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Physiological and Biochemical Responses of Salt-Tolerant Cultivated *Amaranthus ultra* to Salinity Stress

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ABSTRACT

In many parts of the world, dryness and salinity of the soil are the primary causes of lower productivity. About 30.000 hectares of Armenian soil have become salinized, posing a severe danger to the country's agricultural viability and food security. The Ararat Plain, a crucial agricultural region in Armenia, faces considerable challenges due to salinity stress, which impedes the region's potential for agriculture. Due to soil salinization, many agricultural lands are being abandoned. Therefore, it is crucial to identify salt-tolerant crops that can be cultivated in such areas addressing both food security challenges and the concurrent need for land rehabilitation. This is attributable to the fact that soil cultivation is accompanied by phytodesalination and leaching during irrigation, as well as an enhancement of the soil's biological activity. Amaranths (*Amaranthus* L.) are highly valued for their nutritional properties and their resilience to salinity stress. Given the rising global challenge of soil salinity, we conducted research to evaluate the salinity resistance of a particular cultivar of *Amaranthus ultra*. The aim of this investigation was to assess the resistance of *A. ultra* to salt stress and evaluate the extent to which these reactions are linked to the mechanisms involved in salt tolerance. For this purpose, we analyzed the effects of soil salinization ranging from non-saline to high saline, on various parameters, including morphological, physiological and biochemical. The results demonstrate that this plant grow well in slight to moderate saline conditions with low impact on various parameters which can contribute to a deeper comprehension of an alternative phytotechnology for remediation of saline soils by tolerant and promising crop species *A. ultra* in sustainable agriculture.

Keywords: soil salinization, Ararat Plain, phytodesalination, salt-tolerant crops, *Amaranthus ultra*

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