
P**Application of *Trichoderma harzianum* as an alternative to fungicides to effectively inhibit mycotoxigenic fungi**Braun, H.¹, Woitsch, L.¹, Geisen, R.¹, Zange, B.² and Schmidt-Heydt, M.^{1*}¹Max Rubner-Institut, Institute for Safety and Quality of Fruits and Vegetables, Karlsruhe, Germany² *Weihenstephan-Triesdorf University of Applied Sciences*, Germany

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Worldwide, a quarter of the cereal based crop is spoiled by filamentous fungi and their mycotoxins and weather-extremes associated with the climate change lead to a further deterioration of the situation. The ingestion of mycotoxins could cause several health issues leading, in worst case, to cancer in human and animal. Since fungicides are expensive, often undesired and fungicide resistance has greatly impacted pre- and postharvest fungal diseases, there is the need to develop alternative strategies to reduce fungal infestation and thus mycotoxin contamination in the food chain. As an alternative *Trichoderma harzianum* has been proved for biological competition against (mycotoxigenic) fungi. All tested food-relevant species, amongst others *Fusarium oxysporum* MRI271, *Penicillium verrucosum* BFE575, *Verticillium dahliae* MRI251, *Alternaria alternata* MRI001 and *Aspergillus carbonarius* MRI13 could be significantly inhibited in the range of 30 % - 100 % by *T. harzianum* MRI-RTh. Especially in direct comparison to the fungicides Mancozeb, Azoxystrobin, Difenoconazol, Pyraclostrobin, Dimetomorph and Boscalid, the inhibition by *T. harzianum* was comparable or in some cases even more effective. Interestingly, when growing in competition with other fungi, *T. harzianum* excretes a yellow pigment, which has been identified as putative furanosteroid with antifungal activity. Only the synergistic action of both, the pigment and the extensive growth rate of *Trichoderma*, lead to the observed maximal inhibition rate. Conclusively, it has been successfully shown that *Trichoderma harzianum* as a natural competitor may be in some cases an effective alternative to fungicides.