

Oxygenated geosmins and plant-like eudesmanes from a bacterial mangrove endophyte.

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Abstract

Geosmin (1) is a microbial terpene metabolite that is responsible for the typical smell of soil and causes an off-odor of food and water. Eudesmane sesquiterpenes are commonly found in plant essential oils. Here we describe the discovery of four geosmin-type metabolites, 7R-hydroxygeosmin (2), 3-oxogeosmin (3), 2R-hydroxy-7-oxogeosmin (4), 5-deoxy-7 β ,9 β -dihydroxygeosmin (5), the plant-like eudesmanes 4 β ,10 α -eudesmane-5 β ,11-diol (6) and (1S,5S,6S,7S,10S)-10 α -eudsm-4(15)-ene-1 α ,6 α -diol (7), and the known 1(10)E,5E-germacradiene-2,11-diol (8) from a bacterial endophyte (*Streptomyces* sp. JMRC:ST027706) of the mangrove plant *Bruguiera gymnorrhiza*. By means of NMR, MS, and ECD spectroscopy, all chemical structures as well as the absolute configurations for the new compounds were elucidated. Compounds 2-5 represent the first geosmin-related metabolites directly as bacterial natural products. The plant-derived eudesmane-5 β ,11-diol (6) and (1S,5S,6S,7S,10S)-10 α -eudsm-4(15)-ene-1 α ,6 α -diol (7) are also now reported as bacterial products. The broad antimicrobial activities of 6 against a suite of fungal and bacterial pathogens including methicillin-

resistant *Staphylococcus aureus* suggest that this terpene could be an important active principle of the medicinal plant *Cymbopogon distans*. The discovery of geosmin metabolites from one actinomycete indicated that these bacteria could possess enzymes for modifying geosmin and offer a possibility for bioremediation.

Involved units

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