EFFECT OF BIOINPUTS ON THE LEAF NITROGEN CONTENTS OF CORN CULTIVATED IN SOILS UNDER DIFFERENT MANAGEMENT

EFEITO DE BIOINSUMOS SOBRE OS TEORES FOLIARES DE NITROGÊNIO DO MILHO CULTIVADO EM SOLOS SOB DIFERENTES MANEJOS

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

[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

The use of bioinputs in agriculture presents is a promising method that can reduce costs and promote greater plant development, with responses that depend on edaphic conditions influenced by different soil management systems. *Herbaspirillum seropedicae* and *Azospirillum brasilense* are promising bacteria that can act as bioinputs, with distinct effects on plant development. Bacteria of the genus *Herbaspirillum* are classified as obligate endophytic diazotrophs, which colonize the interior of plants and have low survival in the soil. *Azospirillum* is a genus of facultative endophytic diazotrophic bacteria that colonize both the interior and surface of roots. Thus, the objective of this study was to evaluate, in a greenhouse, the effects of isolated or co-inoculated bioinputs based on *H. seropedicae* and *A. brasilense* on the mineral nutrition of creole maize, grown in soils with different management histories. The experiment was carried out in a greenhouse, with planting in 5 dm^3 pots, filled with soil collected in an experimental area with a history of different management systems, implemented in a 2x2x4 factorial scheme, with four replications, as follows: two soils, collected in areas with history of a no-tillage system (HNTS) and conventional tillage system (HCTS), two soils collected in areas with a history of irrigation with swine wastewater (HSW) and water history (HW), equivalent to 100% of the actual crop evapotranspiration (ETc), 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 *H. se;ropedicae* and *A. brasilense* + 40% fertilization. Pot irrigation was calculated to reach 70% of field capacity. After 60 days of training, maize leaves were collected for foliar N determination. The experimental data were submitted to analysis of variance by applying the F-test ($p \leq 0.05$). The effect of bioinputs on foliar N content stood out in HNTS and HSW soils, indicating that co-inoculation with 40% fertilization (B3) (21.75 g kg of N) generated a slight decrease in relation to treatment B0 (100% fertilization) (24.53 g kg N). Treatment B3 was statistically superior to B1 and B2, demonstrating the positive and synergistic effects of co-inoculation for N absorption. These results can be attributed to the ability of the studied bioinputs to promote biological N fixation. Another situation to be highlighted is the better results attributed to the HNTS soil, which can be attributed to its better biological quality, since the no-tillage system generates an edaphic environment favorable to the development of inoculated microorganisms. This effect is related to the deposition of residues from this management system, providing an increase in carbon organic (CO) matter in the soil (HNTS 14.2 g kg^{-1} and HCTS 12.3 g kg^{-1} CO), which is directly related to greater stability of microbial communities and their population increase. This has a biostimulant and/or plant biofertilizer effect. Soil with a history of no-tillage management and irrigation with swine wastewater provided a more favorable rhizospheric environment for maintaining the microbial population, increasing the effect of N fixation by bacteria applied via bioinputs, especially when co-inoculated.

Keywords

Biotechnology, corn nutrition, Plant growth-promoting bacteria.