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Evaluation of *in vitro* activity of OII-YS against fungi associated with crown rot in bananas

Objectives:

- Evaluate the activity of OII-YS against the most frequently isolated crown rot fungi.

Introduction

Crown rot is one of the most serious post-harvest problems in banana. It is caused by a complex of fungi that vary according to the country, time of year and other factors.
The most frequently isolated fungi are: *Fusarium proliferatum* (syn. *F.moniliforme*), *Fusarium pallidoroseum* (syn. *F.semitectum*), *Colletotrichum musae,Verticillium theobromae* and *Botryodiplodia theobromae*.
Based on the incidence of each one of the genera, we select one isolate from the more common *Fusarium* species (*F. proliferatum* and *F. pallidoroseum)* and one from *C.musae*

Materials and methods

Previously isolated pure cultures of *Fusarium proliferatum*, *Fusarium pallidoroseum* and *Colletotrichum musae* were selected .

According to the protocol, colony diameter methodology was evaluated

Fungicide preparation

OII-YS 8 % was dissolved in sterile water .
The following concentrations were evaluated: 0, 0.1, 1.0, 10.0, 100, 1000 and 10 000 ppm (mg/l).

Colony diameter methodology

Seven millimeter diameter agar plugs were removed from pure cultures of each isolate and placed in the center of each petri plate
Each concentration was replicated five times.

Culture dishes were incubated in dark at 24 °C. Colony diameter were recorded 6 days after inoculation for each of the five dishes per concentration. Two measurements of each colony were made at 90 angles. The percent of growth reduction was determined and the EC_{50} (50 % effective concentration) was calculated by regressing the natural logarithm of the colony growth reduction

RESULTS AND DISCUSSION

Logarithmic graph for the EC_{50} determination of the three tested isolates are shown in fig.1

All of the isolates showed little or no inhibition at 0.1 ppm , 1.0 and 10.0 ppm.

The three isolates were highly inhibited at 100.0 ppm and had more than 95 % inhibition at 1000 ppm and 10 000 ppm

Their EC_{50} values ranged from 40.0 to 60.0 ppm: *Fusarium* isolates had lower EC_{50} values than Colletotrichum showing that Fusarium specie may be more sensitive to OII-YS than the other genera (table 1)

Even though there are few studies in the use of coatings for the control of banana postharvest diseases, other researchers found a high *in vitro* activity of chitosan against *Colletotrichum musae* (Maqbool, et al., 2010)

The high concentration for mycelium growth inhibition were also found by Rivero et al., 2009 when testing a chitosan compound for the control of rice spotted grain pathogens.

OII-YS showed in vitro antifungal acitivity against the three tested pathogens. This result contrast with the one obtained in the fruit trial where high disease values were obtained in the treated fruits.

A possible explanation may be that OII-YS activity against fungi depends of the developmental stage of the fungus: in the fruit trial, the pathogens have been growing inside the tissue when OII-YS was applied. On the other hand, in the *in vitro* test during the early stage of mycelium growing (when agar plugs are placed in the petri dish), the pathogens may be more sensitive.

Fig.1 Dose response curve of crown rot isolates to XXXXX, 6 days after inoculation

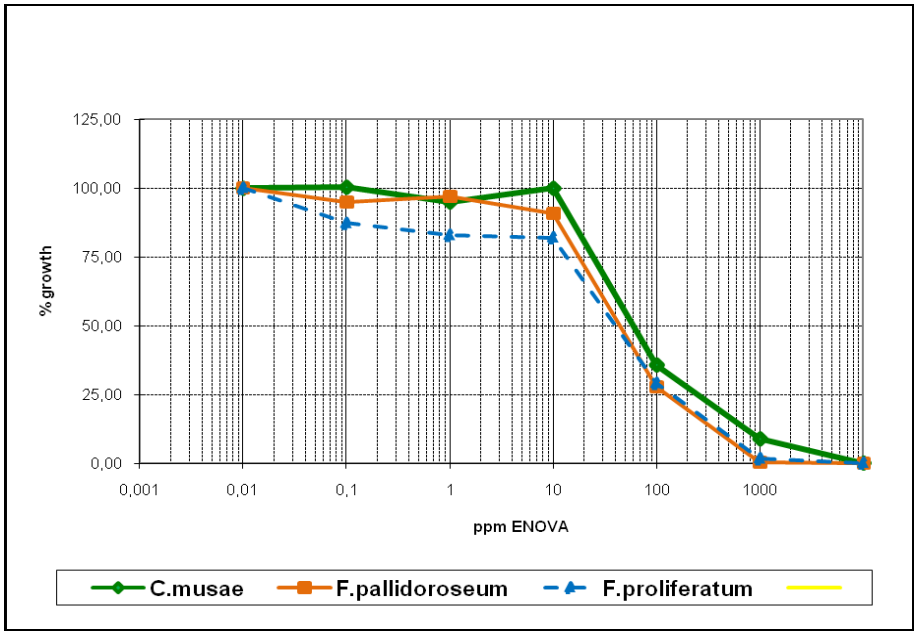

Table 1. Percent reduction of colony diameter of crown rot pathogens to OII-YS.

Fungi	OII-YS concentration						EC50
	0.1	**1.0**	**10.0**	**100.0**	**1000**	**10 000**	
C.musae 3	100.0	95.0	100.0	35.7	8.8	0.0	**60.0**
F.pallidoroseum 3	95.0	96.9	90.8	27.8	0.24	0.0	**45.0**
F.proliferatum 1	87.2	82.9	82.0	29.0	1.64	0.0	**43.0**

Conclusions

- OII-YS was effective for the *in vitro* control of the three tested pathogens.
- Based on this *in vitro* experiment and the previous fruit trial, OII-YS may have an option as a postharvest treatments if it used in mixture with other compounds of more curative activity that have the capacity to control advance fungi lesions.

Literature cited

Maqbool, M., Ali, A., Ramachandran, S., Smith, D., Alderson, P. 2010. Control of postharvest anthracnose of banana using a new edible composite coating. Crop Protection 29: 1136-1141

Rivero, D., Trianna, A., Martinez, B., Ramirez, M., Rodriguez, A. 2009. Antifungal activity in vitro of Chitosan on pathogen fungi that cause spotted grain in rice. Fitosanidad 13 (2): 1818-1686
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