

TITLE: DETERMINATION OF VOLATILE ORGANIC COMPOUNDS PRODUCED BY THE CYANOBACTERIUM *Synechococcus* sp. STRAIN GFB01

AUTHORS: DO AMARAL, S.C.; DA SILVA, J. K. DO R.; SCHNEIDER, M.P.C.; XAVIER, L.P.

INSTITUTION: UNIVERSIDADE FEDERAL DO PARÁ, LABORATÓRIO DE BIOTECNOLOGIA DE ENZIMAS E BIOTRANSFORMAÇÕES (RUA AUGUSTO CORRÊA, 1 - GUAMÁ, BELÉM - PA, 66075-110)

Abstract

Cyanobacteria exhibit a great biotechnological potential due to its capacity in producing compound with various applicability. The high variability of molecules identified in cyanobacteria is related to metabolic, morphological and physiological diversity present in this group. Volatile organic compounds are characterized by possessing low molecular weight and high vapor pressure. These properties allowed its easy evaporation and migration to the atmosphere. In nature, these chemicals are involved in numerous processes, such as communication, defense, reproduction and stress response. The role played by volatile in cyanobacteria is poor understood. However, it is known that many volatiles produced by these microorganisms can be applied in the chemistry, cosmetic, food, energy industry. This study aimed to investigate the volatile organic compounds synthesized by cyanobacterium *Synechococcus* sp. strain GFB01, collected from the surface of the freshwater lagoon Lagoa dos Índios, situated in the municipality of Macapá, Amapá state, northern Brazil. The cyanobacterium was grown photoautotrophically at a constant temperature at 25°C with controlled light conditions (12 h/12 h) in BG-11 medium. The volatiles compounds were extracted by simultaneous distillation-extraction process, using a Likens-Nickerson apparatus (2 h) and identified by GC-MS. In total, 5 constituents were detected and the major compounds were heptadecane (81.32) and octadecanol acetate (11.71%). To our best knowledge, this is the first study of volatiles emitted by a cyanobacterium from Amazon. 6-Pentadecanol and octadecanol acetate have never been reported in any other cyanobacteria. In a search in the genome of this microorganism was revealed the presence of zinc-binding alcohol dehydrogenase enzyme, probably involved in the synthesis of 6-Pentadecanol. Both has biotechnological importance for the industry. Octadecanol acetate is very useful to produce shampoo, deodorants, candles, hairspray cream and rinse due to its low toxicity and cause no allergic response. 6-pentadecanol can be used as biofuel additives. Further studies based on genomic can be utilized to a better understanding about the biosynthetic pathway responsible for the production these volatiles.

Keywords: cyanobacteria, volatile metabolites, biotechnology

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