

TITLE: Isolation and Structural Identification of Herbicidal Compounds from *Streptomyces* sp. Caat 7-52

AUTHORS: Souza, D.T.¹; Boni, E.D.¹; Fugita, F.L.S.¹; Crevelin, E.J.¹; Melo, I.S.²; Moraes, L.A.B.¹;

INSTITUTION: ¹Faculdade de Filosofia Ciências e Letras de Ribeirão Preto, Av. Bandeirantes, 3900. Ribeirão Preto – SP. CEP 14040-900 – Brasil; ² EMBRAPA – Meio Ambiente, Rod. SP 340, KM 127,5 – Jaguariúna – SP. CEP 13820-000 - Brasil.

ABSTRACT

Chemical control of weeds is a method of phytosanitary control in agriculture, in which synthetical herbicides are usually applied in high demand. Although they are quite effective in controlling such weeds, their indiscriminate use cause environmental concerns and human health hazards. Moreover, the continuous use of herbicides may lead to evolution of resistant weeds. These problems need searches for an alternate ecofriendly method of weed management through the biological approaches, in which microorganisms or their metabolites could be used to suppress the growth of weed species. Thus, the discovery of natural herbicides is one of the focuses of the agrochemical industry, and among many natural sources, the genus *Streptomyces* is an of main potentially bioactive producers. This work was carried out to describe the bioassay-guided isolation of phytotoxic compounds from the ethyl acetate extract of *Streptomyces* sp. Caat 7-52 strain, isolated from the Brazilian dry forest, known as Caatinga. Chemical structures were determined based on comprehensive analysis in high-resolution mass spectrometry (HR-MS), as well as 1D and 2D nuclear magnetic resonance (NMR) experiments. As results, two known compounds were identified: acid benzoic and albocycline. In addition, one of the fractions obtained, namely fraction 28 (Fr28), contained a possible new compound determined due to absence of relevant hits with known mass and spectral data. However, further NMR experiments are needed to confirm this assumption. Albocycline showed phytotoxicity to *Lemna minor*, *Chlorella vulgaris*, *Conyza canadensis*, *Lactuca sativa* and *Eruca sativa* at 0.312 mg.ml⁻¹, while acid benzoic was moderately active to *L. minor* at concentrations greater than 5 mg.ml⁻¹. The Fr28 has so far been tested to *L. minor* and showed significant biological activity at 2.5 mg.ml⁻¹, when compared to Atrazine, a commonly used commercial product. These results illustrated the strain Caat 7-52 has the potential to produce phytotoxic compounds that may be leads in pest management programs.

KEYWORDS: *Actinobacteria*, Albocycline, Bioassay-guided isolation, Caatinga, Phytotoxic

DEVELOPMENT AGENCY: FAPESP (17/21229-7)