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UNIVERSITÀ CATTOLICA del Sacro Cuore

Botanicals suppress different stages of the life cycle of *Fusarium graminearum*


Picture: Agroscope

ISSUE

Fusarium head blight (FHB) is one of the most important cereal diseases worldwide causing yield losses and contamination of cereal grains with mycotoxins. *Fusarium graminearum* is the predominant FHB-causing species in wheat and barley cropping systems.

To minimise the use of conventional crop protection products and to improve food and feed safety, there is an increasing interest in the use of natural, more environmentally friendly plant-based compounds, i.e. botanicals, to control FHB.

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Botanicals suppress different stages of the life cycle of

Fusarium graminearum

APPROACH

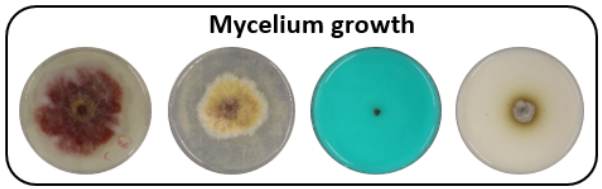
We tested the effects of two mustard-based botanicals and extracts of Chinese galls on different stages of the life cycle of *F. graminearum.*

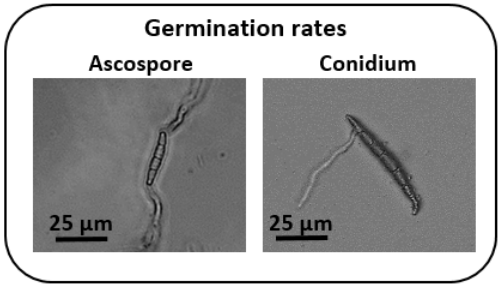
We analysed the chemical composition of the mustard-based botanicals and the Chinese galls using liquid chromatography (LC) coupled to diode array detection or LC time-of-flight mass spectrometry, respectively.

Mustard flour

Chinese galls

***In vitro* bioassays performed in this study targeting mycelium growth, ascospore discharge, ascospore/conidium germination and perithecia formation on maize stalks**





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OUTCOMES

Botanicals based on white mustard seed flour and Chinese galls were able to suppress or fully inhibit growth and development of *F. graminearum* in various *in vitro* bioassays. Interestingly, different effects were observed for conidia versus ascospore germination.

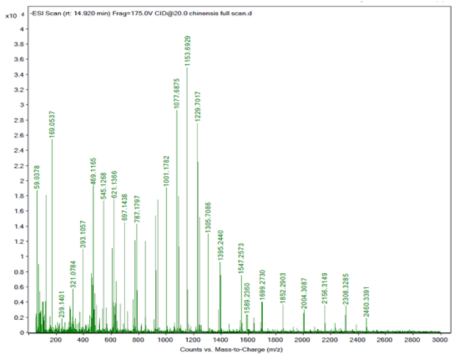
We quantified the principal glucosinolate sinalbin of the mustard-based botanicals, while Chinese galls contained gallotannins as well as gallic and tannic acids.

The antifungal effects of the botanicals are promising and suggest that they should be explored further for efficient control of FHB *in planta* under field conditions.

	Mustard 1	Mustard 2
Glucosinolate Sinalbin (mg/g)	56.4	57.5
Isothiocyanate p-HBITC (mg/g)	2.56	2.44

Mustard flour

Chinese galls



Compound	Calculated masses (Da)	Relative abundance (%)
Gallic acid	170.0348	19
GG	332.1129	2
2-GG	484.1289	1
3-GG	636.1294	4
4-GG	788.1872	2
5-GG	940.2873	1
6-GG	1092.2381	1
7-GG	1244.2296	1
9-GG	1548.2471	3
Tannic acid	1700.2751	54
11-GG	1853.2861	5
12-GG	2005.3059	1
14-GG	2309.3371	2
15-GG	2461.3385	4

GG = galloylglucopyranose

Open access article:
Drakopoulos D, Luz C, Torrijos R, Meca G, Weber P, Bänziger I, Voegele RT, Six J, Vogelgsang S (2019)
Use of botanicals to suppress different stages of the life cycle of *Fusarium graminearum*.
Phytopathology. doi: ……

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