000001

PRESENCE OF PESTICIDES AND HEAVY METALS IN SOFT DRINKS INDUSTRIES IN CENTRAL ZONE

CENTRAL POLLUTION CONTROL BOARD

Central zonal Office, 3rd Floor, Sahkar Bhawan

BHOPAL

000002

PRESENCE OF PESTICIDES AND HEAVY METALS IN SOFT DRINKS INDUSTRIES IN CENTRAL ZONE

Principal Coordinator- Sh. A. Sudhakar, Incharge

Supervision – Dr. P. K. Srivastava, Scientist "C"

Project Coordinator- Dr. R. P. Mishra, Scientist "B"

Monitoring team –

Dr.R.P.mishra, Scientist "B"
Sh. Milind Nimje, SSA
Sh. Rajeev Sharma, Sr.Tech.
Sh. Rameshwar Bandewar, JLA

CENTRAL POLLUTION CONTROL BOARD
Central zonal Office, 3rd Floor, Sahkar Bhawan
BHOPAL

PRESENCE OF HEAVY METALS AND PESTICIDES IN SOFT DRINKS PLANTS

1.0 INTRODUCTION

Soft drinks are non-alcoholic water-based flavoured drinks that are optionally sweetened, acidulated and carbonated. The market growth rate, which was around 2-3% in '80s, increased to 5-6% in the early '90s and is presently 7-8% per annum. Soft drinks can also be divided into cola products and non-cola products. The two global majors PepsiCo and Coca-Cola dominate the soft drink market in India. Coca-Cola, which had winded up its Indian operations during the introduction of the FERA regime, re-entered India 16 years later in 1993. Pepsi started a couple of years before Coca Cola in 1991.

In pursuant to the press report regarding high concentration of heavy metals in sludge generated from ETPs of beverage units, Central Pollution Control Board had carried out studies in 16 units across the country. The Cadmium (Cd) concentration in ETP's sludge was found to be more than 50 mg/kg in eight units, while in other units it was found between 5 mg/kg to 50 mg/kg. Large variations in concentration of other metals have been also noticed to justify ETP sludge of beverages units as hazardous under schedule 2 of Hazardous Waste (Management & Handling) Rules, 2003. Pursuant to the press report regarding high concentration of heavy metals in sludge generated from ETP of beverages units, random samples from few units were collected in 2003. The short study revealed that metal concentration in sludge generated from beverages plants is of serious concern. In some industries the concentration has exceeded to the extent to declare it as hazardous waste.

In recent studies it is found that metal concentration in sludge generated from soft drink plants is of serious concern. In some industries the concentration has exceeded to the extent to declare it as hazardous waste. The analysis of other samples collected from different locations including raw water used in process did not reveal any source of metal contamination. Hence it is proposed to carry out in-depth study of few plants to find out source of metal accumulated in sludge.

The effluent of the bottling plants of soft drinks is mostly treated biologically and the sludge generated from ETP (biological sludge) is not classified as chemical sludge under 34.3 and 34.4 of Schedule 1 of Hazardous Waste (Management & handling) Rules, 2003. However it may be categorized as hazardous waste when the concentrations of various parameters exceed

the limits notified under Schedule 2 of the Hazardous Waste (Management & handling) Rules, 2003.

According to the Hazardous Waste (Management & Handling) Rules 2003, toxic metal containing residue from used-ion exchange material in water purification as listed at 34.2 in Schedule 1 is required to be disposed of in secured landfill sites. Other sludges generated from waste water purification would not fall under the purview of Schedule 1. However, they could be categorized as Hazardous Waste (Management & handling) Rules, 2003 on detection of metal present in higher concentration, as notified under Schedule 2.

2.0 SCOPE OF WORK:-

In order to know the present status of presence of heavy metals in ETP sludge, Central Pollution Control Board had monitored 08 units located in Central Zone i.e Madhya Pradesh, Rajasthan and Chattisgarh. The list of industries monitored for the study is as below-

S.No	Name of Industry	Address	Monitoring date
01	Hindustan Coca Cola Beverages Pvt. Ltd.	AKVN, Industrial Area, Pilukhedi Distt: Raigad (M.P.)	20th June 2007
02	Varun Beverages Ltd.	RIICO Industrial Area, Chopanki, Bhiwadi,Distt: Alwar (Raj.)	21stAugust, 2007
03	SMV Beverages Pvt. Ltd	26-30 Urla Industrial Area, Raipur (C.G.)	22ndMay, 2008
04	Narmada Drinks Pvt. Ltd	Plot no. 6 & 7, Sirgiti Industrial Area, Bilaspur (C.G.)	23rdMay, 2008
05	Udaipur Beverages Limited	Richhai Industrial Area, Jabalpur (M.P.)	24thMay, 2008
06	SMV Beverages Pvt. Ltd	Plot no. 28, Sector- New, Mandideep, Distt: Raisen (M.P.)	28thMay, 2008
07	Varun Beverages Ltd.	Plot no. 159,RIICO Industrial Estate,Phase -III, Baronda,Jodhpur (Raj.)	14th July, 2008
08	HCCB Pvt. Ltd.	RIICO Industrial Area, Kaladera, Chomun, Jaipur (Raj.)	15th July, 2008

3.0 THE METHODOLOGY

The methodology adopted for study included collection of data from all bottling plants located in Central Zone to select short-listed industries for monitoring. The study also included examining the process with collection of samples at various points and further analysis for metals like Lead, Cadmium and Total Chromium. The number of samples was finalized depending on the path & source of pesticides and heavy metal. Being one of suspected sources ground water samples were collected from either bore wells or other sources of raw water being used by the industry. Segregated process discharge stream samples were also collected to identify particular source of pesticide and heavy metal contamination. As all discharges from the process were being treated in ETP, samples from ETP inlet, ETP outlet and sludge generated from ETP were also collected. The samples were analysed in CPCB Delhi laboratory (NABL accredited lab) using certified analysis methods. The methods used in analysis are given below-

3.1 DETERMINATION OF PESTICIDES

The determination of pesticides was done using APHA (American Public Heath Association), 1998 : Standard methods for examination of Water and Wastewater, 20th Edition, Washington, D.C., USA P. 9-47 to 9-53. The pesticides present in water and wastewater samples were extracted with n-hexane (HPLC grade) for organo chlorine pesticides and chloroform (HPLC grade) for organo- phosphorus pesticides. The individual pesticides were determined by gas chromatography using suitable column.

This gas chromatographic method is applicable for determination of Organo- chlorine pesticides (Cypermethrin, Aldrin , BHC, DDT, Dieldrin & Endosulfan) and Organo Phosphorus pesticides (Monocrotophos, Dimethoate, Chloropyriphos, Anilophos, Malathion and Methyl parathion) residues in water and wastewater samples.

3.2 DETERMINATION OF HEAVY METALS

Determination of heavy metals were done by using APHA (American Public Heath Association), 1998: Standard method for examination of Water and Wastewater, 20th Edition, Washington, D.C., USA and USEPA 1979 : Manual of method for Chemical analysis of Water and Wastewater" US, EPA, Washington DC. Digestion of the samples was done to

reduce the interference by organic matter and to convert metals associated with particulates to a form (usually free metal) that can be measured by atomic absorption spectrophotometer. Nitric acid can digest most of the samples adequately and nitrate is an acceptable matrix for both flame and electro thermal atomic absorption spectrophotometer method.

4.0 THE PROCESS:

The manufacturing activities of bottling plants of soft drinks are divided in three stages i.e. Raw water treatment, Bottle Washing and Syrup preparation & Bottling.

4.1 RAW WATER TREATMENT: -

The most important raw material in soft drinks industry is water. In almost all the units the raw water source is ground water. The metal content in ground water samples, collected from 08 industries, was found negligible. The unit wise report of ground water quality is presented in Table 01. The water required for domestic purpose and floor washing is not getting any treatment, whereas treatment is given for water used in bottle washing and syrup preparation. Water used for bottle washing is first chlorinated and passed through softener plant. Raw water used in process for syrup preparation gets extensive treatment. Most of the industries are treating raw water by Coagulation process, while some have installed Reverse Osmosis plants.

4.1.1 Coagulation Process: This process is batch process wherein bore-well water is treated chemically. In this process appropriate quantity of lime, ferrous sulphate and bleaching powder are added in raw water with agitation for 45 minutes. After four hours settling water is decanted and passed through sand filter. The sludge generated here is defined as **coagulation sludge** and is either mixed with ETP sludge or disposed of after sundry. After sand filter water is tested for prescribed quality control parameters i.e. Total Hardness <100, Turbidity <0.5 NTU and pH > 4.9. The tested water is again passed through carbon filter and

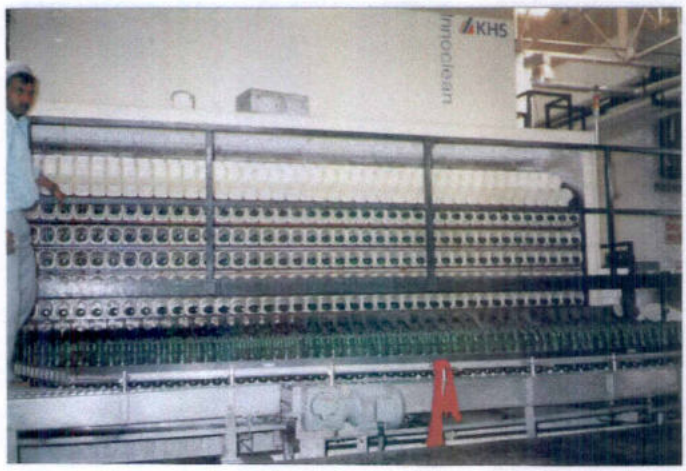
membrane filter of 10 and 5-micron pore size. This water is used for preparation of syrup. Disadvantage of this process is generation of huge quantity of chemical sludge as various chemicals like lime, ferrous sulphate and bleaching powder are being used for coagulation.

4.1.2 Reverse Osmosis Process:

Reverse Osmosis is the reversal of the natural flow of osmosis. In this process water is forced through the membrane in the opposite direction by application of pressure. The membrane used in RO process of these industries consist of several thin layers or sheets of film that are bonded together and rolled in a spiral configuration around a plastic tube (also known as a thin film composite or TFC membrane). The material of the membrane is semi-permeable and allows water molecules to pass through, while acting as a barrier to dissolved solids. The pores of the membrane are too small for the contaminants in water to pass through it. Through this process, screening out the salts and other contaminants produces pure water. The membrane gets clogged by salts and other impurities with the time and require increasing greater pressure to force water through the membrane. The membranes are configured to split the feed water into two streams to overcome this problem-- one part to be purified and the other part to wash away the particles rejected by the membrane. The rejects are allowed to join the stream of Effluent Treatment Plant (ETP).

4.2 BOTTLE WASHING:

Bottle washing section of beverage plant is the biggest wastewater generating source and its characteristics are also highly variable because of wide range of contamination in used bottles. This is fully atomized section in which movement of bottles are on conveyer belt. Washing of bottles completed in three phases- primary washing, caustic soaking and rinsing. In first phase bottles are primarily washed with last rinsed wastewater.



Primarily washed bottles are passed through caustic soaking tank. As shown in picture caustic soaking tanks are of variable size depending on capacity of bottling. Number of caustic soaking tanks is based on number of lines installed for bottling. Pre washed bottles are soaked for approximately 7.5 minutes in 3% caustic solution pre heated upto 85^0C. Temperature and carbonyl levels are regularly checked and maintained, as caustic solution of less than 01

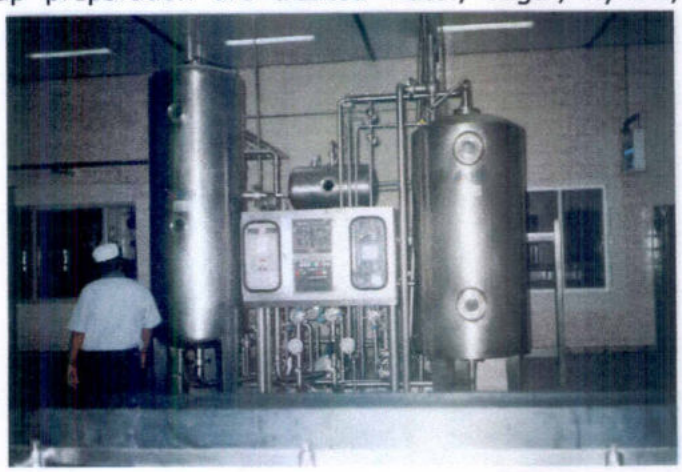
carbonyl level is not fit for use. **The most significant incidence in this process is removal of all coding ink from bottles that gets accumulated in caustic solution.**

This process of graduated colour removal from the bottles may lead to high concentrations of metals, accumulated in caustic solution. Caustic solution from tank is discharged in batches i.e. 3-4 times in a season.

After soaking, bottles are rinsed several times and wastewater generated from 1st rinse and from 2nd rinse in some plants is re-circulated. The wastewater of final rinsing is commonly used in pre-rinsing of used bottles and thereafter discharged to ETP.

4.3 SYRUP PREPARATION:-

The important ingredients for syrup preparation are treated water, sugar, hyflow, carbon, filter paper and concentrate. Initially syrup tank is filled with water, which subsequently heated up to 85^{0}C to clean and sanitize the tank. This hot water is allowed to run onward at least for 30 minutes to sanitize filter press and lines. After complete sanitation of system, syrup preparation starts with heating of required quantity of treated water up to 85^{0}C. Sugar is mixed slowly with agitation and again temperature is raised up to 85^{0}C. PAC (powdered activated carbon) is added for clarification of syrup and after agitation of 10 minutes hyflow is added. After 20 minutes contact time this complete mixture is passed through filter press for removal of PAC and keeps on re-circulating till syrup qualifies carbon carry over test of 0.45-micron filter.

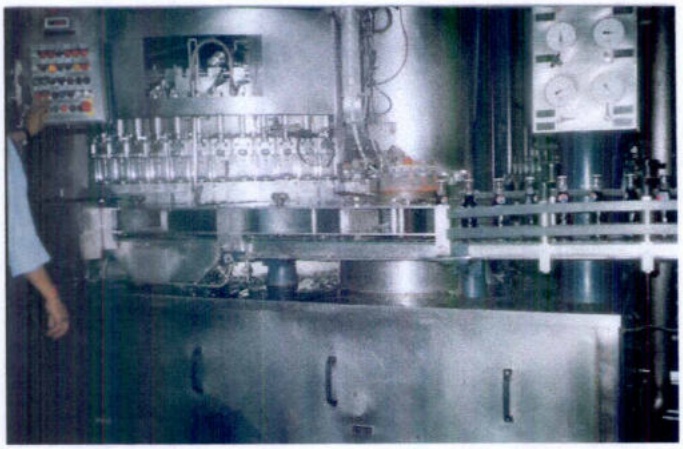


After complete removal of PAC, syrup is tested for ICUMSA test (sugar colour test) where colour of the syrup should not exceed 35. All these processes are completed at 85^{0}C and then syrup is allowed for cooling up to 25^{0}C. The process used for cooling is known as PHE (plate heat exchanger). In this process glycol is used as cooling agent and is in circulation. After complete testing for turbidity, ICUMSA and odor, syrup is transferred in pre sterilized syrup tank. After Brix and TOA, test syrup is ready for addition of concentrate and preparation of final

syrup. Syrup is agitated for 30 minutes after addition of concentrate and once again brix of syrup is recorded. More water is added to maintain volume and Brix as per MMI and recorded. After de-aeration of 1-4 hours, syrup is ready for bottling and for consumption with in specified period. Wastewater is generated from this section in washing of syrup tanks, flour and filter press. The wastewater generated from this section goes to ETP in common drain mixed with effluent of other sections.

4.4 BOTTLING:

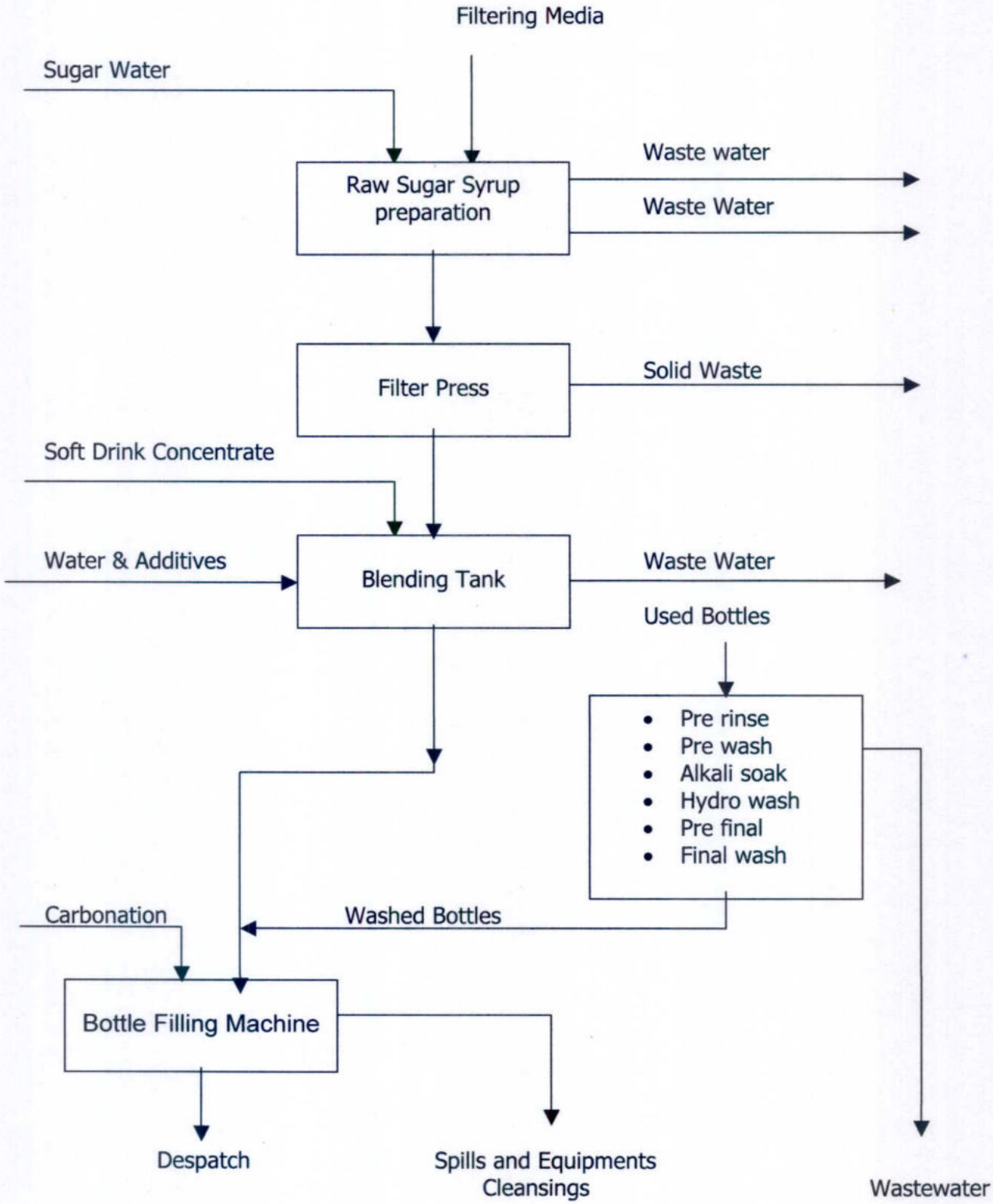
The process of bottling the soft drinks is fully automatic and carried through a programmed machine. Total number of bottles filled in a minute indicates the capacity of plant in term of bottles per minute (BPM). The process involves dilution of syrup, addition of carbon dioxide, controlled filling of bottles and finally capping. The movement of bottles is on conveyer belts starting from empty warehouse through washing section. Completely washed and dried bottles coming from washing section enters in bottling section, where these are filled with the help of nozzle outlet fitted in revolving machine. Every nozzle outlet is followed by mechanical capper to avoid any air contamination as well as escape of carbon dioxide. The same conveyer belt is used to take away filled bottles up to final product ware house and coding on these bottles is done in between by automatic machine, giving details of its batch number, expiry period, manufacturing date and time. The coding ink used in this process has a concentration of total chromium (70,000 mg/kg), cadmium (100 mg/kg) and lead (2500 mg/kg).



The process of pet bottling is different from glass bottling and do not involve washing section. Hence no waste water is generated in this process. Pet modules with readymade neck are used as raw material for pet bottle blowing. Beverage is filled in same automatic filling machines and thereafter capped. Coding ink is also used on these bottles for printing of manufacturing details. The process details are presented in the flow chart at Figure 01:

FIGURE 1:

FLOW SHEET SHOWING MANUFACTURING PROCESS OF SOFT DRINKS



5.0 RESULTS AND DISCUSSION:

1. In previous studies conducted by CPCB Zonal office, Lucknow, samples of paints collected from M/s Hindustan National Glass, Bahadurgarh, Haryana, got analyzed for heavy metals. The data produced is presented in Table: 03. M/s Hindustan National Glass, Bahadurgarh is the only plant manufacturing and printing the labels on the beverages bottles for Coca-Cola and Pepsi bottlers.
2. Results presented reveal that Chromium concentration in all types of paints varies from 0.06 – 20 mg/kg whereas cadmium concentration varies from 0.03-369 mg/kg. Lead powder as basic constituent of paint contributed it concentration between 22-252 gm/kg. As reported by industry all the paints used in this process is imported from M/s Ferro Corporation,105-115 Cochranes Road, P.O.Box number 231, Moorabbin, Victoria – 3189, Australia
3. Total chromium concentration in Domino coding ink was found up to 70 gm/ L.
4. The Arsenic metal concentration was found not traceable (NT) in all samples.
5. Cadmium concentration (0.003-0.09 mg/kg), Lead concentration (0.2-64.30 mg/kg) and Chromium concentration (0.02-0.1 mg/kg) were found only in sludge samples of industries. Analysis results of heavy metal analysis are presented in Table -01.
6. Copper and Iron being as basic elements were found present in almost all the samples.
7. Nickel was found present in samples of six industries only.
8. Organo-phosphorous pesticides (OPP) were found absent in all samples. Analysis was done for DMT- Dimethoate, CPP- Chloropyriphos, MPT- Methyleparathion, PPMD- Phosphamidon, MLT- Malathion, PFP- Prefnophos, QNP- Quinolphos.
9. Organo-cholorinated pesticides (OCP) namely Aldrin and Dieldrin were found not traceable in all samples. Analysis results of OCP pesticides are presented in Table-02.
10. Total BHC was found present in sludge sample of two PEPSI plants.
11. Ground water of Jabalpur and Jaipur has shown presence of pesticides.
12. Raw water treatment given by M/s SMV Beverages, Raipur and M/s Udaipur Beverages Limited, Jabalpur needs to be improved as concentration of Total Endosulfan was found increasing after treatment.
13. Increased lead concentration and presence of total Endosulfan in GW of Kaladera area in Jaipur indicate towards a trend of initial stages of ground water pollution.

6.0 OBSERVATION:

1. It has been observed that during washing of bottles, coding ink used for marking manufacturing and expiry details gets completely washed.
2. Various colours used for printing of bottles also gradually removed in due course of time.
3. The analysis of approximately 15 sludge samples revealed presence of total chromium (0.02-0.1 mg/kg), cadmium (0.003-0.09 mg/kg) and lead (0.2-64.03 mg/kg).
4. The presence of coding ink and traces of colours in soaked caustic solution, which ultimately joins ETP, is one of the major contributors for metal, in ETP sludge.
5. The major sources of other two metals i.e. lead and cadmium may be various colours used for printing the bottles. The path of movement for these metals is caustic bath effluent, in which concentration of lead varies from 3.23- 43.85 mg/L, cadmium 0.11-1.63 mg/L and total chromium 0.10-0.33 mg/L.

7.0 RECOMMENDATION:-

1. Data available indicates that the chief source of metals is originating from bottle washing effluent. It is also supported by observations made during monitoring and analysis of coding ink. In the process of bottle washing, previous codes of bottles get washed and coding ink keeps accumulating in caustic bath. It is also suspected that paints of various colours used for printing of bottles are contributing to heavy metals. Hence, separate treatment of soaking caustic waste may further reduce concentration of heavy metals in ETP sludge.
2. It is very important to develop a database for ground water quality in and around the bottling plants, as the initial stages of ground water pollution were observed. The industrial units and SPCBs may monitor the GW quality and ensure that corrective measures are taken in time.

Table: 01- Status of Heavy Metals in Beverages Plants

000013

Name of Industry	Sample Location	Parameters (Concentration in mg/l in liquid samples mg/kg in solid samples)						
		Cd	Cr	Cu	Fe	Ni	Pb	Zn
M/s Hindustan Coca Cola Beverages Pvt. Limited, Pillukheddi, District-Rajgarh MP	GW	NT	NT	0.03	0.19	NT	NT	0.07
	Treated GW	NT	NT	0.03	0.08	NT	NT	NT
	ETP Inlet	NT	NT	0.05	1.06	NT	NT	NT
	ETP Outlet	NT	NT	0.04	0.53	NT	NT	NT
	ETP Sludge- WTP	NT	0.062	0.003	14.800	0.099	0.056	0.035
	ETP Sludge	0.050	0.092	0.087	8.610	0.027	0.452	0.277
M/s Varun Beverages Limited, Bhiwadi, Rajasthan	GW	NT	NT	0.04	0.20	NT	NT	NT
	Treated GW	NT	NT	0.04	0.16	NT	NT	NT
	ETP Inlet	NT	0.07	0.10	3.77	NT	0.67	0.31
	ETP Outlet	NT	NT	0.04	1.66	NT	0.29	0.01
	ETP Sludge	0.104	0.180	0.122	12.500	0.015	0.786	0.774
M/S SMV Beverages, Raipur, Chattisgarh	GW	NT	NT	NT	1.52	NT	NT	NT
	Treated GW	NT	NT	NT	1.16	NT	0.46	NT
	ETP Inlet	NT	0.09	0.05	3.02	NT	0.33	0.01
	ETP Outlet	NT	NT	NT	2.39	NT	0.30	NT
	ETP Sludge –I	0.021	0.081	0.205	37.600	0.029	1.420	0.699
	ETP Sludge –II	NT	0.009	0.015	1.510	NT	NT	0.049
M/s Narmada Drinks, Bilaspur, Chattisgarh	GW	NT	NT	NT	0.16	NT	NT	0.06
	Treated GW	NT	0.11	NT	0.19	NT	NT	0.12
	ETP Inlet	NT	NT	0.03	0.49	NT	NT	0.15
	ETP Outlet	NT	NT	0.03	1.18	NT	7.05	0.07
	ETP Sludge	0.003	0.053	0.026	13.600	0.022	0.145	0.293
M/s Udaipur Beverages Limited, Jabalpur MP	GW	NT	NT	0.03	0.21	NT	NT	NT
	Treated GW	NT	NT	NT	0.12	NT	10.30	NT
	ETP Inlet	NT	NT	0.04	0.83	NT	0.29	0.05
	ETP Outlet	NT	NT	0.03	1.42	NT	0.11	NT
	ETP Sludge –I	0.006	0.077	0.207	16.100	0.046	0.194	0.294
	ETP Sludge – II	NT	0.045	NT	17.000	0.049	NT	0.084
M/s SMV Beverages, Mandideep, District-Raisen MP	GW	NT	NT	0.43	NT	NT	0.62	NT
	Treated GW	0.18	0.09	0.54	NT	NT	NT	0.21
	ETP Inlet	NT	0.05	9.83	NT	NT	0.74	0.24
	ETP Outlet	NT	0.04	2.48	NT	NT	0.27	0.41
	ETP Sludge- I	0.033	0.069	0.075	19.500	0.011	0.977	0.260
	ETP Sludge –II	NT	0.007	0.010	1.110	NT	NT	0.002
M/s Varun Beverage Limited , Jodhpur, Rajasthan	GW	NT	NT	NT	1.00	NT	NT	0.14
	Treated GW	NT	NT	NT	1.35	NT	NT	NT
	ETP Inlet	NT	NT	NT	0.30	NT	NT	0.08
	ETP Outlet	NT	NT	NT	0.23	NT	NT	0.01
	ETP Sludge –I	0.03	0.078	0.014	13.65	NT	0.644	0.254
M/s Hindustan Coca Cola Beverages Limited, Kaladera Industrial Area, Jaipur, Rajasthan	GW	NT	NT	0.05	2.93	NT	**14.80**	0.17
	Treated GW	NT	NT	NT	0.32	NT	NT	0.13
	ETP Inlet	NT	NT	NT	0.18	NT	0.20	0.06
	ETP Outlet	NT	NT	0.03	0.26	NT	3.57	NT
	ETP Sludge –I	0.039	0.06	0.056	8.00	NT	64.30	0.248
	ETP Sludge –II	0.096	0.027	0.043	7.03	NT	3.95	0.239

Abbreviations: Arsenic (As), Cadmium (Cd), Chromium (Cr), Iron (Fe), Nickel (Ni), Lead (Pb), Zinc (Zn)

Table: 02 - Status of Organo-Chlorinated Pesticides in Beverages Plants

Name of Industry	Sample Location	Parameters (Concentration in ng/l in liquid samples ng/kg in solid samples)		
		Total BHC	Total Endosulfan	Total DDT
M/s Hindustan Coca Cola Beverages Pvt. Limited, Pillukheddi, District- Rajgarh MP	GW	NT	NT	NT
	Treated GW	NT	NT	NT
	ETP Inlet	NT	NT	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge	NT	NT	NT
M/s Varun Beverages Limited, Bhiwadi, Rajasthan	GW	NT	NT	NT
	Treated GW	NT	NT	NT
	ETP Inlet	NT	163.61	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge	16.89	61.47	15.08
M/S SMV Beverages, Raipur, Chattisgarh	GW	NT	NT	NT
	Treated GW	35.40	41.80	NT
	ETP Inlet	NT	NT	NT
	ETP Outlet	26.95	NT	NT
	ETP Sludge -I	NT	NT	NT
	ETP Sludge –II	NT	NT	NT
M/s Narmada Drinks, Bilaspur, Chattisgarh	GW	NT	NT	NT
	Treated GW	NT	NT	NT
	ETP Inlet	NT	86.31	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge	NT	2.85	NT
M/s Udaipur Beverages Limited, Jabalpur MP	GW	NT	26.48	NT
	Treated GW	NT	59.89	71.45
	ETP Inlet	NT	NT	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge -I	18.65	NT	NT
	ETP Sludge –II	NT	NT	NT
M/s SMV Beverages, Mandideep, District- Raisen MP	GW	NT	NT	NT
	Treated GW	NT	NT	NT
	ETP Inlet	NT	NT	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge -I	NT	NT	NT
	ETP Sludge –II	NT	NT	NT
M/s Varun Beverage Limited , Jodhpur, Rajasthan	GW	**37.29**	NT	NT
	Treated GW	NT	NT	NT
	ETP Inlet	NT	NT	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge I	**8.20**	NT	**23.19**
	ETP Sludge II	NT	NT	NT
M/s Hindustan Coca Cola Beverages Limited, Kaladera Industrial Area, Jaipur, Rajasthan	GW	NT	**72.64**	NT
	Treated GW	NT	NT	NT
	ETP Inlet	NT	NT	NT
	ETP Outlet	NT	NT	NT
	ETP Sludge I	NT	**9.96**	NT
	ETP Sludge II	NT	**4.67**	NT

Note: Aldrin and Dieldrin were not found present in any of the samples.

Table: 03 Analysis Result of Different paint samples collected from M/s Hindustan National Glass, Bahadurgarh, Haryana

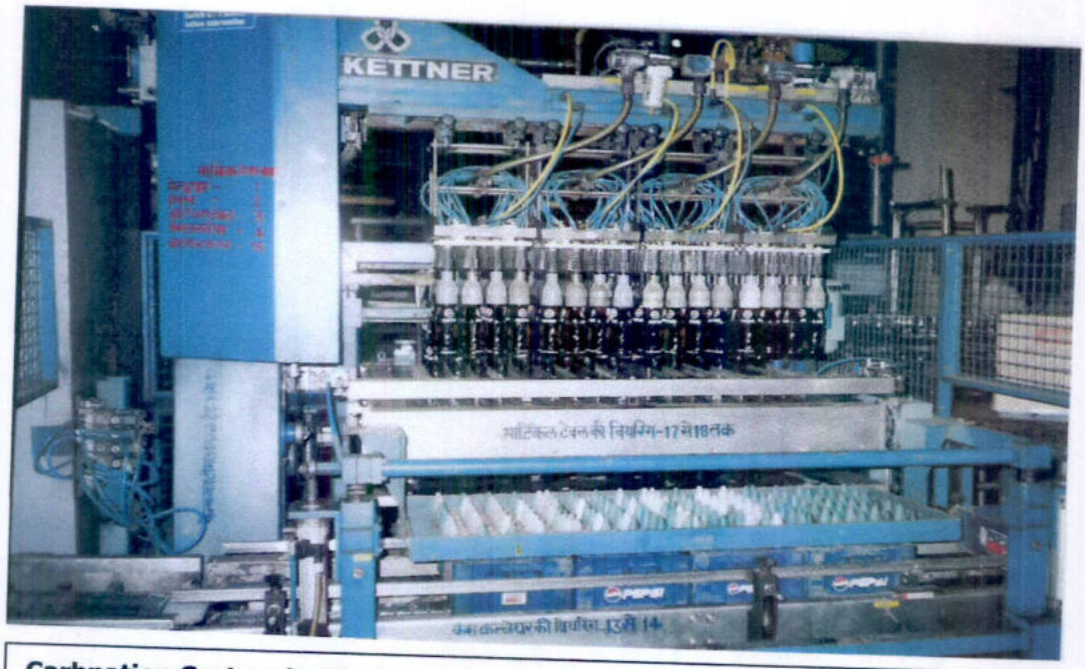
Sample code	Sample Description	Lab code of ZO Lucknow	Concentration in mg/lt (L) and mg/kg (S)		
			Cr	Cd	Pb
SDP-0134	Lipton Yellow – FERRO-404/60/25	754/5	10	260	260100
SDP-0135	Coke and Pepsi white 744/60	755/2	7	30	182100
SDP-0136	Slice green Johson Matthey – RBB- 401/64/64	756/5	20	360	199400
SDP-0137	Thumsup Blue FERRO – 248/60	757/5	ND	220	309800
SDP-0138	Thumps up red - FERRO-544/60	758/5	4	350	214300
SDP-0139	Limca Green – FERRO-696/60	759/5	20	260	22000
SDP-0140	Coke red- Ferro- 573 / 60/25	760/5	1	340	247500
SDP-0141	PEPSI Blue- FERRO – 246/60	761/5	ND	5720	272300
SDP-0142	Slice Yellow – Johnson Matthy – RBB 314 / 64 / 64	762/05	ND	36900	252700
SDP-0143	MIRINDA Green – FERRO-695 / 60	763/05	0.06	3820	148300
SDP-0144	PEPSI Red – FERRO- 558/ 60	764/5	ND	360	241000

TABLE 04: Detail of industries monitored under the project

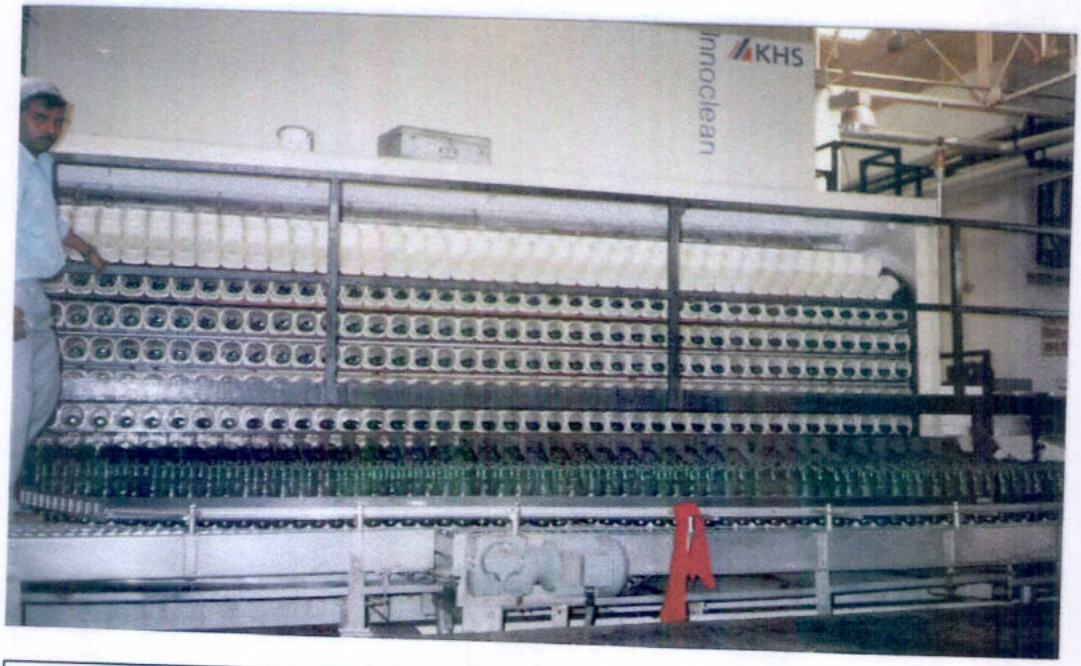
S.No	Name and address of Industry	Production Capacity	Water consumption KLD	ETP Capacity KLD	Actual effluent KLD	Sludge generation quantity TPA	Mode of Disposal
01	M/s Hindustan Coca-Cola Beverages Private Limited Raigarh, MP	Coca Cola 55 Lacs liters per year	Supply water 295	350 KLD /	217	1TPA	used in vermin composting
02	M/s Hindustan Coca-Cola Beverages Private Limited Jaipur Rajasthan	Coca Cola 1200 BPM Glass line	GW 243	450 KLD/	350	1.02 TPA	--
03	M/s SMV Beverages Pvt. Limited Raisen, MP	Pepsi 170 Million Bottles	GW 65	90 KLD	60	12.5	TSDF Pithampur
04	M/s SMV Beverages, Pvt. Limited Raipur, Chattisgarh	Pepsi 200 BPM glass line	GW 300	740 KLD	250	1.5	--
05	M/s Varun Beverages Limited Jodhpur, Rajasthan	Pepsi 1200 BPM Glass line	GW 150	600 KLD	250	3.2	--
06	M/s Varun Beverages Limited Bhiwadi, Rajasthan	Pepsi Glass line 720 BPM	GW 300	700	--	09	--
07	M/s Udaipur Beverages Limited Jabalpur, MP	Coca-Cola 35 Lacs Cases	GW 80	400	110	49 TPA	TSDF
08	M/s Narmada Drinks, Bilaspur	Coca Cola 400 BPM glass line	GW 300	400	270	03	Stored

-- indicates data not available.

Pet bottling line Hindustan Coca Cola Beverages Private Limited, Kaladera.



Carbnation System in Hindustan Coca Cola Beverages Private Limited.



Glass bottle washing line in M/s Varun Beverages Limited, Bhiwadi, Rajasthan

Carbon reject generated in soft drink industries during syrup filtration

ETP in Hindustan Coca Cola Beverages Private Limited, Kaladera.

Laboratory Establishment in soft drinks industries