Biochemical characterization of ochratoxin A-producing strains of the genus Penicillium - DTU Orbit (10/02/2019)

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In order to explore the biochemical scope of ochratoxin A-producing penicillia, we screened 48 Penicillium verrucosum isolates for the production of secondary metabolites. Fungal metabolites were analyzed by high-pressure liquid or gas chromatography coupled to diode array detection or mass spectrometry. The following metabolites were identified: ochratoxins A and B, citrinin, verrucolones, verrucines, anacines, sclerotigenin, lumpidin, fumiquinazolines, alantryptinones, daldinin D, dipodazine, penigequinolines A and B, 2-pentanone, and 2-methyl-isoborneol. By use of average linking clustering based on binary (nonvolatile) metabolite data, the 48 isolates could be grouped into two large and clearly separated groups and a small outlying group of four non-ochratoxin-producing isolates. The largest group, containing 24 isolates, mainly originating from plant sources, included the type culture of P. verrucosum. These isolates produced ochratoxin A, verrucolones, citrinin, and verrucines and had a characteristic dark brown reverse color on yeast extract-sucrose agar medium. Almost all of a group of 20 isolates mainly originating from cheese and meat products had a pale cream reverse color on yeast extract-sucrose agar medium and produced ochratoxin A, verrucolones, anacines, and sclerotigenin. This group included the former type culture of P. nordicum. We also found that P. verrucosum isolates and three P. nordicum isolates incorporated phenylalanine into verrucine and lumpidin metabolites, a finding which could explain why those isolates produced relatively lower levels of ochratoxins than did most isolates of P. nordicum.

General information
State: Published
Organisations: Center for Microbial Biotechnology, Department of Systems Biology, Center for Biomedical Microbiology
Contributors: Larsen, T. O., Svendsen, A., Smedsgaard, J.
Pages: 3630-3635
Publication date: 2001
Peer-reviewed: Yes

Publication information
Journal: Applied and Environmental Microbiology
Volume: 67
Issue number: 8
ISSN (Print): 0099-2240
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 3.99
Web of Science (2017): Impact factor 3.633
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 4.08
Web of Science (2016): Impact factor 3.807
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 4.14 SJR 1.891 SNIP 1.308
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 4.02 SJR 1.857 SNIP 1.384
Web of Science (2014): Impact factor 3.668
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 4.25 SJR 1.899 SNIP 1.414
Web of Science (2013): Impact factor 3.952
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 4.29 SJR 1.975 SNIP 1.429
Web of Science (2012): Impact factor 3.678
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 4.12 SJR 1.914 SNIP 1.455
Web of Science (2011): Impact factor 3.829
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): Impact factor 3.778
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
Keywords: myk
Source: orbit
Source-ID: 45859
Research output: Research - peer-review > Journal article – Annual report year: 2001