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Actinofuranones A and B, New Polyketides from a Marine Bacterium of the Genus *Streptomyces* (Actinomycetes)

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Introduction

Actinomycetes are a diverse group of gram-positive, filamentous bacteria that are one of the most prolific resources for lead compounds for the development of new pharmaceuticals. The recent discovery of phylogenetically unique and taxonomically diverse actinomycetes from marine sediments suggests that this order of bacterium is not limited only to the terrestrial environment and thus adds an important new dimension to microbial natural products research. In particular, the genus *Streptomyces* has produced a wide variety of secondary metabolites. In this paper, we report the discovery of two new *Streptomyces* metabolites, actinofuranones A and B, which was isolated from a sediment sample collected from the Bahamas.

Experimental Section

General Experimental Procedures. UV spectra were measured on a Varian Cary UV visible spectrophotometer. IR spectra were obtained with a Perkin-Elmer 1600 Series FTIR spectrophotometer as a film on a NaCl disk. ^{1}H and ^{13}C NMR spectra were obtained in CD_3CN on a Varian Inova spectrometer at 500 and 125MHz, respectively. HR-ESI-TOFMS data were obtained at The Scripps Research Institute, La Jolla, CA. Reversed-phase HPLC separations were performed using a semi-preparative C_8 Betasil column (250 x 10 mm) at a flow rate of 2 mL/min using a Waters pump and a Knauer variable UV detector.

Collection and Cultivation of Strain CNQ766. The marine bacterium *Streptomycetes* sp. CNQ766 was collected from the Bahamas in 2002 and identified based on its morphology. The strain CNQ766 was cultured in 30 replicate 2.8 L Fernbach flasks each containing 1 L of fermentation medium CKA (starch 5 g, 4 mL of 50 % hydro soluble, menhaden meal 2 g, kelp powder 2 g, chitosan 2 g in 1 L seawater) for 7 days.

Isolation of Compounds 1-2. The crude extract (3.2 g from 30 L) was adsorbed onto diatomaceous earth (Celite) and subjected to C_{18} reversed-phased flash chromatography eluting with a step gradient from 20 to 100 % methanol in water. Compounds A and B, from the 60 % methanol in water fraction, were isolated by reversed-phase HPLC chromatography using a C_8 Betasil column (250 × 10 mm) eluting with 55 % acetonitrile at a flow rate of 2 mL/min with detection at 254 nm by a UV spectrometer. Actinofuranone A eluted at 18 min (15 mg, 0.47 % yield) and Actinofuranone B eluted at 68 min (1.5 mg, 0.047 % yield).

Result

Two new metabolites Actinofuranones A and B were isolated from the culture extract of the *Streptomyces* strain designated CNQ766. The structures of A and B were elucidated by interpretation of the NMR spectroscopic data. The relative stereochemistry was assigned based on analysis of the NOE data and the ^1H-^1H coupling constants. The absolute configurations of the asymmetric centers were determined using the modified Mosher's method.

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