

## Monitoring of Heavy Metals Pollution in the Soil Samples around Different Industries of Bilaspur District

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### Abstract

*Our environment degraded day by day and the environmental pollution is one of the undesirable side effects of industrialization. The assessment of heavy metals including Iron,arsenic,cadmium, mercury aluminium & Zinc in the soil<sup>1-6</sup> of industrial area around the different industries of Bilaspur district by different chemical and Spectrophotometric methods. Samples Collected from different locations of four industries. VNDANA POWER PLANT (VPP), NOVA (SPONG IRON) , MANGAL SPONG IRON (Bilha) & DOLOMITE MINES (Hirrimines).All soil samples those were collected from sponge iron industries have near about equal concentration of iron and the samples collected from mines have maximum concentration of aluminium. The concentration of Hg, Pb, As and cadmium found maximum in the samples of Vandana Power Plant. These heavy metals are very toxic and therefore dangerous for the health of human being as well as animals, so it is necessary for the industries to pre treat the effluent before drained out. Conclusion are made that the samples of wastes of the industries and the amount of heavy metals were found in tolerable limit.*

**Keywords:** Iron, arsenic, cadmium, mercury, aluminium, environmental pollution

### Introduction

Industries an important source of heavy metals<sup>6-11</sup>. Numbers of heavy metal are used by various industries. Agriculture soils are usually rich in heavy metal as a result of the use of various fungicides, herbicides, phosphates fertilizers, organic matter and presence of decaying plant and animal residue. The use of water irrigation industrial effluent and sewage sludge has further increases the quantity of heavy metal in agriculture soil. In certain case microorganism play an important role in release of metal. Heavy metals like As, Cd and Pb in more than permissible limits is hazardous for living organism. Heavy metal contents in crop plants which may result in serious health hazards such as kidney damage, anemia. Many scientists [1,2,3,4] have documented adverse effects of industrial waste on the growth of plants and has also been found toxic to several crop plants, on seed germination and growth of seedlings. So the objectives of this paper to assess the heavy metals in soil samples around different industries.

### Study Area

The study area of this paper covered 4 industrial regions in Bilaspur District of Chhattisgarh

1. VANDAN POWER PLANT located at distance 7 km from Bilaspur District.
  2. NOVA (SPONG IRON) located at 26 km from Bilaspur District
  3. MANGAL SPONG IRON (Bilha) located at distance 19 km,
  4. DOLOMITE MINES located at distance 15 km from Bilaspur District comes under the urban area.
- Soil samples were collected randomly from 4 selected industries. The objective of the present study is assessment of heavy metals pollution in the soil sample around different industries of Bilaspur

district. This can help in identification of environment impacts because of release of effluents, dust and wastes.

Heavy metals<sup>7-12</sup> estimation was carried out by using Perkin almer 2380 atomic absorption spectrophotometer with graphite hollow cathode lamp. The spectral and lamp current employed for each of the metal are specified. all chemicals were used of AR grade. Prepare samples and reagents according the appropriate methods.

### Results and Discussion

Results were obtained by the assessment of different soil samples collected around four industries are shown in table -1. Observed Heavy metals concentration of **As, Cd & Hg** were found in the samples collected from Vandana Power Plant, Nova Iron and MSI are the sponge iron industries therefore reported **Fe** amount is high. Value of **Al** found highest in the samples of Dolomite mines. If the value of **As, Cd & Hg** is increases the soil becomes toxic, increases value of Fe affected the growth of lower plant and soil becomes low fertile.

Tables of Results of soil Samples and Heavy metals –a, b, c, d, e & f

Soil samples	As
VPP	0.2569
NOVA	0.0687
MSI	0.0548
DOLOMITE	0.0642

(a)

Soil samples	Hg
PP	0.2121
NOVA	0.0562
MSI	0.0235
DOLOMITE	0.0547

(b)

Soil samples	Al
VPP	0.0959
NOVA	0.0756
MSI	0.0384
DOLOMITE	0.3122

(c)

Soil samples	Zn
VPP	0.0212
NOVA	0.0656
MSI	0.0235
DOLOMITE	0.0854

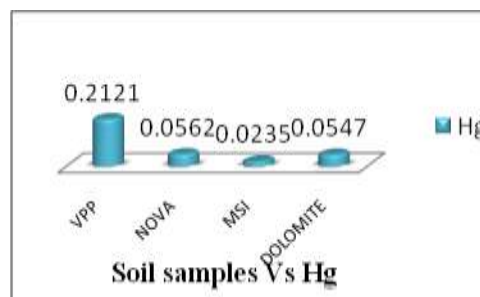
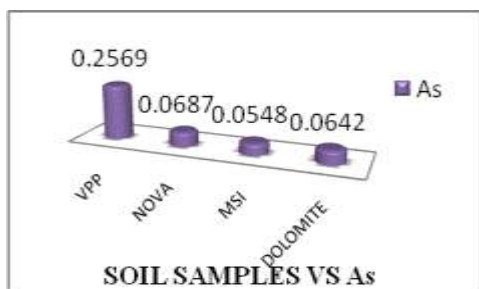
(d)

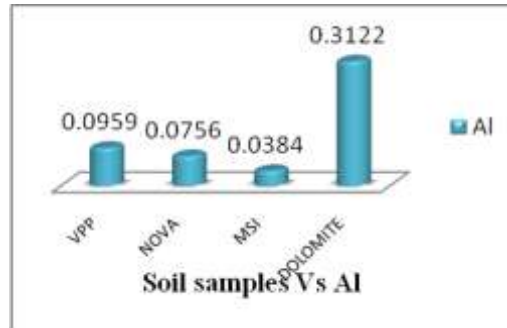
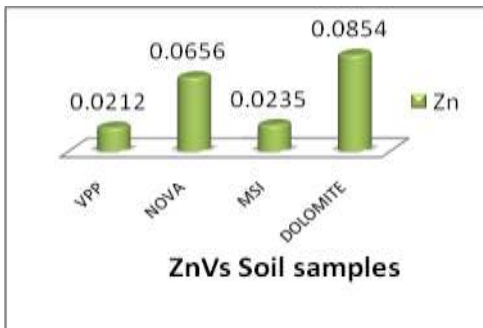
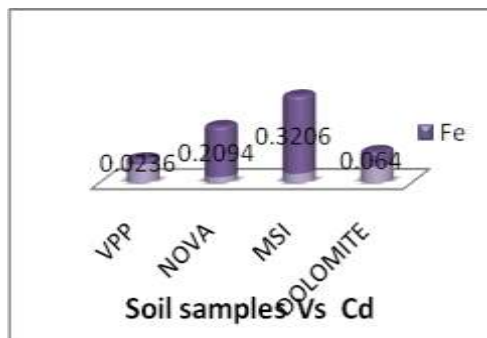
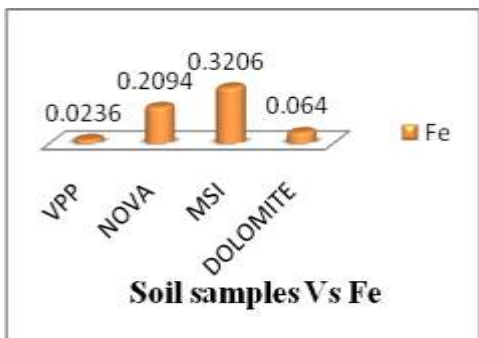
Soil samples	Cd
VPP	0.0756
NOVA	0.0234
MSI	0.0372
DOLOMITE	0.0662

(e)

Soil samples	Fe
VPP	0.0236
NOVA	0.2094
MSI	0.3206
DOLOMITE	0.064

(f)



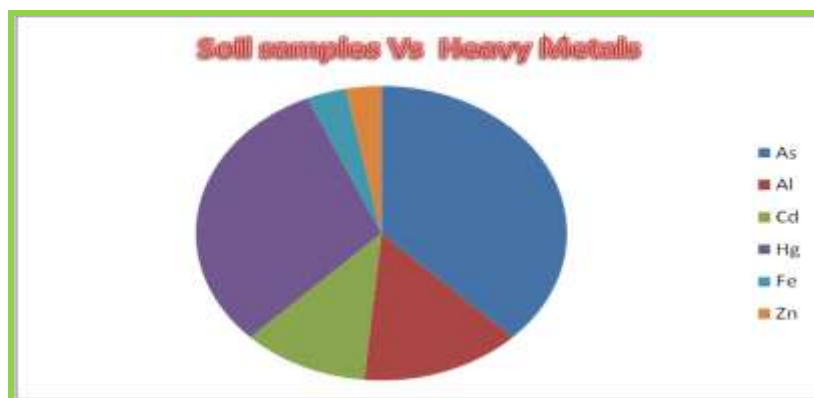


**Graphs of soil sample Vs Heavy Metals**

**TABLE -1: HEAVY METALS CONC. Vs SOIL SAMPLES**

Soil samples	Heavy metals					
	As	Al	Cd	Hg	Fe	Zn
VPP	0.2569	0.0959	0.0756	0.2121	0.0236	0.0212
NOVA	0.0687	0.0756	0.0234	0.0562	0.2094	0.0656
MSI	0.0548	0.0384	0.0372	0.0235	0.3206	0.0235
DOLOMITE	0.0642	0.3122	0.0662	0.0547	0.0640	0.0854

**GRAPH – 1: HEAVY METALS CONC. VS SOIL SAMPLES**



## Conclusions

Conclusions are made that the As, Cd, Hg & Al were found in tolerable limit while increased amount of Fe reduces the fertility of soil. So pre treatment of waste water is necessary for the industries before drained out.

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