

Estimating the Concentration of Lead and Cadmium for Some Areas of Najaf Governorate

Hakeem J. I.

Assistance Prof., Department of Environment, Faculty of Science, University of Kufa, Najaf, Iraq

Abstract

The study showed that lead element is higher than the normal limits due to the high level of gases. Which makes the concentrations of lead vehicles in the fuel used high. Cadmium is within the normal level because the sources of this element in the study areas are limited.

Keywords: *Heavy metals, pollution, concertation, health, raw materials.*

Introduction

Heavy elements, or what is known as heavy metals, are defined as those elements that are more than five times the density of water, and they have negative effects on the environment when they are used excessively, as they affect human, animal and plant health⁽¹⁾.

Lead is one of the most dangerous and widespread pollutants as a result of the significant development achieved in the chemical and mining industries and the growing uses of this mineral in various technologies⁽²⁾. The importance of any source of exposure to lead differs according to the geographical location, climate, ground chemistry and industrial activities, as well as the exposure intensity that the individual faces with different age, gender, profession, food, and culture. The population of developing countries is higher because their lead protection rules are less stringent than in developed countries⁽³⁾.

Cadmium is one of the toxic heavy metals that play an important role in environmental pollution and constitutes a threat to human and animal health alike^(4,5), as it is found in nature in a pure form linked with other raw materials⁽⁶⁾ and is excreted to the environment from industrial waste and from agricultural fertilizers⁽⁷⁾.

Corresponding Author:

Hakeem J. I.

Department of Environment, Faculty of Science,
University of Kufa, Najaf, Iraq
e-mail: hakilaby@gmail.com

Materials and Method

Sample collection

Soil samples were taken from the most traffic-crowded areas in the province of Najaf

1. Intersection of the airport
2. The intersection of the twentieth revolution
3. The intersection of Al-Sahedrin
4. Al-Zahra'a intersection
5. Al-Wafa University intersection
6. Al Mukhtar Tunnel
7. The intersection of the northern transportation garage
8. The intersection of the southern transport garage
9. Najaf - Karbala checkpoint
10. Najaf Control - Abu Sukher

The chemicals used:

1. Hydrochloric acid
2. Nitric acid

Method of measuring concentrations

After drying and grinding the sample and sifting it, we do the following

1. Take (0.5) grams from the sample and put it in a conical flask
2. Digest the sample by adding a 3: 1 ratio of hydrochloric acid to nitric

3. Evaporate the sample by placing the beaker on a constant heat source until all the liquid has evaporated
4. We add nitric acid with 2% dilution.
5. Filter the sample and supplement the filtrate to 100 ml with distilled water
6. The sample is measured using atomic absorption technology

Results and Discussion

Table 1 shows the concentration of lead in soil samples for some areas of Najaf Governorate. Table 2 shows the concentration of cadmium in soil samples for some areas of Najaf Governorate.

Table 1 Concentrations of lead

Region	Lead (ppm)
Al Mukhtar Tunnel	0.142
Najaf-Karbala checkpoint	0.171
The intersection of Al-Sahedrin	0.191
Twentieth Revolution Zone	0.174
The control of Abu Sakhir	0.12
Airport junction	0.161
The intersection of Wafa-Jahma	0.12
Southern garage	0.141
North garage	0.191
Al-Zahra'a intersection	0.135

Table 2 Concentrations of cadmium

Region	Cadmium (ppm)
Al Mukhtar Tunnel	0.0182
Najaf-Karbala checkpoint	0.015
The intersection of Al-Sahedrin	0.0189
Twentieth Revolution Zone	0.0121
The control of Abu Sakhir	0.011
Airport junction	0.01
The intersection of Wafa-Jahma	0.009
Southern garage	0.015
North garage	0.0058
Al-Zahra'a intersection	0.017

The study showed that the levels of the lead element are higher than the normal limits due to the high level of gases emitted from cars, as these areas are very congested, especially at peak time, and the lack of control over the specifications of fuel used in automobile engines, which makes the concentrations of lead vehicles in the fuel used high. Cadmium is within the normal level because the sources of this element in the study areas are limited.

Conclusions

Lead element are higher than the normal limits due to the high level of gases emitted from cars. Cadmium is within the normal level because the sources of this element are limited.

Ethical Clearance: This study was approved by the Ethics Committee, University of Kufa. The study protocol was thoroughly explained for using samples. This investigation was done according to the principals of the Declaration of Helsinki.

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Conflict of Interest: Nil

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