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Short Communication

PHYSICO-CHEMICAL ANALYSIS OF TEXTILE WASTE WATER AROUND AGRICULTURAL FIELDS IN SANGANER TOWN, JAIPUR

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ABSTRACT
Physico-chemical analysis of waste water collected from Sanganer town, water drawn from underground sources and used in tie and dye industries and converted into waste water. This waste water is used in several nearby located agricultural fields. Results revealed that pH of the waste water ranges between 7.35 to 9.38 and electrical conductivity between 0.87 to 1.15 umho/cm and total solids from 955.8 to 2010.2 mg/L. Calcium and magnesium ranges between 46.76 to 103.24mg/L and 466.23 to 941.64mg/L respectively. The total Hardness ranges between 560 to 1133mg/L. Chloride and D.O. values ranges between 295 to 578.3 mg/L and 17.1 to 38.12 mg/L respectively. Heavy metals were also analysed. This waste water contains Pb 1.098, mg/L, Fe 0.161mg/L, Cu 4.66 mg/L, Cd 1.98 mg/L, Zn 3.29 mg/L, Ni 0.076 mg/L and Cr 3.96 mg/L.

KEYWORDS: Sanganer, textile industries, Physico-chemical, Waste water *etc.*

INTRODUCTION

Environmental pollution has become a worldwide phenomenon .Pollution of water bodies is a phenomenon of concern in the developing countries of the world including India (Awomeso *et al*., 2010). Industrial effluents urban runoff, direct disposal of wastes into the water bodies agricultural fertilizer and animal wastes remain the major water contaminants .It is also reported that textile and dyeing industry pose a major environmental threat because of the large amounts of water and dyes involved in the manufacturing process .Large amount of chemically different dyes are employed for various industrial applications including textile dyeing(Pal and Brijmohan,1990).The waste water contains heavy metals because the water comes from the printing industries. The dye used in these industries contain synthetic chemicals, which are generally metal based .Many of the metals are harmful for human body above permissible limits (Orebiyi *et al*., 2010).Metals occur naturally in our environment, especially in the Earth's crusts where they contribute to the balance of the planet. However, as a result of human activities they are distributed, concentrated and chemically modified, which may increase their toxicity (Mihaly *et al*., 2005). Environmental pollution and continuous exposure of human beings to toxic heavy metals such as Hg, Cd, and Pb is serious growing problem throughout the world (Yusuf and Sonibare, 2004). Exposure to metals has risen dramatically in the last 50 years as a result of an exponential increase in the use of heavy metals in industrial processes and products .Industrial waste and effluents are undesirable by-products of economic development and environment and when these products handled and disposed improperly, they cause serious threat to human health and environment. Such as use of dye stuffs in textile paper, paint and printing industries and improper disposal of these stuffs into the water sources cause serious problem of pollution and health hazards due to presence of heavy metals above permissible limits (Khan *et al*., 2001). Textile industry effluents account for several point sources of water pollution thus posing negative effects on aquatic lives and human health (Bakiredere and Yaman 2008). Amanishah Nala which is of great importance to Jaipur city particularly Sanganer area has effluent water (polluted water) from textile industries. The ground water is used in the cottage industries (Khan *et al*., 2003).Waste water effluents from textile dyeing and printing industries from Sanganer which contains dyes, bleaching agents, salts, acids and heavy metals like Cr, Cu, Pb, Zn, Fe are discharged continuously without any treatment into Amanishah Nala. The effluent water takes the dissolved toxicants to crop plants and its consumers (Khan et al. 2009). This waste water cause many problems including ground water pollution and adverse effects on agricultural products, animals and health of the people.

MATERIAL & METHODS

The samples were collected from different location of Amanishah Nallah. These samples were collected periodically from April 2010 to March 2012.Water samples were collected in different glass bottles. Physico-chemical parameters for the collected samples were studied by standard methods.

Study area

Sanganer town is situated nearly 20 km away from the main city of Jaipur. Sanganer town lies between 26^{o} 49' to 26^{o}51'N latitude and 75^{o}46' to 75^{o}51'E longitude. The total area of Sanganer is about 635.5 sq km. various industries discharge untreated waste water in Amanishah Nala.

Heavy Metal Analysis By Atomic Absorption Spectrophotometer

Atomic absorption Spectrophotometer (AAS Model GBC 932) was used for analysis of heavy metals in water. The 25ml of the sample was digested in diacid mixture of HNO3 and per chloric acid in the ratio of (10:1). The digestion was performed in 100 ml conical flasks and to facilitate complete digestion the samples in di acid mixture were kept overnight at room temperature .These flasks containing samples and di acid mixture were heated at hot plate until a clear solution was obtained .This was followed by a slow but complete evaporation of acids. Then, the volume of the digested samples was made up to 100 ml with the help of the double distilled water .Finally these solutions were analyzed by Atomic Absorption Spectrophotometer.

RESULT & DISCUSSION

Textile industry effluents collected from several point sources of water pollution. The results related to physico-chemical characteristics of textile effluents are given in the table no.1. In the present study pH was found to be maximum in July. The results indicated that pH values range between 7.30 to 9.38. Minimum pH (7.30) was found in January 2011 and maximum pH (9.38) was in July 2012. E.C. ranged between 0.76 to 1.20 mmhos its maximum concentration *i.e.* 1.20 was found in July 2011 and minimum in January 2011 i.e. 0.76. Total solids ranged from 970 mg/L was found in October 2012 and maximum 2011.2 mg/L in July 2012. Similarly Chloride values ranged between 284.60mg/L in April 2011 and 578.3mg/L was maximum in July 2012. Calcium and Magnesium hardness ranged between 40.24 was minimum in January 2012 and 90.46mg/L was maximum in July 2012 and 520.4mg/L minimum in. January 2012 to 997.4 mg/L Maximum in July 2012. The Total Hardness was between 560.4 to 1133 mg/L (Table-1).In the present study the maximum concentration 1.024 mg/L of lead was recorded from textile waste water maximum permissible limits of lead is 0.1 mg/L. Desirable limits of lead is .05 mg/L beyond this limit water becomes toxic. Average concentration of copper and cadmium 4.95 mg/L found in the textile water samples is more than the permissible limits. Average concentration of cadmium 1.65 mg/L cadmium level was found high in industrial area. Average concentration of ferrous 0.168 mg/L found in textile water samples is more than permissible limits. Chromium metal was found 3.78 mg/L it was higher than permissible limits. The permissible limit for Cr is 0.05 mg/L. Average concentration of zinc and nickel was 3.59 mg/L to 0.045 mg/L, (table-2).

TABLE 1: Analysis of Textile Waste Water Samples from Amanishah Nallah(Sanganer)

Parameters	Months (2010-2011)				Months(2011-2012)			
	April	July	October	January	April	July	October	January
pH	8.55	9.26	7.49	7.30	8.53	9.38	8.68	7.35
E.C. (m mhos / cm)	0.96	1.20	1.02	0.76	0.87	1.15	0.92	0.97
Total solids (mg/L)	1601.2	2010.2	955.8	1284.4	1024	2011.2	970	1300
Chloride (mg/L)	284.60	539.52	360.73	314.67	295	578.3	395	344.5
D.O. (Mg/L)	22.36	35.40	19.10	19.18	20.98	38.12	17.1	23.14
Ca Hardness (mg/L)	63.18	103.24	63.15	46.76	66.7	90.46	70.76	40.24
Magnesium Hardness (mg/L)	569.42	924.7	941.64	466.23	728	997.4	640	520.4
Total Hardness (mg/L)	632.6	996.4	1004.8	513	793	1133	742	560.4

TABLE 2: Analysis of Textile Waste Water Samples from Amanishah Nallah (Sanganer)

	Pb (mg/L)	Fe(mg/L)	Cu(mg/L)	Cd(mg/L)	Zn(mg/L)	Ni(mg/L)	Cr(mg/L)
Heavy Metals Concentration 2010-2011	1.098	0.161	4.66	1.98	3.29	0.076	3.96
Heavy Metals Concentration 2011-2012	1.024	0.168	4.95	1.65	3.59	0.045	3.78
WHO Standards Permissible limits	0.1	0.3	1	0.05	5	-	0.05

RECOMMENDATION

There is a need of treating effluent water by central effluent treatment plant and removing heavy metals before utilizing this water for crop plants.

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