

TITLE: POST-EMERGENCE INOCULATION OF SOYBEAN WITH RHIZOBACTERIA ASSOCIATED TO THE USE OF A BIO-INDUCER.

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ABSTRACT:

Several microorganisms have a great potential to contribute to the future of agriculture. Among them, plant growth-promoting rhizobacteria are the most remarkable ones. Another promising aspect of agricultural microbiology is the use of secondary microbial metabolites, which are usually obtain through fermentation processes and may increase plant growth. This study aimed to evaluate the response of soybean to post-emergence inoculation with different species of rhizobacteria, combined or not with a bio-inducer (Stamina). Applications were performed and V3 and R1 stages. We evaluated nodulation and growth at the R2 stage and also soybean yield. The experiment was carried on in Brunópolis – SC under field conditions during the 2016/2017 harvesting year. Experimental design was completely randomized blocks with five repetitions. Treatments included: T1 – inoculation with *Bradyrhizobium japonicum*; T2 – coinoculation with *B. japonicum* + *Azospirillum brasilense*; T3 – coinoculation with *B. japonicum* + *A. brasilense* + *Pseudomonas fluorescens*; T4 – coinoculation with *B. japonicum* + *A. brasilense* + *Bacillus subtilis*; T5 - T1 + bioinducer; T6 - T2 + bioinducer; T7 - T3 + bioinducer; T8 - T4 + bioinducer. All products were developed and provided by Total Biotecnologia. Bacterial inoculants were applied at V2, whereas the bio-inducer was applied at V3 and R1. The highest values of nodules larger than 2mm were observed in T3 (10.3 nod pl^{-1}), T5 (10.6 nod pl^{-1}) and T7 (10.2 nod pl^{-1}) in comparison to T2 (3.7 nod pl^{-1}). Nodule dry biomass was higher in T1 (190mg pl^{-1}), T3 (185mg pl^{-1}) and T5(200mg pl^{-1}), compared to T2 (74mg pl^{-1}). Values from treatments T4, T6, T7 and T8(111-158mg pl^{-1}) were below values from T1, T3 and T5. Overall mean of shoot dry weight was 8g pl^{-1} , with no statistical difference among treatments. Grain yield was higher in T3 (3489 kg ha^{-1}) and T7 (3317 kg pl^{-1}) compared to T1 (2405 kg ha^{-1}), T2 (2541 kg ha^{-1}) and T8 (2615 kg ha^{-1}). Values from T4 (2899 kg ha^{-1}), T5 (2924 kg ha^{-1}), and T6 (3070 kg ha^{-1}), were not different than values from T3 e T7. Post-emergence coinoculation with *B. japonicum*, *A. brasilense* and *P. fluorescens*, combined or not with Stamina, is an alternative to increase soybean yield compared to post-emergence inoculation only with *B. japonicum*. Application of the bio-inducer with *B. japonicum* is not recommended to increase any of growth or productivity parameter that might be interesting to the producer.

Keywords: *Azospirillum*, *Bacillus*, *Bradyrhizobium*, Coinoculation, *Pseudomonas*.

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