

Effect of Foliar Biostimulants on Yield and Quality of "Pizzutello" Tomato Sicilian Landrace Cultivated Without Irrigation

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Abstract: The use of biostimulants in agriculture sector represent a sustainable and efficient technology to improve resource use efficiency, securing crop yield stability. Since biostimulants may boost vegetative growth, enhancing plant tolerance to biotic and abiotic distresses, the application of microbial and non-microbial plant biostimulants has rapidly expanded. Tomato (*Solanum lycopersicum* L.) is a crop sensitive to drought stress, particularly during fruit setting and fruit development stages. In Italy, especially in southern regions, long-storage tomato genotypes, such as Pizzutello di Sciacca and Locale di Salina, characterized by drought resistance, were selected. In this study, the effect of foliar application of different biostimulants (betaine, seaweed extracts, vegetable protein hydrolysate and animal protein hydrolysate) on the productive and qualitative parameters of a local tomato landrace (Pizzutello) cultivated in Sicily without irrigation was evaluated. In plants treated with betaine (F1) the highest dry matter (9.9%) and solid soluble content (6.9 °Brix) were observed. Plants treated with *A. nodosum* (F3), or animal protein hydrolysate (F4) showed the highest potassium concentrations, whereas those supplied with vegetal protein hydrolysate (F5) had the highest calcium concentrations. Tomato plants exposed to betaine (F1) revealed the highest nitrate concentrations. Fruits from untreated plants had the highest firmness. The highest marketable yield (13.8 t ha⁻¹) was recorded in plants treated with F5, with an increase of about 17% compared to the control plants. The highest unmarketable yield was observed in control plants and in those treated with F1 (1.1 t ha⁻¹). Overall, our results indicate that the application of biostimulants has proved effective in improving plant growth and productivity of tomato under limited water availability conditions. Furthermore, although the sub-optimal growing conditions of the test environment, fruit qualitative features were improved.

Keywords: Tomato; Ecotype; Yield; Quality; Biostimulants; Drought Stress.