Phytoaccumulation of zinc using the duckweed *Lemna gibba* L.: effect of temperature, pH and metal source

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**ABSTRACT**

The use of aquatic plants in the removal of pollutants is an alternative technique for the remediation of contaminated waters. In this work, the capacity of accumulation of soluble Zn by the duckweed *Lemna gibba* L. native to a Mediterranean area (North-east Algeria) was studied under controlled conditions. The effect of temperature (17, 21, 25 and 29˚C), medium pH (3, 4, 5 and 6) and Zn source (ZnSO₄, Zn(NO₃)₂ and ZnCl₂) was investigated in order to assess the ability of the plants to remove metal pollutant under various conditions.

The results revealed that, at 21, 25 and 29˚C, the plants reduced initial Zn concentration (\(\frac{C_2}{C_0}\) 18 mg L\(^{-1}\)) to 4.64, 1.69 and 1.92 mg L\(^{-1}\), respectively, with 9.1–22.1 mg g\(^{-1}\) DW of Zn accumulated in the biomass. Low Zn accumulation in *L. gibba* biomass (7.5 mg g\(^{-1}\) DW) corresponding to a low plant growth was observed at pH 3 and 4 indicating that this species is not tolerant to water acidity. A very low Zn concentration in *Lemna* biomass (1.04 mg g\(^{-1}\) DW) was observed when Zn(NO₃)₂ was used as Zn source. The results obtained in this study demonstrated that temperature \(\geq 21˚C\) and pH values of 5 and 6 are favourable factors for the phytoaccumulation of Zn by *L. gibba* L.

**Keywords:** Abiotic factor; Duckweed; Metal removal; Zn accumulation