EFFECT OF BIOINPUTS ON THE INITIAL GROWTH OF CREOLE MAIZE

EFEITO DE BIOINSUMOS NO CRESCIMENTO INICIAL DE MILHO CRIOULO

Rebyson B. Guidinelle*[1]; Filipe. P. S Teixeira[2]; Felipe B. Ramos[1]; Antônio M. A. C. Rodrigues[2]; Otacilio J. P. Rangel[2]; Diego L. Burak[1]

[1]Universidade Federal do Espírito Santo, Campus de Alegre, Alegre - ES, Brazil;
[2]Instituto Federal do Espírito Santo, Campus de Alegre, Alegre - ES, Brazil.
*Corresponding author: rebysonguidinelle@gmail.com

Abstract

Bacteria-based microbial inoculants are bioinputs that colonize plants and produce important results for the vegetative development, with positive effects on nutrient and water absorption, also stimulating plant resistance to abiotic stresses. The objective of this study was to evaluate, in a greenhouse, isolated or co-inoculated, bioinputs based on Herbaspirillum seropedicae and Azospirillum brasilense with better performance in the initial growth of creole maize, in different edaphic conditions. The experiment was conducted in a greenhouse with soil collected in an experimental area under different management systems. The factorial scheme adopted was 2x4x4, with four replications, as follows: two irrigation conditions in the greenhouse (70% and 45% of field capacity- FC); soil collected in areas with different management histories: M1 - no-tillage system (NTS) irrigated with swine waste water (SW), M2 – conventional tillage system (SPC) irrigated with SW, M3 - NTS irrigated with water (WA) and M4 - SPC irrigated with WA and; four applications of bioinputs with variations in fertilization (NPK): B0 – without bioinputs + 100% fertilization; B1 - H. seropedicae + 40% fertilization; B2 - A. brasilense + 40% fertilization; and B3 - co-inoculation with H. seropedicae and A. brasilense + 40% fertilization. After 60 days, plant height (PH) and shoot dry mass (SDM) were evaluated. Data were submitted to analysis of variance and the F-test ($p \leq 0.05$) to verify the significance of the effects of factors and the interactions. The results demonstrated there was no significant difference for PH, both for the isolated effect of bioinputs and for their interaction with irrigation. These results were satisfactory, since with only 40% fertilization with NPK, treatments B1, B2 and B3 presented similar responses to B0, where 100% fertilization with NPK was applied. Bacteria of the genera Azospirillum and Herbaspirillum produce phytohormones that promote plant growth. The production of auxins, gibberellins and cytokinins by microorganisms associated with plants is reported in the literature. The production of SDM in treatment B0 stood out statistically ($p<0.05$), both in isolation and for the interaction with 70% FC irrigation. Even so, the production of SDM in treatments that received B1, B2 and B3 was, on average, 12.34% lower than in B0, when analyzed in isolation. Plants with the same PH produced more SDM in the treatment with 100% fertilization with NPK and absence of bioinputs. This effect may be related to the cell elongation caused by the bioinputs, due to the action of auxins, in which the cells get longer but do not acquire mass. The effect of bioinputs on the vegetative growth of creole maize is well known, even though it does not provide SDM gains statistically similar to plants that had access to an ideal condition of fertilization and irrigation. The 60 percentage point decrease in NPK fertilization did not represent such a severe loss of SDM production in the 70% FC irrigation treatment. These reductions were 16.50% (B1), 16.70% (B2) and 16.90% (B3), when compared to B0. With irrigation equivalent to 45% of FC, even with only 40% fertilization with NPK, the SDM results of the bioinputs (B0, B1, B2 and B3) were statistically equal. These results are promising, since they reveal the performance of bioinputs in conditions of water stress and low availability of nutrients in the soil.

Keywords

Bioinputs, sustainable production, innovation