TITLE: MALDI-MS LIPID PROFILES OF HYDROCARBON DEGRADATION BY A *GORDONIA* STRAIN TOWARDS A BIOMAKER IDENTIFICATION

AUTHORS: SOUSA, P. R. C[1]; REIS, M. L.[1]; LOPES, R. P.[1]; BELAZ, K. R. A.[2]; ZAMPIERI, D.[3]; EBERLIN, M. N.[2]; MELO, V. M. M.[1]; HISSA, D. C.[1]

INSTITUTION: [1]LABORATÓRIO DE ECOLOGIA MICROBIANA E BIOTECNOLOGIA, DEPARTAMENTO DE BIOLOGIA, UNIVERSIDADE FEDERAL DO CEARÁ (AVENIDA HUMBERTO MONTE, 2977, CAMPUS DO PICI, BLOCO 909, CEP 60455-000, FORTALEZA – CE, BRAZIL);
[2]LABORATÓRIO THOMSON DE ESPECTROMETRIA DE MASSA, UNIVERSIDADE ESTADUAL DE CAMPINAS – UNICAMP (RUA JOSUÉ CASTRO, S/N, CIDADE UNIVERSITÁRIA, CAMPINAS-SP, BRAZIL).
[3]LABORATÓRIO DE PRODUTOS NATURAIS E BIOTECNOLOGIA, DEPARTAMENTO DE QUÍMICA ORGÂNICA E INORGÂNICA, UNIVERSIDADE FEDERAL DO CEARÁ - UFC (AVENIDA HUMBERTO MONTE, 2977, CAMPUS DO PICI, BLOCO 909, CEP 60455-000, FORTALEZA – CE, BRAZIL).

ABSTRACT:

The use of microorganism's metabolic potential, in order to clean or to stabilize areas affected by oil spill, has become an economically viable and effective alternative, when compared to conventional techniques of chemical, physical and thermal treatment that generally produce secondary pollutants. Bacterial strains belonging to the genus *Gordonia* have been described as possessing metabolic pathways that may degrade the recalcitrant compounds present in petroleum, suggesting the potential of these bacteria for bioremediation. Moreover, metabolomics analyses can be used for monitoring the biodegradation as the metabolites profile can provide detailed information on metabolic pathways that are happening at an exact moment. Hence, the present study aims to research the MALDI-MS lipid profile produced by a bacterial strain of *Gordonia* sp. PET15 related to the degradation of hydrocarbons in order to find a lipid biomarker. The bacteria *Gordonia sp*. PET15 was cultured in Mineral Medium Bushnell-Haas supplemented with different carbon sources (glucose, n-hexadecane and kerosene) for 7 days at 30ºC under 250 rpm. At the end of cultivation, cells were harvested by centrifugation and lipids were extracted using chloroform/methanol. 2,5-dihydroxybenzoic acid (DHB) was used as MALDI matrix. MALDI-MS spectra were obtained covering the mass range from *m/z* 600 to 3000 Da. Peak picking and alignment were performed using Flex Analysis software and multivariate analysis (PCA and PLSDA) by Metaboanalyst 3.0. The spectra showed the most intense ions in the *m/z* 600-1400 region. The main ions observed in the strain cultivated with glucose were *m/z* 685.6, *m/z* 1236.9 and *m/z* 1239.0; when cultivated with n-hexadecane were *m/z* 685.6, m/z 1237.0 and *m/z* 1239.0; and with kerosene were *m/z* 663.6, *m/z* 685.6, *m/z* 714.7 and *m/z* 736.7. The replicates from each carbon source showed high similarity and reproducibility. In the score plot of the PCA and PLSDA model three distinct clusters were observed corresponding to each of the carbon source. Variable Importance in Projection (VIP) analysis established the ions with higher influence in each group discrimination were *m/z* 685.6, 1210.9, 1217.0, 1237.0, 1239.0 and 1294.0. In conclusion, our study shows that the carbon sources tested produced different lipids profiles and a lipid biomarker may be further investigated in order to monitor different hydrocarbon's degradation.

Keywords: bioremediation, lipid biomarker, lipidomics, *Gordonia*

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