

Influence of Iron on Production of the Antibacterial Compound Tropodithietic Acid and Its Noninhibitory Analog in *Phaeobacter inhibens* - DTU Orbit (08/11/2017)

Influence of Iron on Production of the Antibacterial Compound Tropodithietic Acid and Its Noninhibitory Analog in *Phaeobacter inhibens*

Tropodithietic acid (TDA) is an antibacterial compound produced by some *Phaeobacter* and *Ruegeria* spp. of the *Roseobacter* clade. TDA production is studied in marine broth or agar since antibacterial activity in other media is not observed. The purpose of this study was to determine how TDA production is influenced by substrate components. High concentrations of ferric citrate, as present in marine broth, or other iron sources were required for production of antibacterially active TDA. However, when supernatants of noninhibitory, low-iron cultures of *Phaeobacter inhibens* were acidified, antibacterial activity was detected in a bioassay. The absence of TDA in nonacidified cultures and the presence of TDA in acidified cultures were verified by liquid chromatography-high-resolution mass spectrometry. A noninhibitory TDA analog (pre-TDA) was produced by *P. inhibens*, *Ruegeria mobilis* F1926, and *Phaeobacter* sp. strain 27-4 under low-iron concentrations and was instantaneously converted to TDA when pH was lowered. Production of TDA in the presence of Fe^{3+} coincides with formation of a dark brown substance, which could be precipitated by acid addition. From this brown pigment TDA could be liberated slowly with aqueous ammonia, and both direct-infusion mass spectrometry and elemental analysis indicated a $[\text{Fe}^{\text{III}}(\text{TDA})_2]_x$ complex. The pigment could also be produced by precipitation of pure TDA with FeCl_3 . Our results raise questions about how biologically active TDA is produced in natural marine settings where iron is typically limited and whether the affinity of TDA to iron points to a physiological or ecological function of TDA other than as an antibacterial compound.

General information

State: Published

Organisations: Department of Systems Biology, Bacterial Ecophysiology and Biotechnology, Metabolic Signaling and Regulation, Metabolomics Platform

Authors: D'Alvise, P. W. (Intern), Phippen, C. B. W. (Intern), Nielsen, K. F. (Intern), Gram, L. (Intern)

Number of pages: 8

Pages: 502-509

Publication date: 2016

Main Research Area: Technical/natural sciences

Publication information

Journal: Applied and Environmental Microbiology

Volume: 82

Issue number: 2

ISSN (Print): 0099-2240

Ratings:

BFI (2017): BFI-level 2

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 2

Scopus rating (2016): CiteScore 4.08

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 2

Scopus rating (2015): SJR 1.891 SNIP 1.308 CiteScore 4.14

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 2

Scopus rating (2014): SJR 1.857 SNIP 1.384 CiteScore 4.02

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 2

Scopus rating (2013): SJR 1.899 SNIP 1.414 CiteScore 4.25

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 2

Scopus rating (2012): SJR 1.975 SNIP 1.429 CiteScore 4.29

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 2

Scopus rating (2011): SJR 1.914 SNIP 1.455 CiteScore 4.12

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.887 SNIP 1.436
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.972 SNIP 1.528
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 2.156 SNIP 1.572
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.043 SNIP 1.647
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 2.054 SNIP 1.602
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.074 SNIP 1.653
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.108 SNIP 1.648
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 2.097 SNIP 1.821
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 2.046 SNIP 1.754
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.989 SNIP 1.736
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.957 SNIP 1.758
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 2.3 SNIP 1.732
Original language: English
DOIs:

10.1128/aem.02992-15

Source: FindIt

Source-ID: 2287705843

Publication: Research - peer-review › Journal article – Annual report year: 2015