Audjima Yamprai 2014: The Correlation between Nitrogenase Activity and Fixed Nitrogen of Azotobacter and Azospirillum Grown with Maize in Kamphaeng Saen Soil Series. Master of Science (Soil Science and Management Techonology), Major Field: Soil Science and Management Techonology, Department of Soil Science. Thesis Advisor: Associate Professor Thongchai Mala, Ph.D. 74 pages.

This research aimed to determine not only the activity of the nitrogenase enzyme, the fixed nitrogen in the day-round of Suwan 5 maize, but also to compare the correlation between the nitrogenase activity and total fixed nitrogen. The research was divided into 2 experiments. The first experiment, study on the total fixed nitrogen and nitrogenase activity in the day-round of azotobacter and azospirillum, was 3 × 4 factorial in completely randomized design with 4 replications. The first factor, inoculation, consisted of non-inoculation (control), *Azotobacter chroococcum* and *Azospirillum lipoferum*, while the second factor was the observation time of nitrogenase activity (6:00, 12:00, 18:00 and 24:00 hr). The results showed that the different time in a day-round did not affect the total nitrogen and nitrogenase activity, but the different inoculations significantly affected the total fixed nitrogen and the nitrogenase activity. Inoculation of azotobacter gave the highest total soil nitrogen and nitrogenase activity in soil. While, inoculation of azospirillum gave the highest total plant nitrogen and nitrogenase activity in root. The second experiment was the study on the total fixed nitrogen and total nitrogenase activity of azotobacter and azosprillum grown with maize. The randomized complete block experiment was conducted with 4 replications and consisted 3 treatments (non-inoculation, *Azotobacter chroococcum* and *Azospirillum lipoferum* inoculations). The datas were collected every 2 weeks after planting. The results showed that inculation of azotobacter and azospirillum had higher standard ears and seed yield than that of control treatment (1,004.50 1,068.20 and 832 kg/rai respectively). Inoculation with both strains stimulated to gain higher seed yield than that of non-inoculation about 200 kg/rai, approximately. Total fixed nitrogen of both microbes had a positive relation yield with total nitrogenase activity. The approximately amount of total fixed nitrogen of azotobacter and azospirillum can be estimated by the equation of $y = 25.039x+49.332$ with $R^2= 0.85$ and $y = 27.262x+264.06$ with $R^2= 0.83$, respectively.

_____ _____ ___ / ___ / ___

Student's signature Thesis Advisor's signature