Relationship between Ganoderma ergosterol concentration and Basal stem rot disease progress on Elaeis guineensis

ABSTRACT

Basal stem rot (BSR) is a devastating disease to Malaysian oil palm. Current techniques employed for BSR disease detection on oil palm are laborious, time consuming, costly, and subjected to accuracy limitations. An ergosterol detection method was developed, whereby it correlated well with the degree of infection in oil palm. This current study was designed to study the relationship between Ganoderma biomass, ergosterol concentration, BSR disease progress and to validate the efficiency of microwave assisted extraction (MAE) method for extraction of ergosterol compound. In addition, testing on the sensitivity of thin layer chromatography (TLC) analysis for detection of ergosterol was also the aim of this study. The optimised procedure involved extracting a small amount of Ganoderma-infected oil palm root tissues suspended in low volumes of solvent followed by irradiation in a conventional microwave oven at 70°C and medium high power for 30 s, resulting in simultaneous extraction and saponification. Based on the results obtained, MAE method may be effective in extracting low to high yields of ergosterol from infected oil palm roots demonstrating disease scale 2, 3 and 4. Positive relationship was observed between ergosterol content and inoculation period starting day 3 in the inoculated oil palm seedlings and hour 6 in germinated seeds. TLC analysis demonstrated a good correlation with high performance liquid chromatography (HPLC) quantification. Therefore, a semi-quantitative TLC analysis may be applied for handling a large amount of samples during onset field survey.