

Mycokey

Integrated and innovative key actions for mycotoxin management in the food and feed chain

Lay summaries

Knowledge transfer to stakeholders



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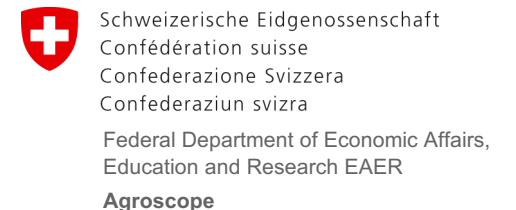
Real-time quantitative PCR to monitor *Clonostachys rosea* as a biological control agent against *Fusarium graminearum*

ISSUE

Clonostachys rosea is a biological control agent against *Fusarium graminearum*. Infections with *F. graminearum* reduce the yield of cereals and the production of mycotoxins affects the entire value chain of food and feed. Sustainable control strategies using *C. rosea* include treatment of infected residues of the previous crop, direct treatment of the cereal crop or post-harvest treatments during malting processes. The follow-up of growth and survival of biocontrol organisms during these stages is of crucial importance.

We developed new primers and a qPCR assay for the detection, quantification and monitoring of *C. rosea* used against *F. graminearum* on crop residues and in malting barley.

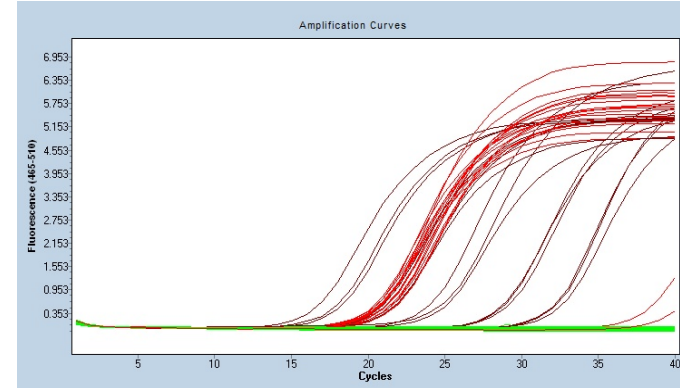
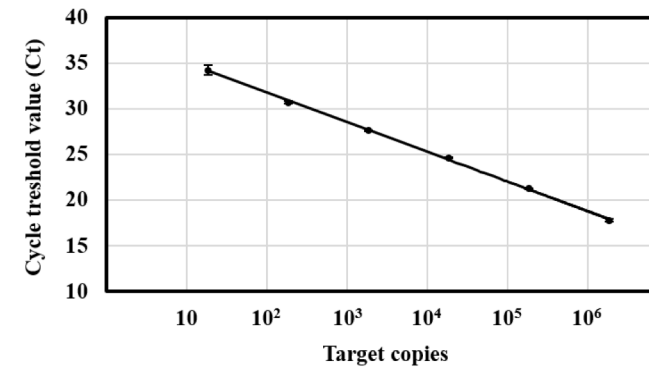
Picture: Agroscope



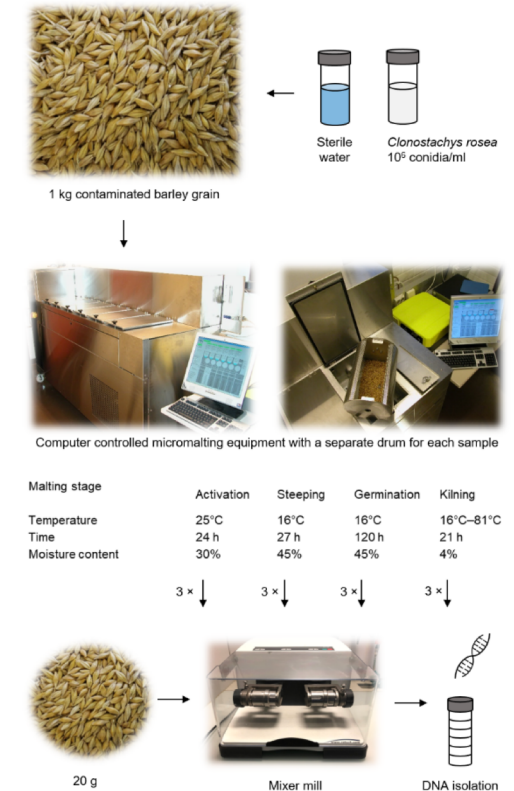
APPROACH

We selected the commonly conserved region encoding the actin gene for identification of sequences unique to *C. rosea* and enhanced the specificity by using TaqMan chemistry. We evaluated the newly established assay for efficient and specific quantification of target DNA in extracts from pure cultures and environmental samples. This evaluation included a wide range of non-target species and amplification in samples from crop residues and grain taken from the laboratory, the field and from a small-scale malting trial where *C. rosea* was applied against *F. graminearum*.

Method validation



Experimental validation



Pictures: Agroscope



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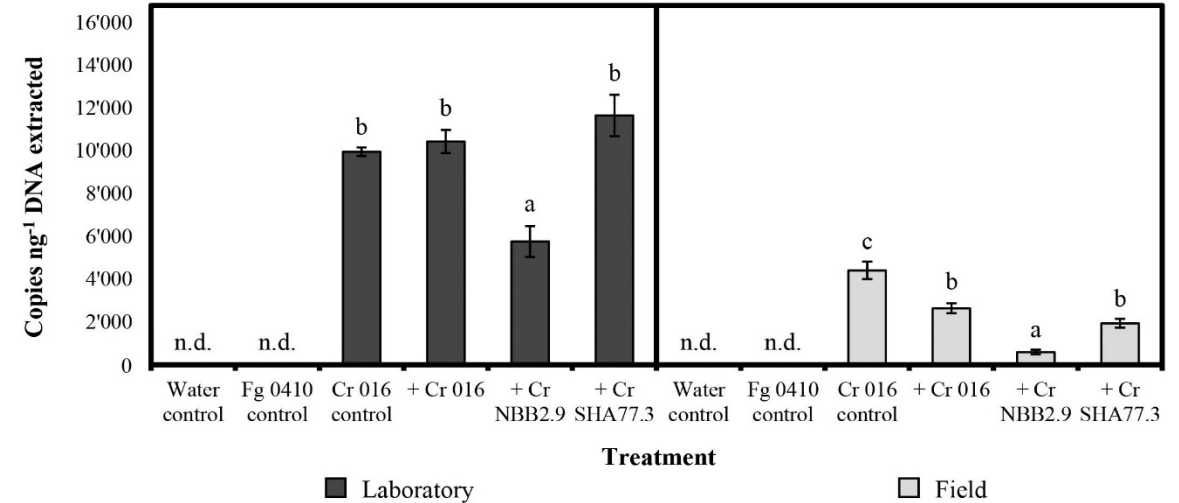
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OUTCOMES

For the detection and quantification of *C. rosea*, a practical and sensitive alternative to culture-dependent methods was developed. Within the scope of improving the biological control of *F. graminearum*, the utilisation of this method to monitor the growth dynamics of *C. rosea* is highly valuable, when applied in sustainable disease control strategies and mycotoxin management.



Quantification of *Clonostachys rosea* (Cr) by TaqMan qPCR in treated maize stalk samples after 10 weeks under laboratory or field conditions. *Fusarium graminearum* (Fg) isolate 0410 was used for artificial infection 48 h before treatment. n.d. = not detected.

Open access article:

Gimeno A, Sohlberg E, Pakula T, Limnell J, Keller B, Laitila A and Vogelgsang S (2019)

TaqMan qPCR for quantification of *Clonostachys rosea* used as a biological control agent against *Fusarium graminearum*. *Frontiers in Microbiology* 10:1627. [doi:10.3389/fmicb.2019.01627](https://doi.org/10.3389/fmicb.2019.01627)



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