

Title: PLANT HORMONE INDOLE-3-ACETIC ACID CONTENT IN ORGANIC LIQUID BIOFERTILIZER

Authors: Mendes, L. S. ¹, Bomfim, C. A. ², Alves, A. A. C. ⁴, Fontenelle, M. R. ³, Vale, H. M. M. do ²; Zandonadi, D. B. ³

Institutions: ¹ICESP/Promove de Brasília (QE-11 - Área Especial C/D - Guará I, Brasília - DF, Brazil), ²UnB - Universidade de Brasília (Campus Universitário Darcy Ribeiro, Brasília - DF, Brazil), ³Embrapa Hortaliças/CNPH—Empresa de Pesquisa Agropecuária (Rodovia BR-060, Km 09 (Brasília/Anápolis), Fazenda Tamanduá. Brasília-DF, Brazil); ⁴ Universidade Católica de Brasília (QS 07, lote 01, EPCT, s/n. Brasília-DF, Brazil).

Abstract:

Plant hormones are molecules essential for normal plant growth and development associated to myriad of processes in plant and microorganisms. However, production of these hormones is not limited to plants, it is also produced by fungi, bacteria and actinomycetes in large quantity. For example, some plant growth promoting rhizobacteria (PGPR), such as *Agrobacterium* sp., *Bacillus* sp. and *Paenibacillus polymyxa*, have been found as producer of indole-3-acetic acid (IAA), cytokinins and gibberellins. Biofertilizers are products that contain living microorganisms that when in contact with plants enhance growth or produces other beneficial response. The two objectives of this research were to evaluate a solid phase extraction procedure for extraction of IAA from a liquid biofertilizer developed by Embrapa Hortaliças and to evaluate the changes in this plant hormone level at three different periods time (10, 20 and 30 days of fermentation) and the general group of microorganism associated. The method of preparation and analysis of IAA from biofertilizer was performed by centrifugation, followed by pH adjustment and solvent extraction and a further cleaning by cartridge containing mixed-mode anion-exchange and reverse-phase sorbents. A nucleosil C₁₈ column was used followed by fluorimetric detection ($\lambda_{EX} = 280/\lambda_{EM} = 350$ nm) by Reversed Phase High Performance Liquid Chromatography (RP-HPLC) determination. The linear regression equation of calibration curve ($P < 0.0001$) had the $r^2 = 0.995$ and the limit of detection was below $0.06 \mu\text{g mL}^{-1}$. The IAA amount at 10, 20 and 30 days was 0.57 , 0.32 and $0.15 \mu\text{g mL}^{-1}$, respectively. Both total number of bacteria and actinomycetes

were higher at day 10, coinciding with the higher IAA production. The use of biofertilizers with potential biostimulant activity (IAA activity) in agriculture may help enhance plant rooting and productivity as a result. This is particularly important for low input agriculture such as organic farming.

Key-words: auxin, organic agriculture, bacteria, fungi, actinomycetes

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