture and washing, we find that the most of the parameters are above the recommended limit. This water is highly polluted because it contains high level of inorganic salts and coliform. Many disease are caused due to polluted water because farmers use this water for irrigation purpose and grow vegetables and this contaminated vegetables are sold in the market.

So it may be concluded that the waste water of the milk dairy is highly polluted and totally unfit for any use as is used without further treatment (mainly disinfection).

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