Antibiotic polyethers produced by the Algerian soil-living *Streptomyces youssoufiensis* strain

N. Leulmi,[1,2] K. Khenaka,[2] L. Ouar,[2] A. Boulahrouf ,[2] and **I. Mancini [1]**

[1] Laboratory of Bioorganic Chemistry, Department of Physics, University of Trento, via Sommarive 14, 38123 Povo Trento, Italy

[2] Laboratory of Microbiology Engineering and Applications , Department of Microbiology, University of Constantine 1, Route de Ain bey, 25017 Constantine, Algeria

Streptomyces is the largest genus of Actinobacteria with over 500 species found predominantly in soil, representing a rich source of antibacterial and antifungal structurally unique metabolites [1]. We report here the isolation of a *Streptomyces* strain from a soil sample collected in Khenchela, a semi-arid region in Eastern Algeria. Morphological data indicated that the selected strain had a yellow mycelium with rectiflexible spore chains bearing smooth surfaced spores. The strain, identified as *S. youssoufiensis* by 16s RNA, and its ethyl acetate extract exhibited good antimicrobial activities against Gram positive bacteria (*ATCC MRSA, ATCC 6633 Bacillus subtilis, ATTC 25923 Staphylococcus aureus)* and phytopathogenic microorganisms (*Fusarium oxysporum, Streptomyces scabies*), as evaluated by disc diffusion method.

The active crude extract was directly analysed by online liquid chromatography coupled to electrospray mass spectrometry (LC/ESI-MS) technique. The same intense chromatographic peak was associated to *m/z* 723 for $[M-H]^-$ ion by detection in negative ion mode and to *m/z* 747 for $[M+Na]^+$ ion in positive mode. It was identified as nigericin by comparison with a pure sample of this polyether in its ionophoric form. Two pairs of additional chromatographic peaks correposnding to less polar metabolites were detected only in positive ion mode, both correpsonding to isomeric forms at *m/z* 745 and *m/z* 759. Further chromatographic purification provided pure compounds, which were analyzed by NMR spectroscopy and by tandem fragmentation experiments (ESI-MS/MS), indicating that they were new derivatives of grisorixin, a polyether belonging to the same nigericin family.

Nigericin and grisorixin are polyether antibiotics very active against MRSA and Gram positive bacteria, so that their presence in the *S. youssoufiensis* strain can be regarded responsible for its bioactivities. It was also reported that these metabolites induced mass programmed death of human tumour cells of various tissues showing multidrug resistance, e.g. leukemic stem cells [2].

Further studies will be devoted to go insights into the chemical structures of these compounds, known to give different forms by epimerization, as well as in changing conditions for strain culture in order to optimize the production of these metabolites.

Keywords: ionophoric polyethers; LC/ESI-MS analysis.

References

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