

## Microalgae as Promising Biostimulants of Plant Tolerance Against Heavy Metals

**Authors :** Soufiane Fal, Abderahim Aasfar, Ali Ouhssain, Hasnae Choukri, Abelaziz Smouni, Hicham El Arroussi

**Abstract :** Heavy metals contamination is a major environmental concern around the world. It has a harmful impact on plant productivity and poses a serious risk to humans and animals health. In the present study, the effect of Microalgae Crude Extract (MCE) on tomato growth and nutrients uptake exposed to 2 mM Pb<sup>2+</sup> and Cd<sup>2+</sup> was investigated. In results, 2 mM Pb<sup>2+</sup> and Cd<sup>2+</sup> showed a significant reduction of tomatobiomass and perturbation in nutrients absorption. Moreover, MCE application in tomato plant exposed to Pb<sup>2+</sup> and Cd<sup>2+</sup> showed a significant enhancement of biomass compared to tomato plants under Pb<sup>2+</sup> and Cd<sup>2+</sup>. On the other hand, MCE application favoured heavy metals accumulation in root and inhibited their translocation to shoot as phytostabilisation mechanism. Tomato plants showed biochemical responses to Pb<sup>2+</sup> and Cd<sup>2+</sup> stress with elevation of scavenging enzymes and molecules such as POD, CAT, SOD, Proline, and polyphenols, etc. In addition, the treatment by MCE showed a significant reduction level of the majority of these parameters. Furthermore, the metabolomic analysis revealed a significant change in important metabolites. Pb<sup>2+</sup> and Cd<sup>2+</sup> showed decrease in SFA and increase of UFA, VLFA, alkanes, alkenes, sterols, which known accumulated as tolerance and resistance mechanism to heavy metal (H.M) stress. However, MCE treatment showed the inverse of these response to return tomato plants to normal state and enhanced tolerance and resistance to heavy metal stress. In the present study, we emphasized that MCE can alleviate H.M stress, enhance tomato plant growth nutrients absorption and improve biochemical responses.

**Keywords :** microalgae crude extract, heavy metal stress, nutrient uptake, metabolomic analysis, solanum lycopersicum (Tomato), phytostabilisation

**Conference Title :** ICABA 2022 : International Conference on Algal Biotechnology and Applications

**Conference Location :** Vienna, Austria

**Conference Dates :** July 28-29, 2022