Study Soil Contamination Surrounding The Brick Factory In Al- Saniyah/ Al- Diwaniyah / Iraq

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ABSTRACT
The study was conducted on the effect of the brick factories in Saniyah on the surrounding soil, with dimensions of 50 m, 500 m, and 1000 m, depending on the direction of the prevailing winds and opposite to the direction of the prevailing winds as well, at 50 m, 500 m, and 1000 m. The concentrations of lead and copper were measured in the soil in two phases : exchangable and residual. The highest concentrations were for lead in the winter. In the alternating part towards the wind, it reached 36.15, and the lowest concentration was in site 5, opposite the direction of the wind. As for the copper element, its highest value was 4.76 in the third site towards the wind, and the lowest value was 1.1 at a distance of 50 m from the chimney, against the direction of the wind. We note that for both elements, the residual phase value is higher than The value of exchangable phase in the direction of the wind is higher than in the opposite direction.

1. Introduction

Pollution is a change in the composition of one of the main elements in the environment, It may occur naturally or through the influence of humans or animals, and most environmental problems are the result of unacceptable human behavior, which causes environmental pollution to achieve self-interest, any hazardous gasses, liquids, or solids with larger concentrations than those that have an adverse effect on the environment might be considered pollutants (1).

The surface layer of agricultural land is known as soil, and it was created over millions of years by a number of intricate processes. When foreign elements enter the soil or when the concentration of one of its natural components rises, the soil becomes contaminated and changes in both its chemical and physical composition. We refer to these substances as soil contaminants. Pesticides, chemical fertilizers, acid rain, household or industrial trash, and radioactive waste are a few possible culprits (2).

The quality of soil has a significant impact on food safety, crop product quality, and ultimately human health. Soil is a complex, living, always changing, and dynamic component of the ecosystem that is essential to human existence and social progress (3).

Contaminated sites include areas containing waste from human activities that have discharged pollutants into soil, air, surface water, groundwater, and the food chain, and that cause or are capable of causing impacts on human health (4) . Brick manufacturing produces a lot of solid waste and pollution, including destructive materials used in manufacturing, such as broken bricks and dirt contaminated with carbon resulting from washing the bases and walls of factories, and the air is greatly polluted with various particulate matter (5).

Numerous studies examined the environmental impact assessment of Baghdad's brick manufacturers and found that the emissions of sulfur compounds from burning black oil contaminated the air and soil (6).

The presence of high concentrations of heavy elements cr, pb, cd, and Ni in the soil of the Daqingshan area. It was also found that there are high concentrations of heavy metals in the plants in the same region. It is believed that the reason for the increase is due to the presence of tanning and brick factories in the area(7).

Natural elements such as the local climate, geology, and lithogenic inputs can introduce metal(loid)s

into the soil, as can human activity. Typically, soil contains very little naturally occurring metals. But human activity has the potential to alter the fundamental properties of soil, leading to metal accumulation and elevated pollution levels(8).

Aim of Study

Examining the pollution that brick factories cause in the soil by examining its composition, examining of its properties in relation to wind direction and, opposite direction and contrasting the findings.

2. Material and methods

The samples were collected from the area surrounding the brick factories. Samples were 1, 2, and 3 in the direction of the wind and 4, 5, and 6 in the opposite direction. The first sample was 50 meters away from the factory, the second was 500 meters, and the last was 1,000 meters.

In the lab, soil tests were performed on the samples after they had been dried at 100 C˚ and sieved through a 2 mm sieve to remove stones, glass, and plant roots. To estimate heavy elements 1 g of dry soil sample was taken, then digested and prepared using the method (9) to obtain exchangeable phase , measured in microgram/gm and according to (10) to obtain residual phase microgram/ g and than Heavy elements were measured by using FAAS .

3. Results and discussion

Soil lead content

In fig (1), lead levels were found in the soil exchangable phase the maximum value was (19.78 , 18.22) µg/g dry weight in S2 in winter and summer .and minimum value in S6 (2.4, 6.01) µg/g dry weight in summer and winter .while fig (2) in residual phase the highest was (36.15, 29.22) µg/g dry weight winter and summer in S2 , the lowest value (11.17,13.23) summer and winter S5.

From these results, the highest value was at station 2, which was towards winds and at a distance of 500 m from the factory. Because of the winter rains, the pollutants emitted from the factory will fall into the soil and mix with it, so that they are among the soil particles. Therefore, their value in the particulate phase is higher, while the exchangable phase is continuous. Production occurs on the surface of the soil, where it descends into the soil either through rain or through the air that’s agree with study of (11).While lowest value was in opposite of wind direction in summer because in S5 the distance and the different wind direction, it was noted that the value of the element in the exchangable phase is less than the residual phase, because that expresses old and accumulated pollution and is within the texture soil (12) . Lead is a non-essential element in the composition of living organisms, and its quality leads to several damages to the cultured organisms of microorganisms and plants (13).

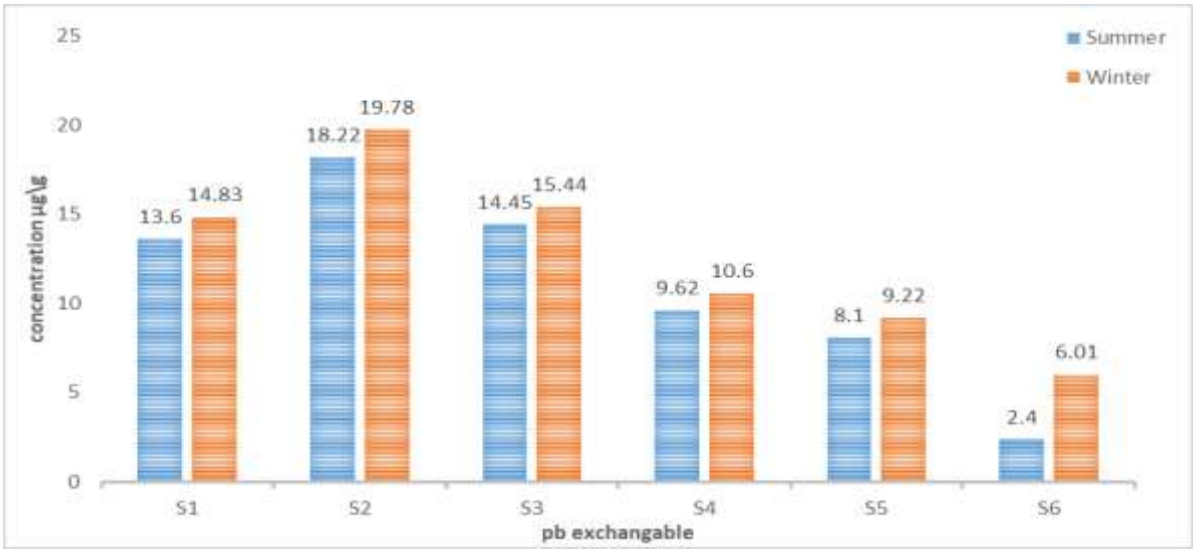

Fig (1)concentrations of lead exchangable phase in study stations

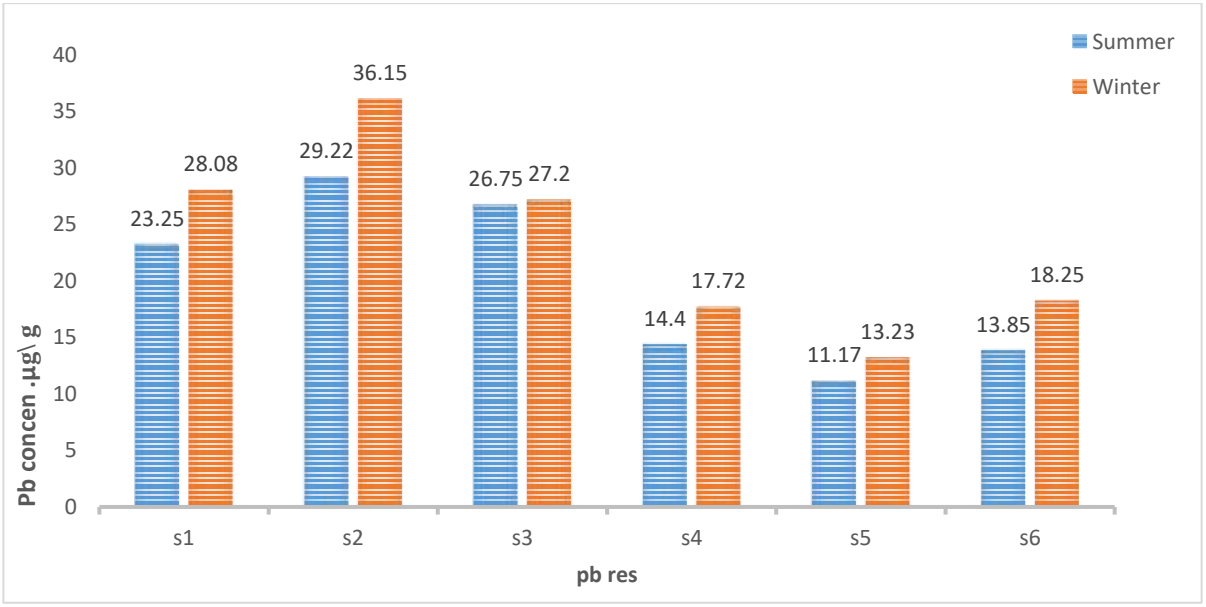

Fig (2)concentrations of lead residual phase in study stations

Copper content in the soil

In Figure 3, copper levels were found in the exchangeable soil stage, and the maximum values were (3.8 and 1.71) µg/g dry weight in S1 in winter and summer, and the minimum values were at (1.1 and 2.78) µg/g dry weight. In summer and winter . While Figure 4 in the remaining stage, the highest concentration of copper was (4.76 and 4.33) µg/g dry weight in winter and summer in S3, and the lowest value was (3.15 and 1.9) µg/g dry weight in summer and winter, according to these results of S3, which is in the direction of air movement at a distance of 1000 meters from the laboratory because Chemical pollution, like that of copper, results from the use of chemicals in industrial operations and their release into the environment without suitable waste management. Even while it plays an essential role in revitalising the soil, huge amounts of it thrown straight into the environment cause contamination. Furthermore, it is challenging to treat or even eradicate its side effects (14) its one of the essential elements that regulates the metabolism of soil organisms, the activity of living organisms' enzymes, and the entry and exit of nutrients is copper ,However, an excess of copper can

be toxic to the environment and negatively impact the physiological processes of living things.Apart from precipitation, excessive humidity causes components in the air to dissolve and precipitate, which increases soil pollution and contaminates the living things in the soil (15) .

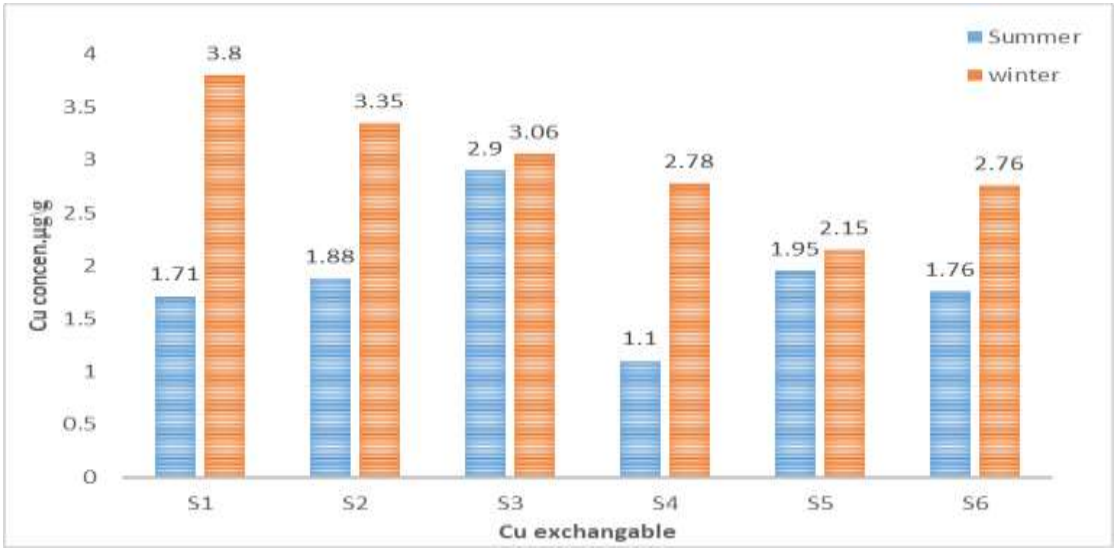

Fig (3)concentrations of copper exchangable phase in study stations

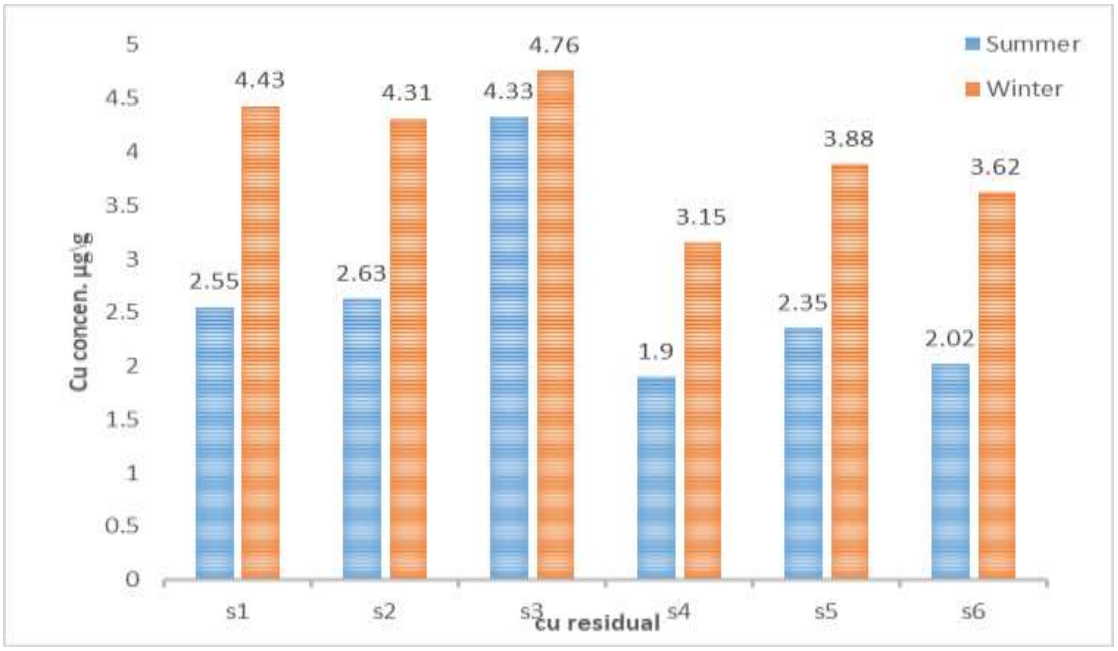

Fig (4)concentrations of copper residual phase in study stations

Conclusion

The current location of the brick factory is not suitable because it is surrounded on three sides by populated residential areas, and as the city grows, it will generate environmental problems in the future. The surrounding soil is directly affected, as the study recorded high levels of lead and copper. The residual phase of the soil recorded higher values in most stations than the alternating phase.

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