

The effect of the selected bacteria and mycorrhizal fungi on nitrogen fixation
and growth of *Tetrameles nudiflora* seedling.

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Final report Submitted to the National Research Council., 1976.

ABSTRACT

The role of some microorganisms in increasing the growth of plants has been known. The role of *Rhizobium* is symbiotic nitrogen fixation in association with leguminous plant, while that of *Azotobacter* is non-symbiotic nitrogen fixation. Mycorrhizal fungi are also known to increase the growth of plant by increasing its nutrient absorbing efficiency. 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 4×10^4 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 (1,030, 747, 619 n Mole $C_2H_4/hr/bottle$) were selected for fruther 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 1) sterile soil, uninoculate; 2) sterile soil with fertilizer; 3) sterile soil with mycorrhizal inoculation; 4) sterile soil with bacterium 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 was measured in terms of height, dry weight and total uptake of nitrogen, phosphorus and potassium at 70, 90, 120, 150 and 180 days of cultivation.

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