Alternative Technology for Crop Improvement and Potentiation of Secondary Metabolites in Coriander Plants Through Dunaliella Salina Biomass Incorporated in Bioplastic Films, Phase II

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The environmental and health hazards associated with the application of synthetic chemical inputs in agriculture increased the demand for technologies that not only allow higher crop productivity, but also contribute to the Sustainable Development Goals (SDGs). At the current phase of this research, the effectiveness of the seed coating with microalgae biomass of Dunaliella salina incorporated in Manihot esculenta (cassava) bioplastic films in increasing initial growth and content of secondary metabolites of Coriandrum sativum (coriander) was evaluated. To assess the coating influence, the following processes were carried out: seed cultivation under controlled conditions; physiological and biochemical analyses (evaluation of plant development as well as determination and quantification of secondary metabolites); and validation of the obtained results through Kruskal-Wallis and Dunn's test, Principal Component and Hierarchical Cluster Analysis, Tukey test, and MANOVA. The gathered data demonstrated that the implementation of biomass in the coating promoted an increase in germination percentage (28.75%) and content of secondary compounds such as the caffeic acid (13.33 mg/ 100 g), which had a six-fold increment. This occurred due to the carbohydrates, lipids, and proteins found in microalgae biomass, since those are capable of providing energy to the germination and initial growth of plants, as well as coordinating the secondary metabolites synthesis. Therefore, it is possible to conclude that the coating with microalgae biopolymer is a promising alternative for crop improvement that contributes to the development of agricultural practices aligned with the principles of green chemistry and the SDGs.

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