iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 4 **Issue:** XI **Month of publication:** November 2016

DOI:

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Phytoremediation of Contaminated Soil

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Abstract: ***This dissertation presents the status of phytoremediation technologies. Due to their immutable nature, metal are a group of pollutants of much concern. A result of human activities such as mining and smelting of metalliferous ores, gas exhaust, electroplating energy and fuel production, fertilizer and pesticide application, etc. The heavy metal pollution has become one of the most genuine natural issues today. Phytoremediation is an emerging cost effective, non-intrusive and aesthetically pleasing technology that uses remarkable ability to plant concentrate element and compounds from environment. Within the field of phytoremediation, the utilization of plants to transport and concentrate metals from contaminated soil in to the harvestable part of roots and above ground shoots. Plant roots, shoots and soil sample were collected and analyzed for selected metal concentration values. To evaluate the potential of plant species for phytoremediation. The result of this study can be used for management and decontamination of soil with heavy metals using plant species having phytoremediation potential/characteristics. The collection of sample in contaminated area (surajpur, Ghaziabad, Hindan River and kasna). In this study the find out of heavy metals on AAS instruments. The plants are growth time to time and decrease the heavy metals. Red Cabbage and Sunflower is the fast accumulate heavy metals concentration in compare to the other plants. When use of chelating agent the uptake mechanisms is fast.***

Key Words
Most of the industrial waste water contains heavy metals similar to Cadmium, Chromium, Lead, copper and Zinc.

I. INTRODUCTION

Heavy metal pollution of soil and water is a serious environmental problem facing the modern world. The heavy metal concentration in different environments is increasing in the environment due to increase in number of refinery industries, coal mining, wooden industries, and electronic industries. Most of the industrial waste water contains heavy metals similar to Cadmium, Chromium, Lead, copper and Zinc. Among heavy metals Chromium is the major pollutant of the leather tanning industry and is more toxic in plants and animals around as metal corrosion inhibitor, in paint as pigments and other different applications. At the present time, environmental problems are critically important to the direct harm they impose a human health and life cycle. Industrial and municipal wastes generate a large deal of particulate emission and waste slag enrich in heavy metals that contaminate the surrounding-soil, water along with air. Such effects are particularly serious and pretense a severe nature and human health danger when smelting works are located in the surrounding area of urban environments. Conventional techniques of soil remediation are costly and may possibly reason the secondary pollution. Phytoremediation is newly developing field of science and technology to clean up polluted soil, water or air Hazardous waste contaminant is an environmental problem which generally comes from industrial activity such as mining, smelting of ferrous and non-ferrous ore fertilizer-pesticide application or unacceptable disposal of municipal waste. Phytoremediation is a biological methodology which used selective plant for removing heavy metal from the soil. In this research used Sun Flower, Red cabbage was selected to reduce the dispersion of heavy metal in soil, due to their physical properties. Not only the Sun flower and red cabbage normally found in the local area, but it also grows well in areas with normal and contaminant soil. The root of sunflower can deeply plunge into the soil. So the plant can translocation large amount of heavy metal. These plant species mixed to get homogenized from. The quality of environmental components of the most important city in India has been rated in the form of the Comprehensive Environmental Pollution Index (CEPI) by the Central Pollution Control Board (CPCB), which has drawn the awareness of the research community in devising techniques to down the levels of pollution in the environment. Many technologies, physico–chemical and biological techniques, precipitation, reduction, oxidation, microbial combination and phytoremediation have been used for Chromium removal.

II. METHODS AND MATERIALS

A. Plan Review

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Volume 4 Issue XI, November 2016
ISSN: 2321-9653

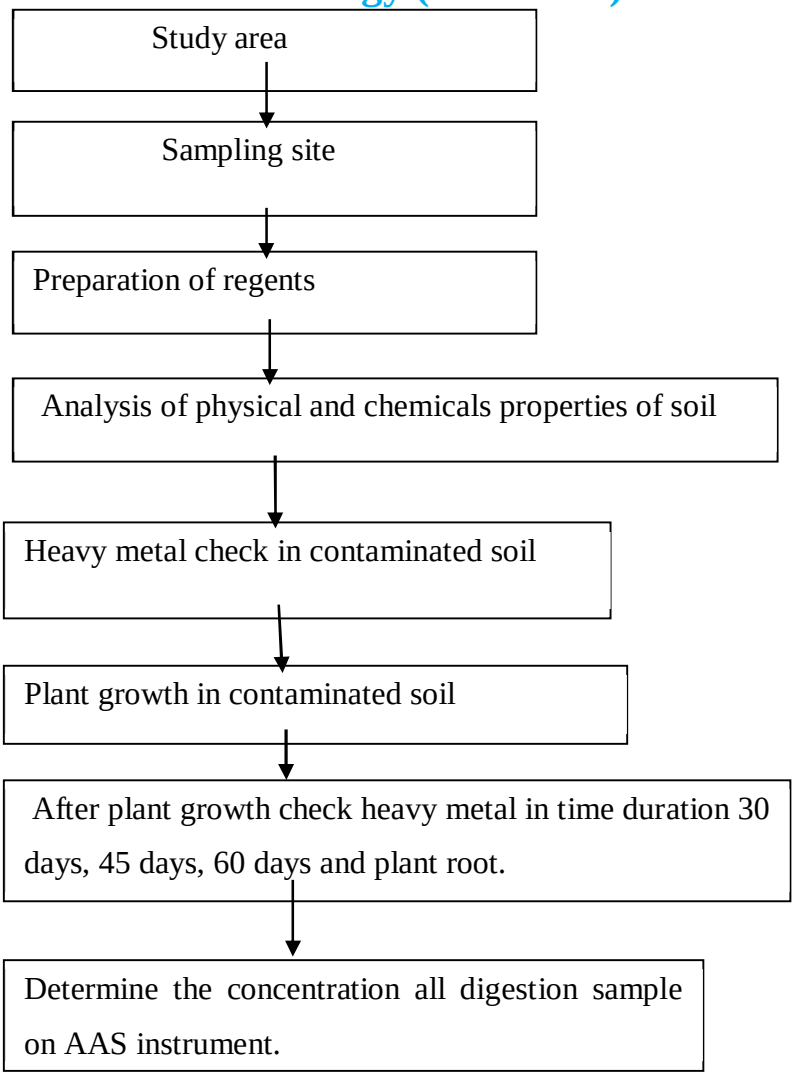

Fig 2.1: Plan review

Fig 2.2 Pots with soil

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Volume 4 Issue XI, November 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Fig 2.3: Pots with plants at the time=45 days

Fig 2.4: AAS instruments(AAS= Atomic Absorption Spectrophotometer)

Fig 2.5: Plant and digestion on hot plate

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Volume 4 Issue XI, November 2016
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

B. Heavy Metal Concentration of Fourth Sampling in Soil

The fourth soil sampling plant growth after 60 days. This time to mechanisms to applied phytoextraction. This phase of the heavy metals is uptake to roots to shoots. The again procedure follow sample digested and check AAS instruments.

Indian mustard (60 days)

Table 1: Concentration in Indian mustard soil (t=60 days)

SN	SOH3	SOS3	SOG3	SOHR3
As	0.042	0.079	0.017	0.013
Cu	0.131	0.113	0.012	0.129
Pb	0.178	0.098	0.089	0.092
Cr	0.01	0.089	0.083	0.038

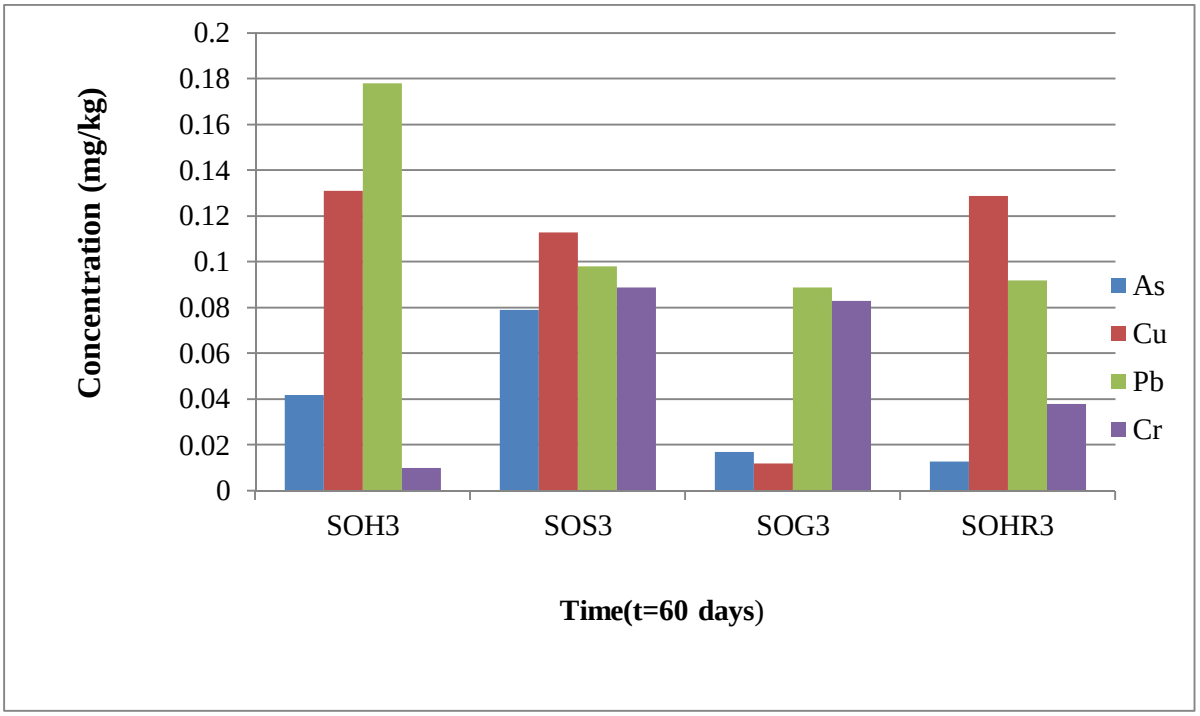

Fig2.6: Concentration in Indian mustard soil (t=60 days)

This figure shows that concentration of heavy metals uptakes after 60 days sampling. The Indian mustard roots heavy metals uptake to shoots.

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Volume 4 Issue XI, November 2016
ISSN: 2321-9653
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Cineraria (60 days)

Table 2: Concentration in Cineraria soil (t=60 days)

SN	SOH4	SOS4	SOG4	SOHR4
As	0.033	0.081	0.019	0.009
Cu	0.129	0.121	0.009	0.109
Pb	0.145	0.119	0.091	0.149
Cr	0.019	0.109	0.049	0.097

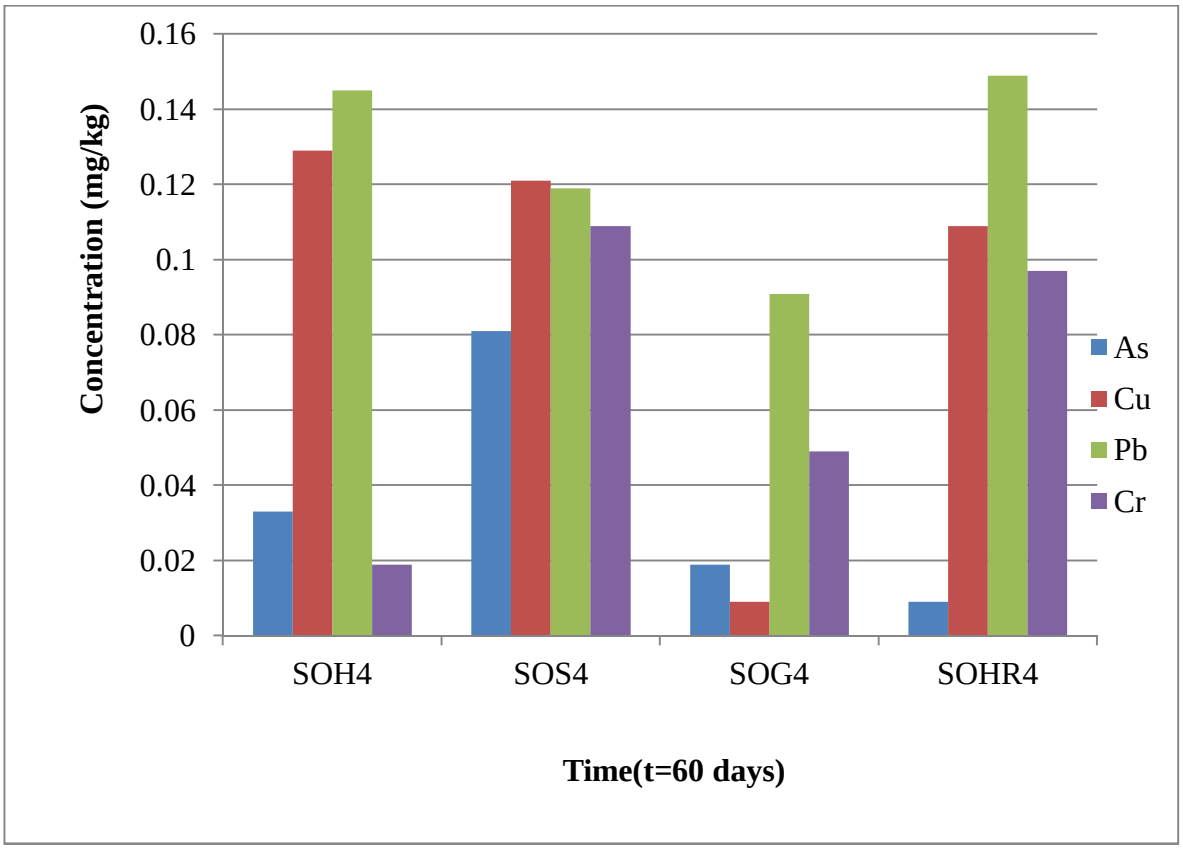

Fig 2.7: Concentration in Cineraria soil (t=60 days)

This figure shows of the metal concentration of the decreases at sampling after 60 days. Cineraria plant is uptake of the all heavy metals

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Volume 4 Issue XI, November 2016
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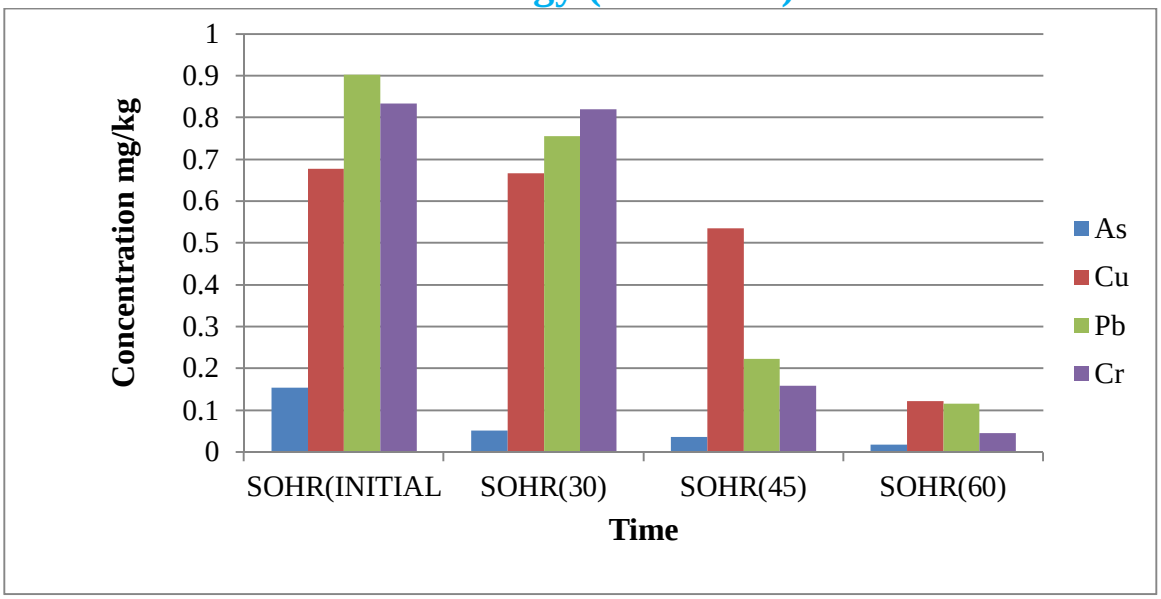

Fig 2.8: Concentration of Cineraria SOHR

In this figure show that the concentration in soil. This concentration was decreased in the time to time plant is growth.
The all of figure shows that result and the heavy metals concentration is decreases with time to increases plant species.

After 45 days plant growth to adding chelating agents. This agent is increase the uptake mechanisms reaction.
This result shows the heavy metals accumulate at the using of accumulating plants.

III. CONCLUSION AND RECOMMENDATION-

The present study of phytoremediation technique of heavy metal contaminated soil from a mining smelter, wooden industries, electroplating area, waste sludge area and etc. Using the PBASE method the total bio-concentration determined in the respective soil. The use of plants to be remediate contaminated soil. Sunflower is fast uptake heavy metals and Red cabbage, Cineraria plants are average heavy metals accumulate.

The trends and finding of this study are listed in the order of their importance relative to remediation of the heavy metals contaminated for this site.

A. Developing such sites gives good chances for phytotechnologies to be among a mix of invasive and noninvasive techniques and approaches to be used for site development, especially when creating parks and recreational areas.

B. Present study is in-situ technique and this study is better to ex-situ technique. Low costly, low time period.

C. The results are showsn in this processes recommend the sunflower and Indian mustard oil is use after complete refined.

D. Recommend this process is used every year to contaminated area ;like industrial area, mining area etc

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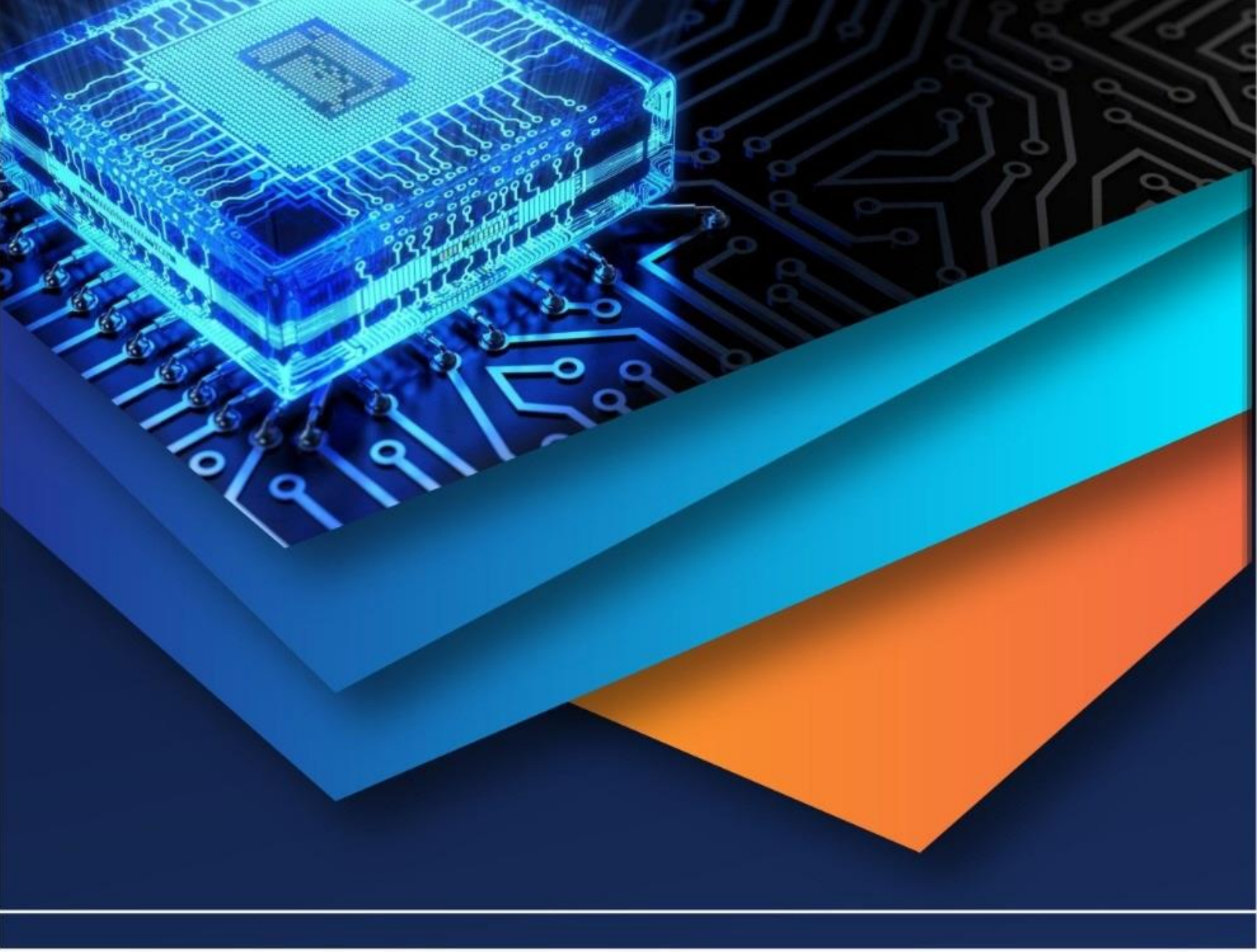

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