

EFFECT OF MAGNETIZED WATER ON PLANTLETS DEVELOPMENT: MAGIC OR INNOVATIVE APPROACH?

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One of the priorities of agriculture is to cope with the climate changes that destabilize plant growth, and the agricultural systems and endanger world food security and production. Low inputs management techniques, good agricultural practices, and the development of varieties adapted to specific environmental conditions are widely applied. In this scenario, the use of magnetized water as irrigation water could represent a valuable and innovative approach to contribute to sustainable agriculture. The effect of magnetized water treatment (MWT) with the OverWater device, on plantlets development of common and durum wheat, tomato, and lentil, was investigated. All the trials were conducted under controlled conditions. Seeds and plantlets were grown on sand-free paper soaked with magnetized water. Tap water was used as control. Root and epicotyl lengths were measured at three time points for all the species. Seeds, roots, and epicotyl of durum wheat and lentil were also used for the metabolic profile analysis of treated and non-treated plantlets. The use of magnetized water significantly increased root length in all species compared to the controls. A significant increase in the epicotyl length was also recorded in common wheat and tomato. The metabolomic analysis performed at the same time points of the growth parameters collection for seeds, roots, and epicotyls in both durum wheat and lentil, highlighted a significant increase for most of the metabolites. A total of 58 and 62 metabolites were identified in durum wheat and lentil, respectively. Despite the increase in the concentration of the metabolites, amino acids in roots and sugars in

epicotyls were mainly positively affected by MWT resulting in a higher or even “new” correlation with the growth parameters with respect to the control. In durum wheat the metabolites variation involved mainly sugar, while in lentil, other than sucrose, mainly affected organic acids, highlighting the exclusivity of some compounds to the species and their correlation with the plant development. Further investigations are needed to evaluate the effect of the use of irrigation magnetized water on different species and environmental conditions. The use of MWT in agriculture although is still controversial and seldom accepted, could represent a valuable and sustainable approach to promote plant development with more efficient water usage.