Screening for efficient aerobic, non-symbiotic nitrogen-fixing bacteria and their interaction with vesicular-arbuscular mycorrhizal fungi on the growth of *Tetrameles nudiflora* R. BR. seedling.

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ABSTRACT

The role of some microorganisms of increase the growth of plant has been known. The role of Rhizobium is symbiotic nitrogen fixation associated with leguminous plant, while Azotobacter is non-symbiotic nitrogen fixation. Mycorrhizal fungi are also known to increase the growth of plant by increasing nutrient absorbing efficiency of plant. However, double inoculation with Azotobacter and Mycorrhizal fungi have not yet been investigated. The present study was carried out to examine interaction of Azotobacter and Mycorrhizal fungi on the growth of *Tetrameles nudiflora* seedling. Twenty-nine soil samples were collected from Sakaerat forest, and counted for the number of non-symbiotic nitrogen-fixing bacteria by dilution plate count method. The numbers of the bacteria in both dry evergreen forest and dry dipterocarp forest were about 4 X 10^4 CFU/g soil.

One hundred and fifty-five isolates of non-symbiotic nitrogen fixing bacteria were isolated from the soil samples. Nitrogenase activities of the isolates were examined by using acetylene reduction method. Three isolates which had highest and consistent nitrogenase activity (1030, 747, 619 n Mole C_2H_4/hr/bottle) were selected for further studies.

Studies were also conducted on the effect of the selected bacteria and mycorrhizal fungi on nitrogen fixation and growth of *Tetrameles nudiflora* seedling. The treatments were 1.) sterile soil, uninoculate; 2.) sterile soil with fertilizer; 3.) sterile soil with mycorrhizal inoculation; 4.) sterile soil with bacteria inoculation; 5.) sterile soil inoculated with both mycorrhizal fungi and bacteria and; 6.) nonsterile soil inoculated with both mycorrhizal fungi and bacteria. The growth

of *Tetrameles nudiflora* seedlings measured in terms of neigth, dry weight and total uptake of nitrogen, phosphorus and potassium at 70, 90, 120, 150 and 180 days of age.

The results showed that the nitrogenous activities of treatment inoculated with mycorrhizal fungi were higher than those of uninoculated with bacteria as well. The growth of *Tetrameles nudiflora* seedlings inoculated with both mycorrhizal fungi and bacteria were higher than those inoculated with bacteria and those uninoculated with the microorganism but not significantly different from the seedling inoculated with mycorrhizal fungi. Seedling inoculated with both mycorrhizal fungi and bacteria in nonsterile soil did not show significantly higher growth than the uninoculated one