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## In vitro effects of metals on the acid phosphatase from the microalgae *Pseudokirchneriella subcapitata*

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Acid phosphatase plays important roles in algae metabolism such availability/recycling of inorganic phosphate and autophagic digestive processes. Chemicals released into the environment from agricultural activities and through industrial and urban wastes, may impair algae phosphatase activity. The aim of this work was to evaluate the *in vitro* activation/inhibition effect of 10 metals, commonly present as contaminants in soil and water, on the acid phosphatase extracted from the green algae *Pseudokirchneriella subcapitata*. Results demonstrated that $Hg^{2+}$, $Al^{3+}$, $Mo^{2+}$, $Pb^{2+}$, $Se^{2+}$ and $Cd^{2+}$ inhibited the enzyme activity in 56.3, 54.5, 30.6, 25.5, 23.1 and 11.5%, respectively. This corresponds to the maximum percentage of effect attained at the metal concentrations tested (0.02–2.0 mM). On the other hand, $Cu^{2+}$, $Zn^{2+}$, $Ni^{2+}$ and $Cr^{3+}$ exhibited an increment on phosphatase activity equal to 95.5, 87.6, 77.6 and 42.8%, respectively. Kinetics parameters values were calculated for the metals that showed highest effects. Thus, $K_i$ (inhibition constant) and $K_d$ (dissociation constant) values equal to 36.50 and 1.64 μM were determined for $Hg^{2+}$ and $Cu^{2+}$, respectively. A non-competitive inhibition mechanism was attributed to the former. Results improved the understanding of the basic events of the impact of metals at biochemical levels in primary producers organisms.

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