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Studies on Heavy Metal Content of Polluted Water at Motinagar Industrial Site of Faizabad (U.P.)

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Abstract: Present study was taken upto analyse the seasonal variation in heavey metal content at three selected sites of Motinagar Industrial area of Faizabad district (U.P.). It has been analysed that the heavy metal concentration was found more than the tolerance limits at all samples of water collected from three sampling stations.
Keywords: Heavy metals, Polluted water.

I. INTRODUCTION

The eastern part of Uttar Pradesh is still a developing area of the state. To keep it at per with rest of the nation, rapid industrialization has been observed in the recent past and it resulted, the rapid growth of several industries like sugar, paper, Fertilizer, Thermal Power, Tannaries, Textile Chemicals etc. Regarding the industrial structure, the district Faizabad occupies a leading place among the eastern cities of U.P. During recent past there has been a mushroom growth of large number of small and big industrial units in and around the city including units in and around the city including the industrial area Motinagar, Darshan Nagar and Mumtaz Nagar. Industrial units like Paper, Sugar, Distillary etc. release bulk of toxic substances along with effluents through independent drains into various fresh water bodies which are only source of irrigation water in the area Moti Nagar Sugar Mill and Distillary are such types of industrial units located on Faizabad-Sultanpur highweay about 15 km away from Environmental Biology Lab, K.S. Saket P.G. College, Ayodhya.

II. MATERIALS AND METHODS

After a through survey of the area under investigation, three sampling stations on the effluent channel of Motinagar Sugar and Distillery Industries, Faizabad were established. Samples of polluted water from prefixed stations were collected fortnightly during the study period. The sample collection, handling the preservation techniques of APHA (1985) were followed.
The heavey metal content of the collected samples were anlaysed by flame atomic observation spectrophotometer using Perkin-Elmer 5000 model with automatic burner control. All furnace injections were made with micro pipettes.

III. RESULT AND DISCUSSION

The heavy metals concentration (Tables 1) in collected samples varied at different sites with the different collection time. The concentration of heavy metals was found to be maximum at site III and minimum at Site I followed by Site II throughout analysis period. Mostly it increases from Site I to Site III. The cadmium(Cd) metal concentration was found maximum during summer 21 and minimum 15 during rainy seasons only at study Site III. Copper(Cu) concentration ranged from 15 µg/l at Site I to 108 µg/l at Site III respectively as minimum and maximum values. The concentration of nickel(Ni) was found to be zero at Site I, during entire period of investigation and at Site II during rainy and winter seasons. It was present at Site II during summer and at Site III throughout the period of analysis.
The chromium (Cr) concentration was recorded at all the study site. It was maximum at Site III during summer and minimum during rainy at Site I. Zinc (Zn) concentration was reported to be minimum as 4 mg/l at Site III during winter season. The manganese (Mn) concentration ranged from 23 µg/l to 13 µg/l with a maximum concentration during summer at Site III minimum during rainy seasons at sites I. The lead (Pb) concentration was recorded to be minimum as 17mg/l at Site I during rainy and maximum as 78 mg/l at Site III during summer seasons.
Heavy metals are the constituents of large numbers of industrial, domestic and agricultural discharge. The toxicity of metal and its rate of uptake from solution depends on oxidation state of metal. So it is important to analyse them and study their speciation which has become and important tool in assessing environmental contamination and ecotoxicology. Bhand and Chaturvedy (1995) carried out speciation studies in the Khan river and reported distribution and variation in dissolved and particulate concentrations of P, Zn and Cd. Itoh (1997) studies speciation of trace metals in pond water by liquid chromatography. Steve has reviewed with 35

references the importance of metal speciation in many areas of environment. Heavey metal speciation was analysed in soil by Boruvka (1997) to assess metal mobility and bioavailability. Similar other studies were also carried out by various workers with respect to concentrations of heavy metals in environment and their impacts.

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Table-01 : Seasonal variation in heavy metals at three study sites

S. N.	Heavy Metal conen-tration (Mg/l)	Rainy Season			Winter Season			Summer Season		
		Site I	Site II	Site III	Site I	Site II	Site III	Site I	Site II	Site III
1	Cd	-	-	15±1.32	-	-	16±2.37	-	-	21±2.310
2	Cu	6±1.05	5±1.01	89±2.19	4±1.00	8±1.31	91±2.51	8±21.301	12±1.054	99±2.860
3	Cr	12±1.62	17±1.30	52±2.81	15±1.03	21±1.06	63±1.04	17±1.624	24±2.316	67±2.081
4	Co	3±0.58	25±2.37	53±1.67	4±0.58	27±2.31	56±1.06	6±0.840	27±2.162	6±1.051
5	Mn	23±2.35	59±2.37	122±5.88	25±2.30	52±2.62	127±4.07	27±2.607	58±2.781	131±3.456
6	Ni	-	-	69±2.05	-	-	72±3.50	-	2±0.810	78±3.465
7	Pb	17±1.01	77±1.85	69±3.06	18±1.61	71±3.05	71±1.08	76±1.08	67±1.751	78±2.710
8	Zn	7±0.89	5±1.01	89±2.19	4±1.00	8±1.31	91±2.51	8±21.301	12±1.054	99±2.860

± Standard error