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An Optimized Yield of Streptazolin Produced by the River Sediment Derived Strain Streptomyces Sp. SRC3

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Efficiency of currently used antibiotics is worldwide decreasing, due to resistance phenomenon and because people are faced with new and emerged pathogens. Most active natural products are isolated from Actinobacteria which are a prolific source of diverse classes of secondary metabolites showing a series of promising bioactivities.

The main aims of this study were *i*) the exploration of Algerian river sediments as a source of actinobacteria producing bioactive metabolites, *ii*) the isolation and structural identification of the molecules responsible for the bioactivity, *iii*) the optimization of culture conditions for the production

In detail, 39 different actinobacteria strains were isolated and subjected to antagonistic activity test against human pathogenic germs. The most active antibiotic producer SRC3 (active against *Salmonella typhi* ATCC14028, *Vibrio cholerae* ATCC14035, *MRSA* ATCC 43300 and *Candida albicans* ATCC10231) was selected and identified as *Streptomyces* sp.. A bioassay-directed fractionation of its ethyl acetate crude extract provided one major compound, identified as the known antibiotic and antifungal streptazolin by extensive 1D and 2D NMR studies and mass spectometric analysis. Furthermore, the MIC value of the pure compound was also determined.

In order to increase the low natural concentration of streptazolin in SRC3 strain, a culture media optimization was carried out by RSM statistical strategy and Plackett-Burman design to screen the media components affecting the antimicrobial production. This statistical strategy allowed to select the following optimal conditions to maximize the production of streptazolin: KCl (0.051 %), $MgSO_4$ $7H_2O$ (0.05 %) and 5 day- incubation for *C. albicans* pathogenic germ.

In conclusion, this optimized production of streptazolin by SRC3 strain, coupled to the easy procedure of its purification from the crude extract, is competitive with the reported availability by a chiral synthesis involving more than 10 reaction steps and a relatively low global yield.

Keywords: River sediments, Streptazolin, Response surface methodology