**Title:** Investigation of Ni, Cd, Pb, Zn heavy metals in liver, kidney, muscle and brain of aquatic birds Chahnimeh Reservoirs Sistan and Oman coast

**Author:** Reza Dahmardeh Behrooz, , Department of Environmental Sciences, Faculty of Natural Resources, University of Zabol, Zabol, Sistan, Iran, Joanna Burger, Division of Life Sciences, Rutgers University, 604 Allison Road, Piscataway, NJ 08854-8082, USA.

**Email:** dahmardehbehrooz@uoz.ac.ir

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**Introduction**

Aquatic environments accumulate pollutants from run of and atmospheric deposition. While aquatic habitats are dynamic, they have a limited capacity to accept man-made waste without adverse effects on biota. With further technology advancement and the increased development of industries, the volume of waste imported into water areas will likely increase. Heavy metals are pollutants of concern due to their toxicity, persistence, and accumulation in the tissues of living organisms. Birds are well suited for biomonitoring because their biology is well-known, they have a relatively long lifespan (up to a dozen or more years), and they feed on different levels of the food chain, depending on the species. Birds are therefore one of the best indicators for evaluating heavy metals in the environment

**Methods**

Fifty individual birds of eight species, cormorant, great crested grebe, black-winged stilt, moorhen ,shoveler, marsh sandpiper, Eurasian spoonbill , and northern lapwing were purchased from Chahnimeh of Sistan and Oman Sea coast of Iran during February and March in 2019. Birds were thawed, and liver, kidney, brain, and pectoral muscle tissues were collected. Samples (1–3 g wet weight) were placed into 150 mL Erlenmeyer flasks; 10 mL 65% HNO3 (Suprapure, Merck, Darmstadt, Germany) was added to the Erlenmeyer fasks and was slowly digested overnight after 5 mL HClO4; 70% was added to each sample (Suprapure, Merck, Darmstadt, Germany). For digestion, we used a hot plate (sand bath) at the first step at 200 °C, for about 6 h or until the solutions were clear after cooling. In the second step, each sample was transferred to polyethylene bottles, and deionized water was added until the sample equaled 25 mL. In each set of eight samples, one control sample was prepared and analyzed. Then the solution was filtered using a 0.45-µm nitrocellulose membrane filter. A Shimadzu AA 680 fame atomic absorption spectrophotometer was used for determining the concentrations of heavy metals. The detection limits for Cd, Pb, Ni, and Zn were 0.09, 0.04, 0.06, and 0.09 µg/g respectively

**Results**

Concentrations of four heavy metals Nickel (Ni), cadmium (Cd), lead (Pb) and zinc (Zn) in liver, kidney, muscle and brain tissues in slender-billed gull on the coast of Oman and 9 bird species in Chahnimeh of Sistan. In Chahnimeh of birds, migration had an effect on the concentration of heavy metals in different species (P <0.05). Our data also showed that the winter populations of birds in the Sistan have higher levels of heavy metals than most parts of the world. There was a significant difference between the concentrations of nickel, cad-mium, lead and zinc in the liver and brain of slender-billed gull on the shores of the Oman Sea with the liver and brain of slender-billed gull in the water Chahnimeh reservoirs (P <0.05). Higher levels of lead, cadmium and zinc were found in the brain and liver of slen-der-billed gull than in kidney and muscle tissues. There was a significant difference in the concentration of heavy metals in liver and brain tissues between male and female slender-billed gull (P <0.05). Also, 40% of the slender-billed gull on the shores of the Oman Sea had lead levels in (more than 5 µg/g) which was higher than the level of adverse effects, also for nickel in the liver were the slender-billed gull on the coast of Oman (100) Percent-age and half well water tanks (90%) were higher than the toxic level (more than 3 micrograms per gram) and 80% nickel concentration in all pink cockroaches on the shores of the Oman Sea and well water tanks was half above the allowable level. Determining the concentration of heavy elements in birds and determining the daily consumption of birds in Chahnimeh of Sistan and their comparison with world health standards showed that the edible tissues (kidney, liver and muscle) have excessive urination for the consumers of these birds are in Sistan.