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Development of a *Fusarium graminearum* biosensor assay to monitor the activity of naturally derived products to control trichothecene production

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In the present study, we developed a microplate reader assay to detect natural products able to limit toxin production by the fungus *Fusarium graminearum*, the major cause of Fusarium Head Blight in cereals and trichothecene contamination in grains worldwide. In the biosensor assay, we exploited a *F. graminearum* isolate expressing GFP-tagged trichodiene synthase, encoded by *TRI5 (TRI5-GFP)*, which catalyses the first step of the trichothecene biosynthesis pathway. This allowed us to monitor the first step of toxin production by fluorimetric assay.

Fungal spores were treated with filtrates from streptomycete liquid cultures in order to evaluate their influence on fungal growth and toxin production, integrating absorbance and fluorescence measurements. The correlation between the fluorimetric assay based on the TRI5-GFP detection and the amount of deoxynivalenol (DON) measured with ELISA technique was assessed. The new method allowed to identify crude filtrates able to reduce toxin production as accurately as ELISA. The main advantages of the newly developed assay are the reduction of the analysis costs and lower use of chemicals and consumables. It contributes to increase the speed and capacity to screen large set of molecules and natural extracts.

A historical collection of *Streptomyces* strains was screened by the newly developed method and five bacterial strains have been identified as producing bioactive molecules able to inhibit the fungal growth and/or the toxin synthesis (DON).