

Bacteria such as *Serratia*, *Burkholderia*, *Pseudomonas*, *Bacillus* and actinomycetes from the genera *Streptomyces*, *Streptosporangium* and *Nocardopsis* are able to induce systemic resistance in plants (Kloepper *et al.*, 1992), and shown biological traits like antibiotic activity and lysis. They have been isolated from a wide range of hosts including wild and cultivated crops, such as woody plants (Bills, 1996), banana (Pan *et al.*, 1997) and oil palm (Tan *et al.*, 2002; Abdullah *et al.*, 2005; Zaiton *et al.*, 2006). From the ecological point, the varied characteristics of bacteria and actinomycetes enhance the natural complexity and diversity of the plant environment, providing greater biological balance and stability. This article describes an *in vitro* method to evaluate the potential of bacteria and actinomycetes as biological control agents (BCA) against *Ganoderma* pathogenic to oil palm.

PROCEDURES

The procedure involved is:

- sample collection and isolation of the bacterium/actinomycete;
- bioassays – dual culture and culture filtrate (Figure 1);
- record the radial growth of the *Ganoderma* and its percentage inhibition of radial growth (PIRG) and data analysis; and
- identification - based on cultural and morphological characteristic of bacterium/actinomycete cultured.

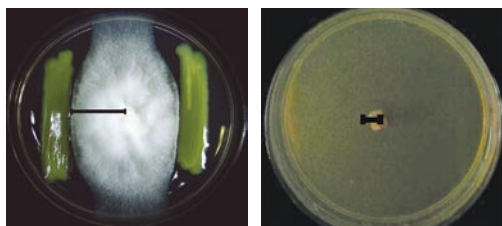


Figure 1. Bioassays. Dual culture (left) and culture filtrate (right).

SERVICE OFFERED

This bacterium or actinomycete evaluation is offered as a service by MPOB to researchers and anyone else 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.

BACTERIA AND ACTINOMYCETES AS BIOLOGICAL CONTROL AGENTS

The report will include the following:

- bacteria and actinomycetes isolates – a pure culture of the isolate is obtained from either the soil, root and stem tissue. The isolate is cultured on selected media (examples as shown in Figures 2 and 3);
- from the bioassay data, the PIRG of pathogenic *Ganoderma* by the isolate of bacterium/actinomycete will be derived. This will be a screening test so that only isolates with high PIRG values need be further explored to control *Ganoderma* in the field; and
- using the dual isolates of culture assay, MPOB has evaluated 2295 bacteria and actinomycetes against pathogenic *Ganoderma in vitro* with 102 (4.44%) giving PIRG > 50%. With the culture filtrate assay, 739 isolates have been tested against pathogenic *Ganoderma* with 62 (8.39%) giving PIRG > 50%.

BENEFITS AND COST

This is a fast, easy and cheap method to screen bacteria and actinomycetes for their potential as BCA against pathogenic *Ganoderma*. MPOB offers this service at a minimal cost per bacterium/actinomycete evaluated.

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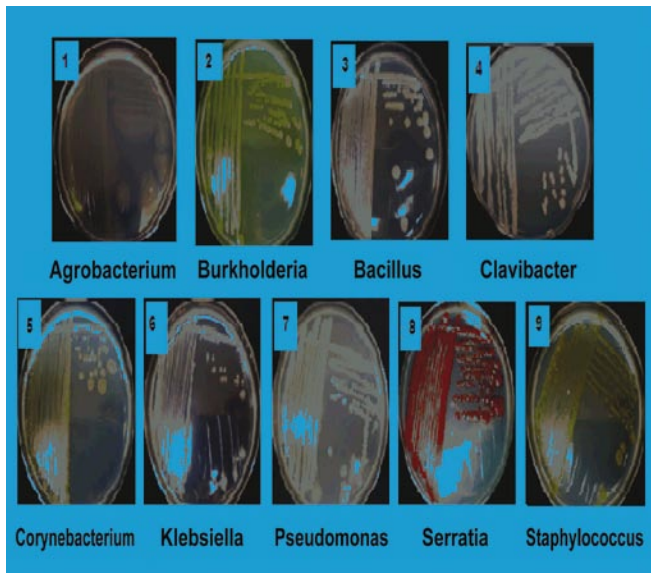


Figure 2. Bacteria isolates.

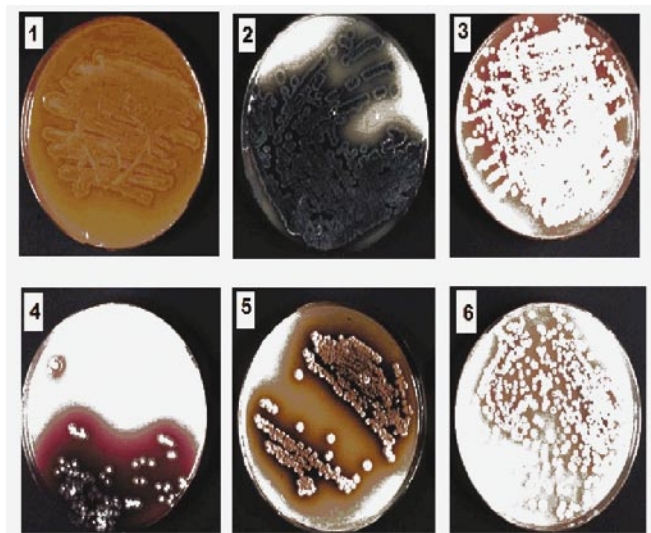


Figure 3. Actinomycetes isolates.

For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
Tel: 03-87694400
Website: www.mpob.gov.my
Telefax: 03-89259446