

## Biological Removal of Cadmium by Aquatic Macrophyte *Lemna Gibba* (A Potential Method for the Phytoremediation of Polluted Water and Wastewater)

A. Parnian<sup>1\*</sup>, M. Chorom<sup>1</sup>, N. Jafarzadeh Haghighi Fard<sup>2,3</sup> and M. Dinarvand<sup>4</sup>

(Received: Jan. 25-2011 ; Accepted : Oct. 14-2013)

### Abstract

Cadmium is a trace element which is harmful to life and is considered as a dangerous pollutant. This element leads to pollution and reduction of water quality and sometimes even to toxicity through contaminated sources such as wastewater (municipal and industrial). Due to the growing population's need for more water resources and increased water resource pollution, a need for new and inexpensive methods for remediation and improving water quality is felt. Phytoremediation with aquatic macrophytes is an effective and inexpensive method for improving water quality and wastewater. In this study, biological removal of cadmium from simulated wastewater was reviewed within 11 days of cultivation of *Lemna gibba* in Hoagland nutrient solution, at four different concentrations of cadmium (0, 1, 2, 4, and 6 mg L<sup>-1</sup>). Maximum Bioconcentration Factor and maximum Uptake Index were calculated from 6 mg L<sup>-1</sup> metal concentration. Maximum (4.71 g/day) and minimum (2 g/day) Biomass production measurement was obtained from 0 mg L<sup>-1</sup> and 6 mg L<sup>-1</sup> of pollutant concentration. The plant used in this study was able to accumulated cadmium with the efficiency of up to 91%. However, the pollutant remediation was not completed in a short time. Thus, pollutants' bioremediation from wastewater solutions by *Lemna gibba*, a native hydrophyte of southern Iran's ponds, is efficient and appropriate.

**Keywords:** Wastewater phytoremediation; Cadmium; *Lemna gibba*; Aquatic macrophyte.

---

1. Dept. of Soil Sci., Collage of Agric., Shahid Chamran Univ., Ahvaz, Iran.

2. School of Health, Ahvaz Jundishahpur Univ. of Medical Sci., Ahvaz, Iran.

3. Environ. Technol. Res. Center, Ahvaz Jundishahpur Univ. of Medical Sci., Ahvaz, Iran.

4. Khuzestan Res. Center of Agric. and Natur. Resour., Ahvaz and Collage of Science., Dept. of Biol., Ferdowsi Univ. of Mashhad, Iran.

\*: Corresponding Author Email: amir.parnian86@gmail.com