

Evaluating the Biostimulant Potential of Cyanobacterial Biomass and Zeolite on Tomato Seedling Development

Răzvan Vințan^{1,2,*}, Adriana Hegedűs¹, Bogdan Drugă¹

¹ Institute of Biological Research Cluj Branch of the National Institute of Research and Development for Biological Sciences, Bucharest

² Faculty of Biology and Geology, "Babeș-Bolyai" University

* Correspondence: razvan.vintan@icbcluj.ro;

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Abstract: Cyanobacterial biomass is increasingly explored for its biotechnological applications in agriculture, particularly as a sustainable alternative to chemical fertilizers. This study aimed to evaluate the biostimulant potential of cyanobacterial biomass and natural zeolite—an aluminosilicate mineral with ion-exchange and water-retention properties—on the early growth of tomato seedlings (*Solanum lycopersicum*, cv. Darsirius). To assess the effects of these amendments on plant development, a total of 80 tomato plants were cultivated under controlled conditions and assigned to four experimental treatments: (1) control (untreated substrate), (2) substrate supplemented with cyanobacterial biomass, (3) substrate amended with zeolite, and (4) a combination of biomass and zeolite. Plant growth parameters, including plant length and stem diameter, were monitored throughout the growth period to evaluate both individual and combined treatment effects. Seedling development experiments were conducted over a defined period, during which plants were regularly assessed for morphological traits and overall vigor. At the end of the experiment, biometric data were collected and analyzed statistically to determine the influence of each treatment. Preliminary results indicated that both cyanobacterial biomass had positive effects on seedling growth. These findings suggest that the integration of biological amendments may offer an effective and eco-friendly strategy for promoting plant development.

Keywords: Cyanobacterial Biomass; Zeolite Amendment; Tomato Seedlings; Biostimulant Effects; Sustainable Agriculture.

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