

Title: IN VITRO PRODUCTION OF INDOL ACETIC ACID (IAA) BY ASSOCIATIVE BACTERIA ISOLATED FROM TOMATO PLANTS (*Solanum lycopersicum*)

Authors Zuluaga, M.Y.A.¹, Milani, K.M.L.¹, Leziér, D.¹, Noguero, D.¹, Moreiro, A.A.¹, Kock, K.¹, Oliveira, A.L.M.¹

Institution ¹UEL – Universidade Estadual de Londrina (Rodovia Celso Garcia Cid Pr 445, Km 380-Campus Universitário-Londrina - PR)

Abstract: Soil is one of the largest sources of microbial biodiversity, making it an important resource for biotechnological exploitation. The soil biodiversity is not evenly distributed, and is highly influenced by plant species composition. This phenomenon is known as rhizosphere effect, where some microbial species are enriched in response to the quality and quantity of rhizodeposition. The rhizosphere effect of tomato plants (*Solanum lycopersicum*) was investigated, by isolating associative bacteria from plants grown in soils with different types of land use (organic soil, horticultural soil and forest soil). The collection of isolates were then screened to identify the ones with ability to produce auxins, one of the main functional mechanisms of growth promotion by plant-associative bacteria. After 30 days growing on the different soils, 49 bacterial strains were isolated from the root/rhizosphere of tomato in populations above of 1×10^4 cells g^{-1} root. In the absence of tomato plants, 29 isolates were obtained (41% less) from soils after incubation for 48 hours at 28°C and 20% humidity. The indole acetic acid (IAA) production was determined in the supernatant of the isolates cultured in DYGS medium supplemented with 100 mg ml^{-1} of L-tryptophan, maintained under stirring at 180 rpm for 48 hours at 28°C by a modified Salkowsky protocol ($FeCl_3$ 40 mM H_2SO_4 7.9 M). The concentration of indole in the culture supernatants was estimated with a standard curve of indole acetic acid (0 to 30 $\mu g \cdot mL^{-1}$). Additionally, the protein content (Bradford) of cultures were used to normalize the amount of indole produced by different isolates, expressed as μg AIA/mg protein. The tests were performed in triplicate and data was submitted to ANOVA and Scott-Knott cluster test (5% probability). The strains BR 11281 (*Gluconacetobacter diazotrophicus*) and BR 11001 (*Azospirillum brasiliense*) which are classified as PGPB, were used as a comparative parameter for AIA production. The IAA production ranged between 2.9 to 55.9 μg IAA/mg protein among the isolates from the rhizosphere, and 5.24 to 193.9 μg IAA/mg protein for the isolates from soil. The reference strains BR 11281 and BR 11001 produced 32.5 and 45.9 μg IAA/mg protein, respectively. The isolated with the higher value for auxin synthesis was originated from soil under horticultural use, and was identified to belong to the *Rhizobium* genus. This work evidenced that the use of tomato plants as physiological trap is a viable strategy to isolate associative bacteria from the soil microbiota, and demonstrates that *Rhizobium* strains can colonize tomato plants in high populations.

Key Words: Rhizosphere, auxins, *Rhizobium*

Agência de Fomento: CAPES, CNPq, INCT-FBN, Fundação Araucária, PROPPG/UEL