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Assessment of Heavy Metals Contamination in Ground Water around Industrial Region in Nadar Ganj Lucknow

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Abstract: ***Nadar Ganj being a prominent industrial area of Lucknow Uttar Pradesh, owes its significance to diverse group of industries. this study is to investigate the pollution of bore water in the industrial region in Nadar Ganj industrial area in Lucknow. The contamination of groundwater is one of the most important environmental issues in the world. Among the various pollutants that affect water resources, pollutants containing heavy metals are particularly important due to their high toxicity, even at low concentrations. The percolation water picks up a large number of heavy metals and reaches the aquifer system and contaminates ground water. five ground water sample were collected from the study area in February 2021.the heavy metals (Pb, Fe, Cu, Cr, Ni).***

Keywords: water quality, pollutants, Lucknow city, industrial area, heavy metals.

I. INTRODUCTION

Groundwater has emerged as the primary democratic water source and poverty reduction tool in India. On account of its near universal availability, dependability and low capital cost, it is the most preferred source of water to meet the requirements of various user sectors in India. Ground water has made significant contributions to the growth of India's Economy and has been an important catalyst for its socio-economic development. Heavy metals pose a threat to the environment due to their toxicity. n, the groundwater can be contaminated due to the continuous leaching of heavy metals. Contamination of groundwater by heavy metals may pose a more serious and continuing health risk to humans and the environment. Water quality is inherently linked with human health, poverty reduction, gender equality, food security, livelihoods and the preservation of ecosystems, as well as economic growth and social development of our societies in urbanization, industrialization and agricultural activities have adversely affected the quality of both surface water and groundwater across the globe.

The Ground water is the common source of drinking water. The ground water is potable when compared to surface water. The ground water is susceptible to pollution due to excessive usage of fertilizers, pesticides, increased anthropogenic activities and fast growth of industries. The area where population is mostly dependent on ground water for their daily activities are more contaminated and polluted.

Lucknow is the capital city of the most populous state Uttar Pradesh and is one of the fastest developing urban centers of India. The city is facing a rapid change in environmental quality. Rapid urbanization leads to many problems as it places huge demand on land, water, housing, transport, health, Education etc. The city has an alarming increase in population it increased from 0.497 million in 1951 to 2.267 million in 2001 and 2.714 million in 2006 to 3.306 in 2011 increased 4.56 times (456 per cent) during the last fifty years. The growth rate of population Lucknow was at 7.12% per annum. This rising population density has major impact on natural resources of the area especially on water quality and quantity.

II. METHODOLOGY

A. Site Description

To thoroughly investigate the Physio Chemical Parameters in the Nadar Ganj industrial areas of Lucknow city, 5 different sites are further selected for sampling purpose and analysis. Groundwater samples are collected and analyzed from the proposed locations once in a month for 2 months period (January -February).the ground water analyzed for five heavy metals. etc. These parameters helped in Understanding the Contamination level of the ground water of any locality. Coordinates of each sample point location were recorded in the field through handset GPS. These sample point locations have been shown in Table.

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Table 1: Location of Sampling Points

S. No	LOCATIONS	LATITUDE	LONGITUDE	ALTITUDE
1.	Royal wine liquor industry (site1)	26.76619º	80.86641º	170.67m
2.	Rajshreefactory (site2)	26.76389º	80.86991º	170.40m
3.	United sariya (site3)	26.76825º	80.87006º	170.96m
4.	P.N. safetech. pvt. L T D (site4)	26.77523º	80.86644º	170.83m
5.	NAQ convent school (site5)	26.77926º	80.86227º	168.79m

Fig. 1 Location of sites

B. Sampling Procedure

The groundwater samples were collected in a pre-cleaned tarson of 1000mL capacity. Proper procedure was followed as described by APHA-AWWAWPFC (23rd edition) for the sampling and the analysis purpose of the selected parameters to avoid any contamination during collection, storage, and precise determination of concentrations of the groundwater samples. Each sample in the collected bottles was capped tightly to avoid leakage and contamination from any pollutants during handling and transportation. The bottles were adequately labeled by date and locations, the source of water to recognize sampling point during chemical analysis. All the collected samples were preserved in cold and transported to the laboratory where they were stored in the freezer at 4 °C until used for final chemical analysis



Fig. 2 Sampling

III. RESULT AND DISCUSSION

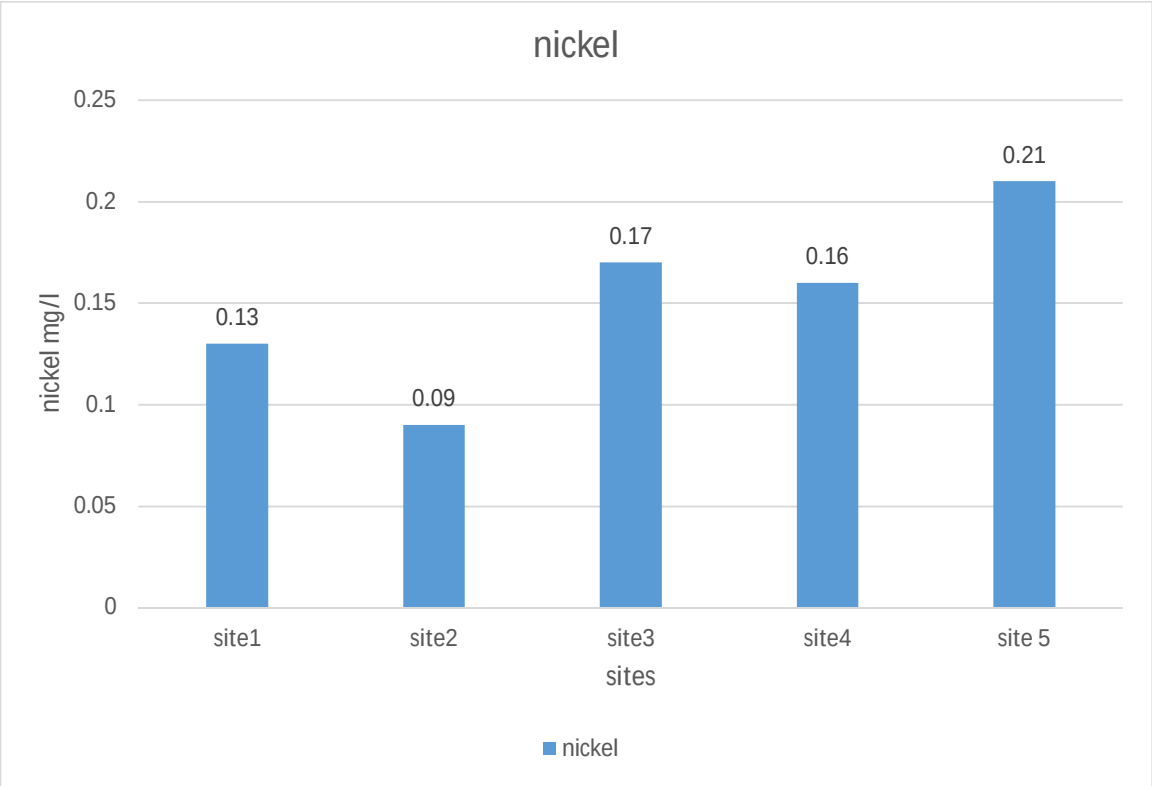
The laboratory analyses of the water quality sample of the 5 sample sites. The water samples were analyzed for physicochemical characteristics. A total of five heavy metals were analyzed namely lead, iron, copper, nickel, chromium. etc.

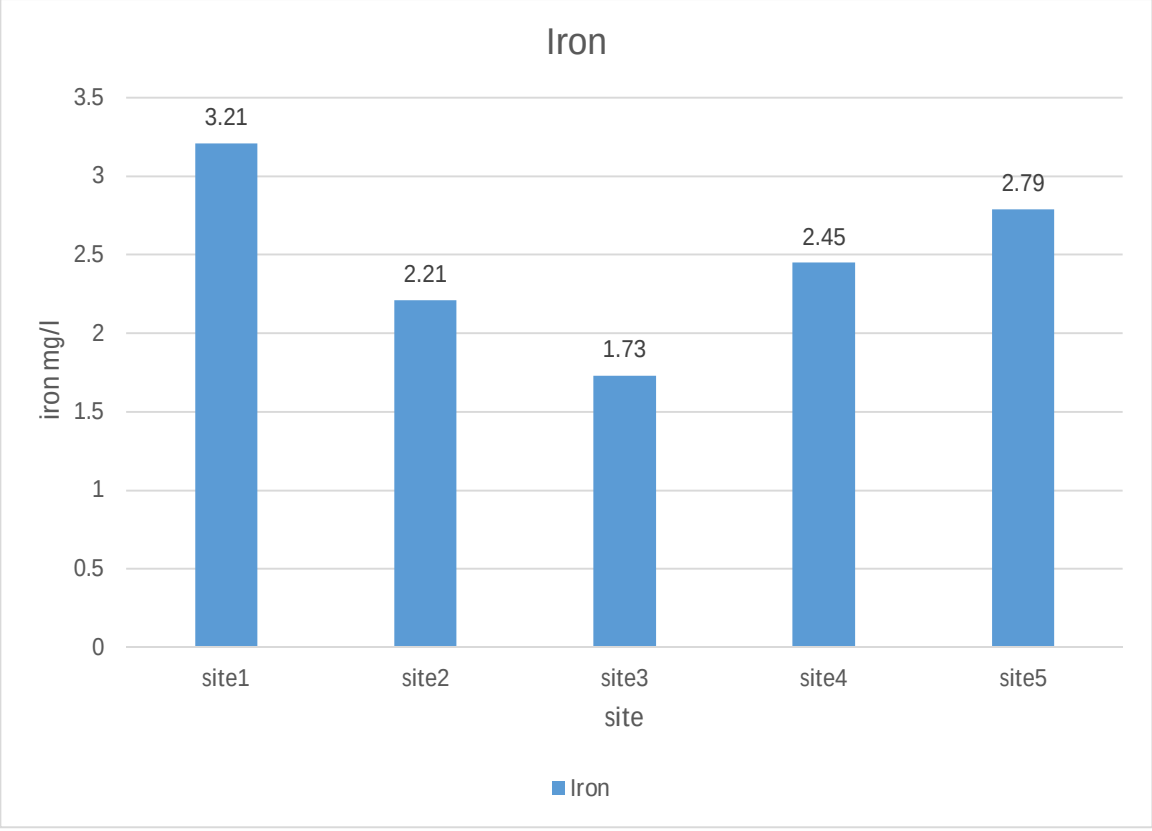
Table 2: results of heavy metals of water sample at different LSampling Points

Quality Parameters	Units	SITE1	SITE2	SITE3	SITE4	SITE5
Iron	mg/l	3.21	2.21	1.73	2.45	2.79
Nickel	mg/l	0.13	0.09	0.17	0.16	0.21
Lead	mg/l	0.23	0.69	0.13	0.33	0.67
Chromium	mg/l	0.09	0.08	0.12	0.16	0.05
Copper	mg/l	0.22	0.26	0.09	0.18	0.17

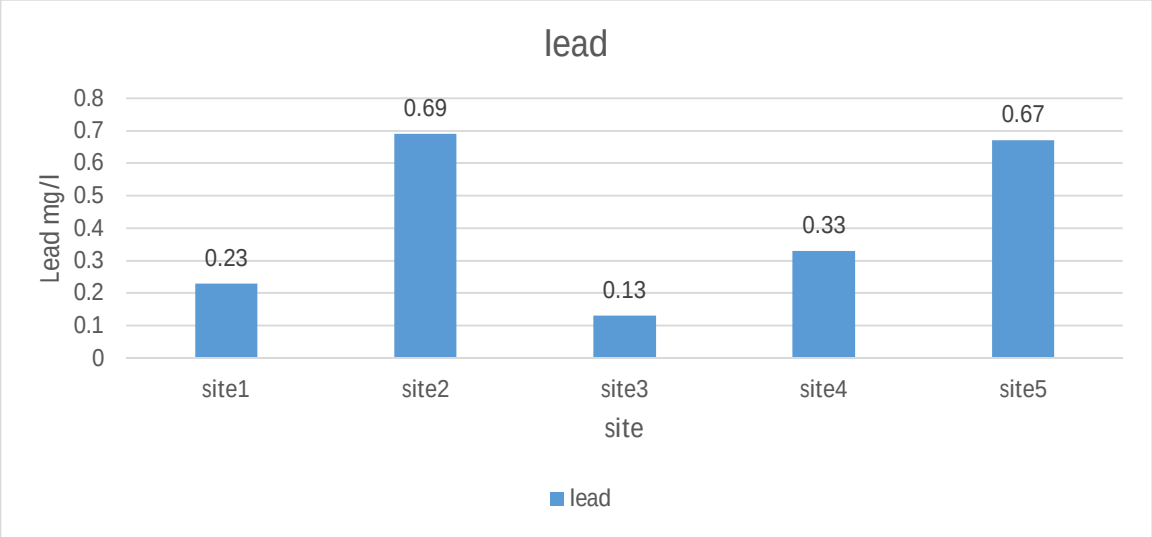
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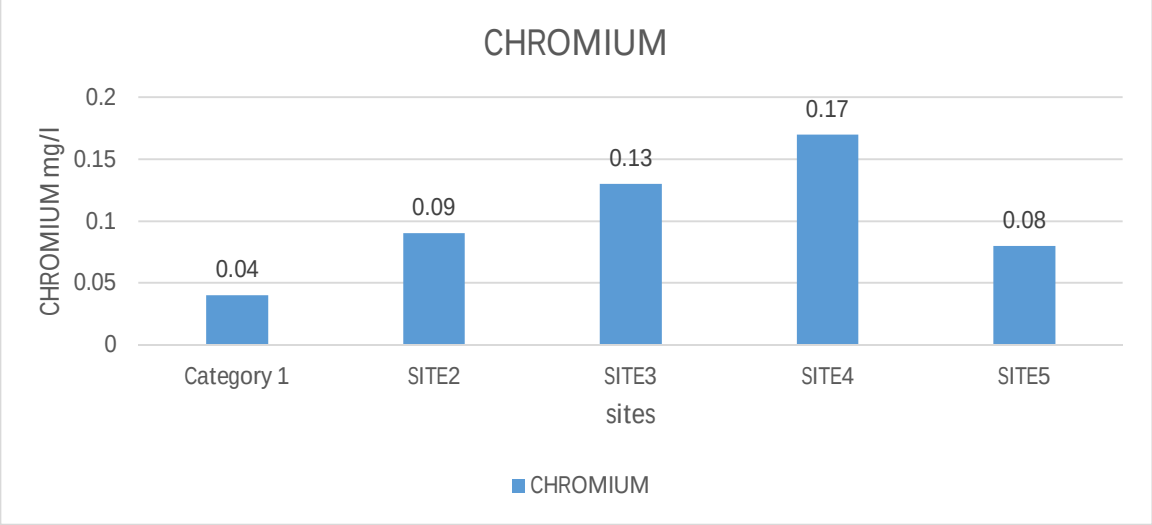
A. Comparison Of Heavy Metals At Different Sites

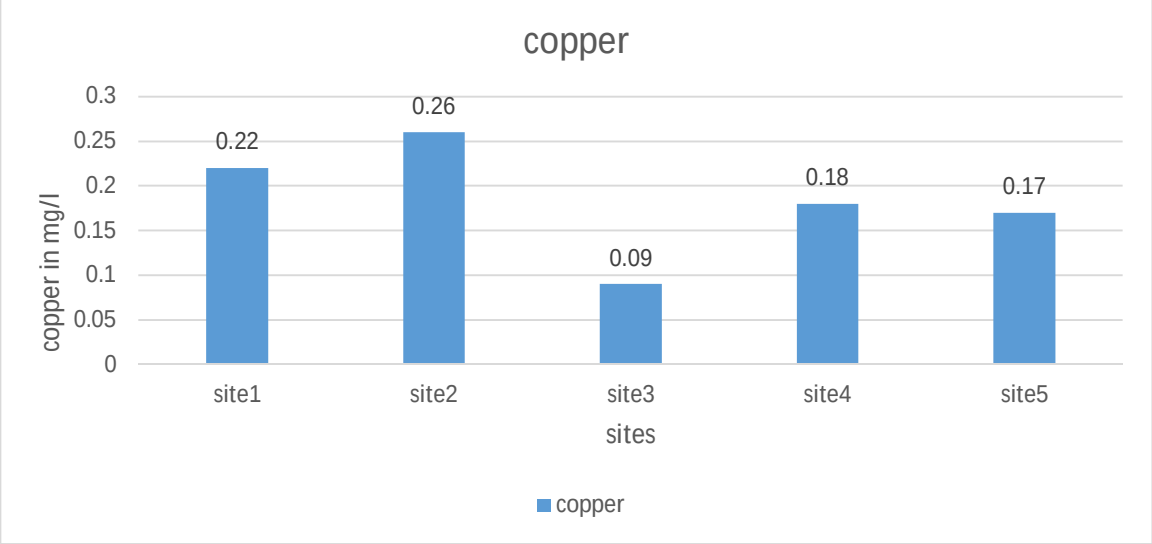




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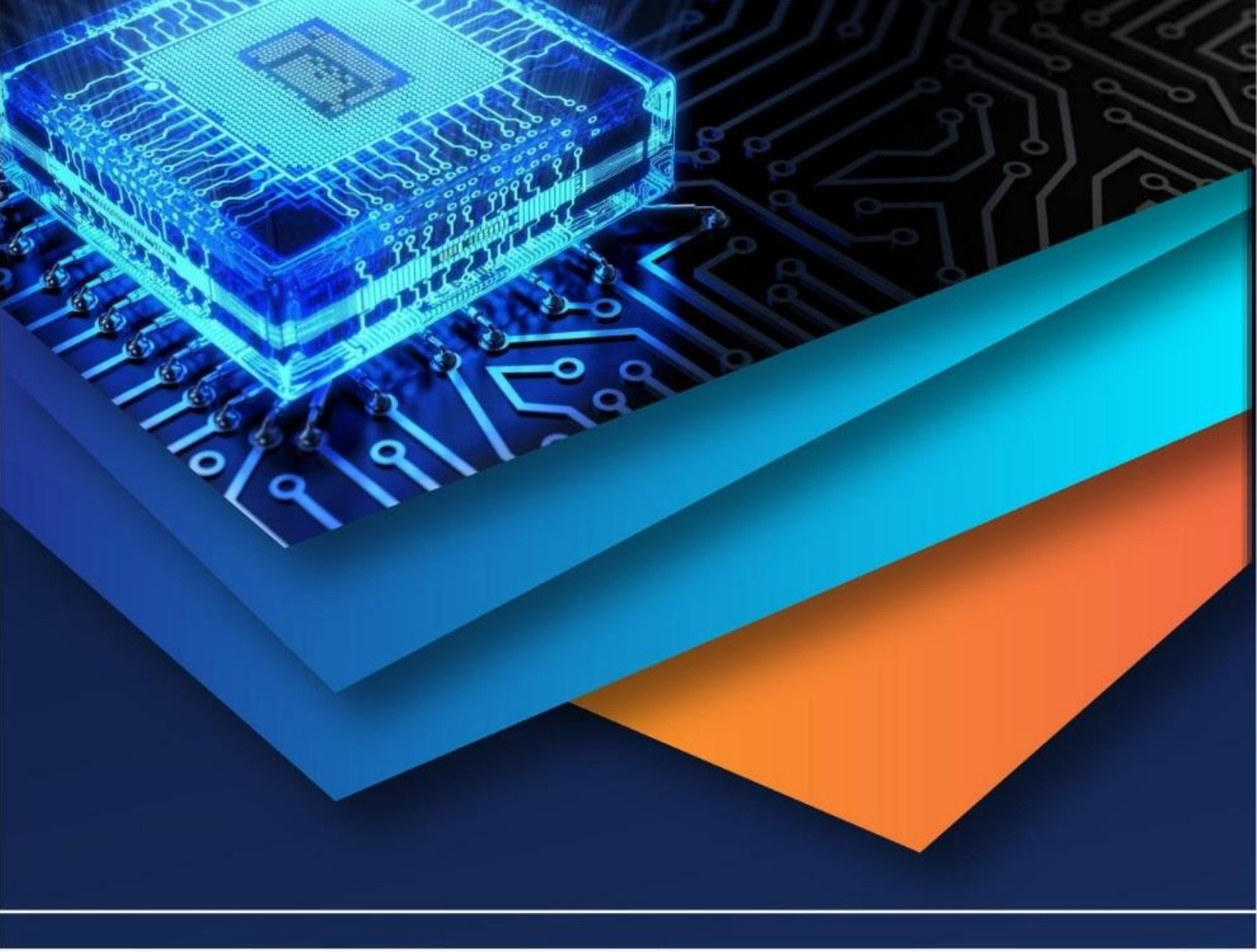
IV. CONCLUSION

In the present study, physio chemical analysis was carried to out to assess the heavy metal in selected location of Nadar Ganj industrial area of Lucknow. Different observation can be concluded from analysis. The heavy metals in different location of Nadar Ganj industrial area varies from location to location because of present of various type of industries. If we compare these results to standards of heavy metal for drinking water, we found that every heavy metal has greater value than acceptable limit. The high level of heavy metals very dangerous for human health. Some combined steps should be taken to bring the parameter within limit so that water become more potable in industrial area around Lucknow.

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