

Fungicides are used to control plant diseases. New compounds with novel modes of action have been developed from the 1990s - strobilurins, phenylpyrroles, anilinopyrimidines, phenoxyquinolines and compounds that trigger the plant defence system. There are now 113 compounds registered worldwide as fungicides (Knight *et al.*, 1997). However, none of them are effective against *Ganoderma* basal stem rot (BSR) in oil palm, either *in vitro* or *in vivo*, or even in slowing down the disease progress in infected palms although some have shown promise (Geogre *et al.*, 1996; Idris *et al.*, 2004). With the new fungicides differing fundamentally from the chemicals of old in their modes of action, it may be worthwhile to test them against *Ganoderma*. However, testing is expensive, and it would be ideal if a screening test can first be run to eliminate the chemicals unlikely to be successful. This article describes an *in vitro* screening test to determine the 50% effective concentration (EC₅₀) of fungicides against *Ganoderma* pathogenic to oil palm.

PROCEDURE OF THE METHOD

The produce involved is:

- dilute the fungicide in water;
- incorporate the diluted fungicide into a medium at different concentrations;
- inoculate *Ganoderma* mycelium on the plates (Figure 1);
- incubate the culture plates in an incubator;
- record the radial growth of the fungus and its percentage inhibition of radial growth (PIRG) by the fungicide; and
- plot the probit analysis and calculate the EC₅₀ values.

SERVICE OFFERED

This fungicide evaluation is offered as a service by MPOB to researchers and anyone else



Figure 1. Growth of *Ganoderma* on medium without (left) and with (right) fungicide.

interested. A report on the results will be given with recommendations on the action to take. Some illustration of the work undertaken with the service and the results to date are given below.

THE EC₅₀ OF TESTED FUNGICIDE

An example report is given below:

- radial growth – the mean radial growth of *Ganoderma* on fungicide-amended media is presented in Figure 2. In this example, the fungal growth was inhibited at $\geq 0.1 \mu\text{g ml}^{-1}$ fungicide.
- PIRG data – the PIRG for the fungicide is presented in Figure 3, with 50% inhibition achieved at $\geq 0.05 \mu\text{g ml}^{-1}$.
- probit analysis and EC₅₀ values – the probit analysis and EC₅₀ value for the fungicide are presented in Figure 4. The EC₅₀ value is $0.026 \mu\text{g ml}^{-1}$.

BENEFITS AND COST

The EC₅₀ of fungicides can be ascertained to screen for the chemicals with greater potential against pathogenic *Ganoderma*. Only the fungicides with lower EC₅₀ values need to be tested to control *Ganoderma* in the field, thereby saving considerable work and cost. This service is offered by MPOB at a minimal cost.

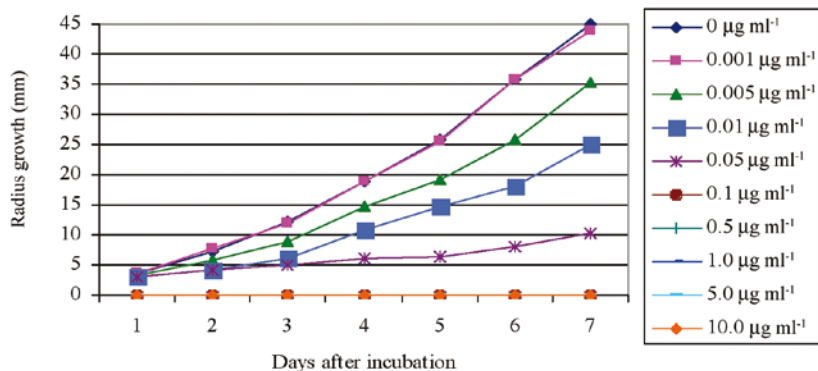


Figure 2. Mean radial growth of *Ganoderma* on fungicide-amended media.

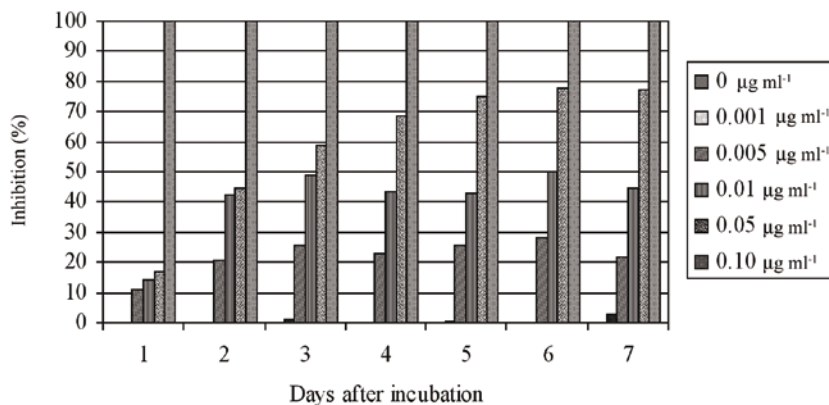


Figure 3. Percentage inhibition of radical growth (PIRG) data of *Ganoderma* on fungicide-amended media.

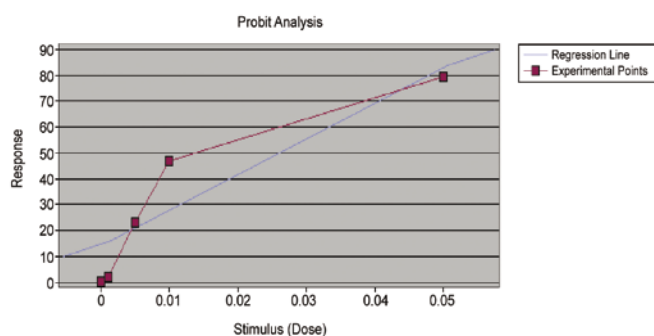


Figure 4. Probit analysis and EC_{50} value for fungicide.

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