

Do *Fusarium* fungi produce mycotoxins in onion crop?

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Background

Onion is an important field vegetable in Finland. *Fusarium* basal rot (FBR) is causing substantial losses in onion production, spoiling the crop both in the fields and during storage.

Fusarium oxysporum and *Fusarium proliferatum* are among the most common *Fusarium* species observed in onion sets and the onion crop.

Many *Fusarium* species produce mycotoxins as their secondary metabolites. Most mycotoxins are harmful to humans and animals, and they have been studied a lot in cereals and animal feed. However, production of mycotoxins like fumonisins, moniliformin and beauvericin has not been studied in onion or other vegetables in Finland.

Objective

To evaluate if *Fusarium* species *F. oxysporum* and *F. proliferatum* produce mycotoxins in onions in Finland.

Analysis

Mycotoxin production of *Fusarium* fungi infecting onions will be studied from:

- 1) in vitro rice cultures infected with known strains of *F. oxysporum* and *F. proliferatum*
- 2) diseased and healthy-looking tissues of onions infected with known strains of *F. oxysporum* and *F. proliferatum* in the laboratory (Figure 1)
- 3) onion crop from farmer's fields

Mycotoxins will be determined by UPLC-ESI-MS/MS equipment (Figure 2) using MRM technology. ¹³C-Fumonisin B1 will be used as internal standard (Figure 3).

Results

This study was started in the summer 2017 and the samples to be tested have been collected. Preliminary results from rice cultures infected with known strains of *F. oxysporum* and *F. proliferatum* indicate that these *Fusarium* strains have potential to produce high amounts of fumonisins, moniliformin and beauvericin in vitro. Mycotoxin production of these fungi in onions will be measured in 2018.

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Figure 1. Onions cut into halves two weeks after inoculation with pathogenic *Fusarium oxysporum* strain.



Figure 2. Waters Acquity UPLC - Xevo TQ MS Instrument will be used for identification and quantification of mycotoxins.

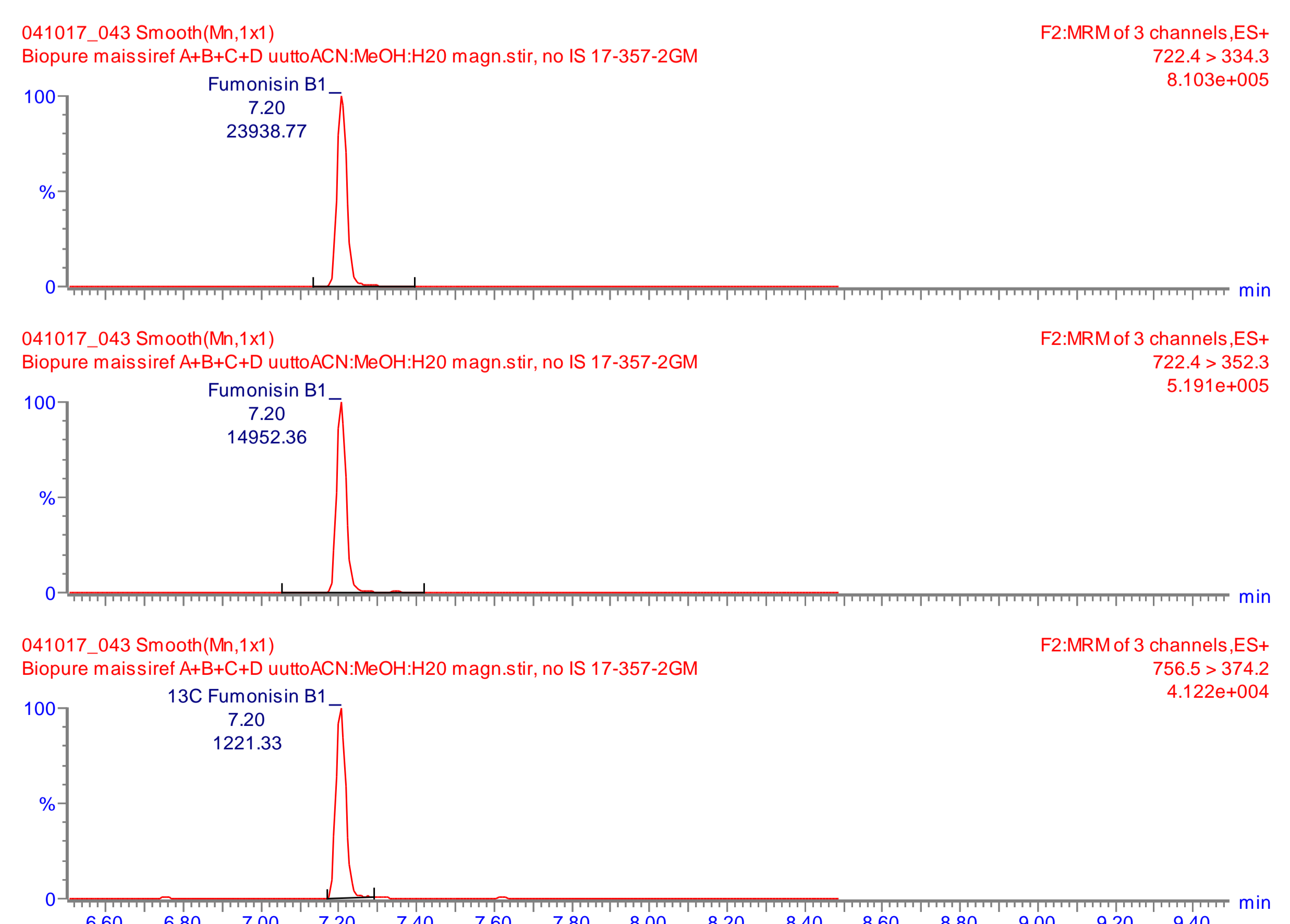


Figure 3. MRM reactions of Fumonisin B1 and ¹³C-Fumonisin B1 detected in Biopure maize reference.