Investigation of bioaccumulation and transfer factor of nickel and cadmium in aerial and underground organs of three species of aquatic plants *Scirpus tabernaemontani*, *Phragmites australis* and *Typha latifolia*

Shahram Goudarzi[1]
Ali Afrous[2*]

1. Assistant Professor, Department of Soil Sciences, Health and Organic Production Technology Research Center, Dezful Branch, Islamic Azad University, Dezful, Iran.
2. Assistant Professor, Department of Water Engineering, Health and Organic Production Technology Research Center, Dezful Branch, Islamic Azad University, Dezful, Iran.

*Corresponding Author: ali.afrous@gmail.com

Received date: 2020.11.01
Reception date: 2021.02.08

Abstract

Aquatic plants have a high and different capacity to absorb heavy metals. Therefore, their use is recommended as an inexpensive and environmentally friendly method to remove metals from contaminated environments. In this study, accumulation, bio-concentration and transfer factors of two heavy metals nickel and cadmium by three plant species *Scirpus tabernaemontani*, *Phragmites australis* and *Typha latifolia* by applying three levels (nickel with levels of 20, 50 and 150 mg/kg and cadmium levels of 10, 35 and 85 mg/kg) cultured in pot culture medium with a sandy bed for 60 days in winter of 2017 were studied. After preparing the substrate, adding nutrient chemicals and concentrating the substrate to the studied metals, each culture medium was randomly assigned to one treatment in three replications. The results showed that the effect of different levels of concentration of both metals and type of aquatic plant on accumulation in plant organs was significant. Also, the accumulation of the two studied metals in the underground organs was far more than the same values in the aerial organs. Maximum amount of nickel accumulation was observed in underground and aerial organs related to *Typha latifolia* with values of 71.6 and 35.8 mg/kg and 34.6 and 12.5 mg/kg in dry matter for cadmium. The highest transfer factor about nickel and cadmium were recorded for *Typha latifolia* with values of 0.44 and 0.34. In terms of bio-concentration factor, *Phragmites australis* and *Typha latifolia* with values of 0.68-0.78 and 0.71-0.84 for cadmium, and 0.48-0.70 and 0.58-0.70 for nickel are in ranges are considerable. Due to the fact that the present experiment was conducted in the warm season in Khuzestan, due to the high air temperature, high evapotranspiration of aquatic plants can be a good reason to absorb more heavy metals.

Keywords: *Typha latifolia*, *Phragmites australis*, Nickel, Cadmium, Bioaccumulation, *Scirpus tabernaemontani*.