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Investigating lead and cadmium metal pollution in urban dust deposits of Zabul

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Abstract

Of the three substances soil, sediment and dust that originate primarily from the earth's crust, dust is the most pervasive and important factor affecting human health and well-being. Long-term exposure to contaminated environmental dust may cause chronic damage through inhalation, ingestion, and skin contact. Heavy metals are dangerous due to their tendency to accumulate, which means that during a long period of time, the concentration of heavy metals in living organisms can be higher than the concentration of metal in the environment. Therefore, the study of dust is an important way to determine the origin and distribution of heavy metals on the surface. This research was conducted in order to investigate heavy metal pollution in the dust of Zabul city. For this purpose, grids with distances of ۳۰۰ x ۳۰۰ meters were laid out on the surface map of Zabul city and their coordinates were determined based on the metric coordinate system, and after entering the coordinates of the points into the GPS, samples were taken. After transferring the samples to the laboratory, the samples were exposed to dry air for ۷۲ hours and passed through a ۱۵۰ micron sieve and prepared for laboratory analysis. Determination of some chemical properties of the samples such as: organic carbon, EC, pH and percentage of lime was done in the laboratory. Also, the concentration of heavy metals (lead and cadmium) was measured using an atomic absorption device to determine the probability and amount of any contamination with these metals in the study area. The degree of toxicity and the source of pollution with heavy metals were determined through pollution indicators, then the distribution map of the spatial distribution of pollution parameters was presented by geostatistics. The results showed that the best method for predicting the amount of lead and cadmium in the samples is the neural network, and the results of the pollution indicators showed that the lead and cadmium of the samples were in the non-contaminated to low pollution level.