TAXONOMY & ECOLOGY

Beyond Classical Approaches

Edited by
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EFFECT OF BACTERIA ON GROWTH OF *GANODERMA BONINENSE* ISOLATED FROM OIL PALM DISEASE

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ABSTRACT

Oil palm has been considered as the most important plant to produce vegetable oils. The palm however has been frequently reported to be infected by the plant pathogenic fungus, *Ganoderma*, which causes disease known as basal stem rot (BSR). The widespread and severe infection of the disease cause major hindrance to palm oil production. In the present study, screenings were done to get bacteria which show as the potential biological agents to control the disease. One hundred and twenty-two (122) bacteria were isolated from various plant materials. Thirty seven (37) isolates showed inhibitory effect on growth of *G. boninense* that was isolated from the palm disease. The screening was done by dual culture assay in which the mycelia of *G. boninense* were inoculated simultaneously with the treated bacteria isolates on MEA media in the same Petri dish. The degree of the inhibition was measured and the changes for the hyphae margin of the fungus were observed. The most effective isolate to inhibit growth of *G. boninense* was isolate of 0030. The average colony radial of the fungus was reduced by 55%. The bacterium have potential to be used as an effective biological control agent of *G. boninense* when the isolate was tested. The bacteria also caused thinned margin at the fungal colony compared to control and the hyphae lengths were not uniform, clamp connection was rarely present and the hyphae tips become swollen. The isolate 0030 was identified as *Streptomyces*. Some bacteria inhibited growth of the pathogen but formed thicker colony margin of the fungus or no changes. Thus, this study suggests that further research should be conducted.

Keywords: antagonist, bacteria, pathogenic

INTRODUCTION

Ganoderma boninense is the major causal agent of BSR in oil palm (*Elaeis guineensis*) in Malaysia and Indonesia (Yonnes and Turner, 1998; Utomo *et al.*, 2005). This serious and devastating disease will result in severe economic loss for vegetable oil's industry. Until today, there is no permanent control method evolved eventhough increased attention by plant pathologist. Chemicals do show promising in controlling the disease (Ramasamy, 1972; Idris *et al.*, 2002; Idris *et al.*, 2004) but for short term and are causing controversy towards the environment. Based on those conditions, the present study was undertaken with the aim to determine bacteria isolate that can control growth of *G. boninense*.

MATERIALS AND METHODS

Ganoderma isolates

Pure culture of *Ganoderma* was obtained from UNIMAS culture collections, which were isolated from basidiocarp of the infected oil palm.

Bacteria isolates

The bacteria were isolated from various substrates such as soils, leaves, water and roots.

Isolation from soils

The bacteria were isolated through serial dilution of soils, which followed the technique of Tortora *et al.* (1998). One gram of soils sample was added with sterilized distilled water until the volume up to 10 ml. One ml of final serial dilution was spread uniformly over the surface of nutrient agar with specially shaped sterilized glass rod (Penn, 1991). Bacteria that form colonies on the agar after 24 to 48 hours were isolated further onto nutrient agar to obtain pure culture (Johnston and Booth, 1983). The bacteria were cultured on slant agar kept at 4 ó C and used as stock. For every experiment, new culture was prepared and culture of 24 to 48 hours old was used.