Single-kernel analysis of fumonisins and other fungal metabolites in maize from South African subsistence farmers.

Fumonisins are important Fusarium mycotoxins mainly found in maize and derived products. This study analysed maize from five subsistence farmers in the former Transkei region of South Africa. Farmers had sorted kernels into good and mouldy quality. A total of 400 kernels from 10 batches were analysed; of these 100 were visually characterised as uninfected and 300 as infected. Of the 400 kernels, 15% were contaminated with 1.84-1428 mg kg(-1) fumonisins, and 4% (n = 15) had a fumonisin content above 100 mg kg(-1). None of the visually uninfected maize had detectable amounts of fumonisins. The total fumonisin concentration was 0.28-1.1 mg kg(-1) for good-quality batches and 0.03-6.2 mg kg(-1) for mouldy-quality batches. The high fumonisin content in the batches was apparently caused by a small number (4%) of highly contaminated kernels, and removal of these reduced the average fumonisin content by 71%. Of the 400 kernels, 80 were screened for 186 microbial metabolites by liquid chromatography-tandem mass spectrometry, detecting 17 other fungal metabolites, including fusaric acid, equisetin, fusaproliferin, beauvericin, cyclosporins, agroclavine, chanoclavine, rugulosin and emodin. Fusaric acid in samples without fumonisins indicated the possibility of using non-toxinogenic Fusaria as biocontrol agents to reduce fumonisin exposure, as done for Aspergillus flavus. This is the first report of mycotoxin profiling in single naturally infected maize kernels.

General information
State: Published
Organisations: Center for Microbial Biotechnology, Department of Systems Biology, University of Natural Resources and Life Sciences, Vienna, Medical Research Council
Contributors: Mogensen, J. M., Sørensen, S., Sulyok, M., van der Westhuizen, L., Shephard, G. S., Frisvad, J. C., Thrane, U., Kraska, R., Nielsen, K. F.
Pages: 1724-1734
Publication date: 2011
Peer-reviewed: Yes

Publication information
Volume: 28
Issue number: 12
ISSN (Print): 1944-0049
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.29 SJR 0.74 SNIP 0.894
Web of Science (2017): Impact factor 2.129
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.12 SJR 0.796 SNIP 0.95
Web of Science (2016): Impact factor 2.047
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.11 SJR 0.778 SNIP 0.878
Web of Science (2015): Impact factor 1.878
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.07 SJR 0.764 SNIP 0.978
Web of Science (2014): Impact factor 1.802
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.55 SJR 1.041 SNIP 1.168
Web of Science (2013): Impact factor 2.341
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Scopus rating (2012): CiteScore 2.12 SJR 0.906 SNIP 1.123
Web of Science (2012): Impact factor 2.22
ISI indexed (2012): ISI indexed yes