C.P.-66 : SEASONAL DISTRIBUTION OF TRACE ELEMENTS IN WATER OF IRAI RIVER, DIST. CHANDRAPUR, MAHARASHTRA.

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ABSTRACT

Attempt has been made to assess the effect of industrial pollution on distribution of trace elements (Arsenic, Cobalt, Cadmium, Lead, Nickel, Zinc) on Irai river of Chandrapur district of Maharashtra.

Maximum level of Arsenic and Cadmium was recorded during winter season at station D. This indicates that the Arsenic and Cadmium is present in the industrial sewage coming from MIDC Datala. Discharge of thermal power plant containing ash slurry attribute to maximum values of cobalt, lead and zinc at station B during summer season. However, concentration of nickel was found more in rainy season at sampling station B due to addition of surface runoff soil and clay along with industrial effluents in to the river water. So it is clear that values of trace elements varied with season and load of pollution.

INTRODUCTION

The term 'trace element' is used widely in the literature and has different meanings. It is general consensus that it designates a group of elements that occur in natural systems in minute concentration. The discharge of trace elements into aquatic ecosystem has become a matter of concern in India over a last couple of decades. The rapid industrialization has resulted in accelerating the flux of trace elements in to the environment. Industrial effluents, agricultural runoff, transport, burning of fossil fuel, animal and human excretion, geological weathering and domestic wastes could contribute trace elements in water bodies [1]. The relevant studies on trace element pollution are made by [2-21].

The presence of any trace element like Co, Pb, Cd, Fe, Zn or Ni interferes the beneficial use of water because of toxicity. Hence an attempt was made to access pollution load in water of Irai river which is lifeline of Chandrapur city and number of villages in Chandrapur district by means of studying seasonal distribution of trace elements.

MATERIALS AND METHODS

To study seasonal distribution of trace elements, following four sampling stations A, B,C, and D were selected along the course of Irai river..

Sampling station A: The area located near the water supply pumping station of Chandrapur Super Thermal Power station (CSTPS), on Irai Dam was selected as sampling station A.

Sampling station B: The area selected as station B is about 20.9 Km away from the station A and is located at the junction of channel coming from Chandrapur Super Thermal Power Station. Apart from thermal wastes this channel also carries domestic waste from the locality settled on the bank of the channel.

Sampling station C: The area chosen as sampling station C is about 27 Km away from station B and is located near the water supply pumping station near the bridge of road coming from Ramnagar, Chandrapur.

Sampling station D: About 1.2 Km away from station C, near the junction of channel coming from Chandrapur MIDC (Datala), selected as sampling station D. This channel is seasonal and flows from monsoon to winter.

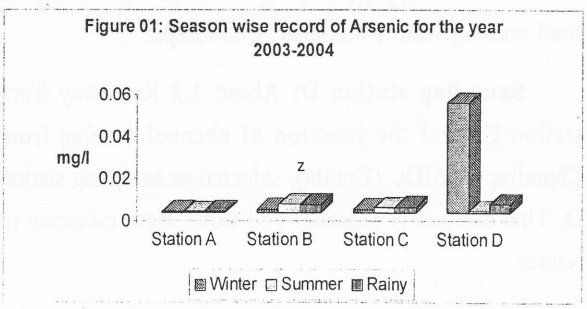
Surface water samples were collected fortnightly for 12 months from Sep. 2003 to Aug 2004 at 8.00 am to 11.00 am in clean plastic bottle (1500 ml) as per the standard procedure and estimated in laboratory by Atomic Absorption Spectrophotometer. Atomic Absorption Spectrophotometer was used for the determination of metals in all type of water samples.This technique is used because of its ease of operation, sensitivity to a large numbers of metals in a wide variety of water, i.e. surface, ground, domestic industrial wastewater and sea water.

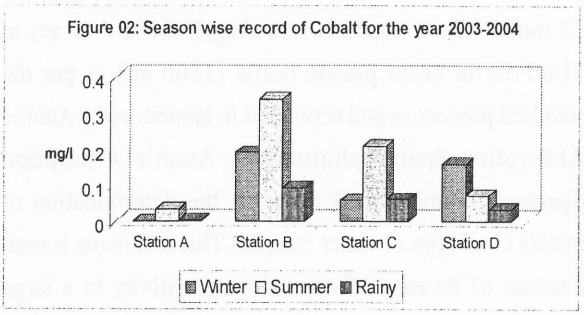
RESULTS AND DISCUSSION

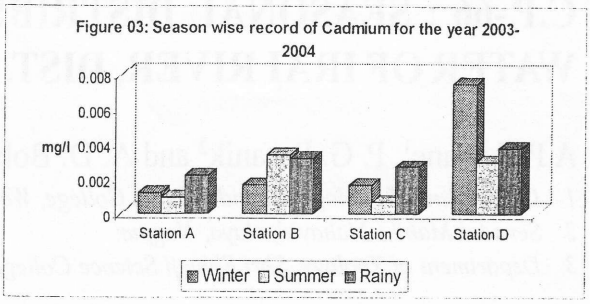
The data observed at various stations during the investigation period are shown in Table 1. and illustrated in figure 1- 6. The recorded values are also compared with quality standards as proposed by WHO.

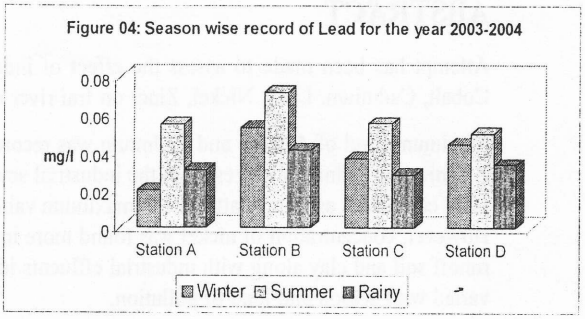
Table 1 Season wise record of As. Cd, Co, Pb, Ni, Zn (mg/l) from Sep 2003- Aug 2004 in Irai River, Dist Chandrapur.

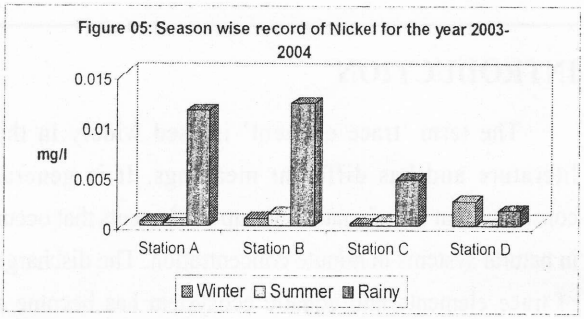
Trace Element	Station	Season		
		Winter	Summer	Rainy
Ar	A	0.0005	0.0003	0.0005
	B	0.0017	0.004	0.0037
	C	0.0017	0.0024	0.0029
	D	0.052	0.0009	0.004
CO	A	0.0012	0.035	0.0036
	B	0.192	0.34	0.093
	C	0.059	0.21	0.062
	D	0.16	0.072	0.033
Cd	A	0.0012	0.00097	0.0022
	B	0.0017	0.0034	0.0032
	C	0.0017	0.00069	0.0027
	D	0.0075	0.003	0.0038
Pb	A	0.02	0.055	0.0308
	B	0.0532	0.0717	0.0412
	C	0.037	0.0552	0.0282
	D	0.0445	0.05	0.0335
Ni	A	0.0005	0.00025	0.0114
	B	0.00075	0.00125	0.0121
	C	0.00025	0.0005	0.0046
	D	0.00245	0.00	0.0015
Zn	A	0.0648	0.077	0.058
	B	0.602	0.885	0.615
	C	0.296	0.507	0.208
	D	0.479	0.461	0.032

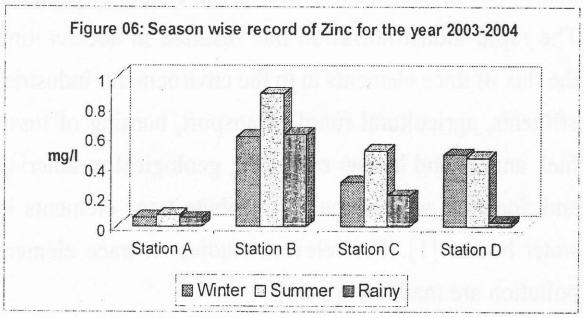












LEGENDS:

WHO - World Health Organisation.
mg/l - Milligram per liter.
Km. - Kilometers.
pH - Hydrogen ion concentration.
No. - Number.
CSTPS - Chandrapur Super Thermal Power Station.
MIDC - Maharashtra Industrial Development Corporation.
Min. - Minimum.
Max. - Maximum.
As. - Arsenic
Cd. - Cadmium
Co. - Cobalt
Pb. - Lead
Ni. - Nickel
Zn - Zink