

Marisa Phiromtan 2013: Effect of Azotobacter Application as Nitrogen Source on Growth and Yield of Brockaleli (*Brassica oleracea*). Doctor of Philosophy (Agricultural Research and Development), Major Field: Agricultural Research and Development, Faculty of Agriculture at Kamphaeng Saen. Thesis Advisor: Associate Professor Thongchai Mala, Ph.D. 185 pages.

This study was started from 1) studying the abundance of Azotobacter in the rhizosphere from various crops, 2) screening the high efficiency strains of Azotobacter in the laboratory, 3) evaluating the effect of various kinds of carrier and temperature levels on the survival of Azotobacter, and 4) monitoring effects of various *Azotobacter* spp. on growth and yield of brockaleli in the greenhouse and field conditions, respectively. The results revealed that population of *Azotobacter* spp. from various soil habitats were significant as determined by plant crops, moisture content, organic matter and pH. Various isolates of *Azotobacter* spp. showed significant difference on N₂-fixation, IAA production, and phosphate solubilization. Eight isolates were chosen as the high potential strains. Peat + leaf compost was the most suitable carrier and storing inoculums at 5 °C was the suitable for Azotobacter inoculum after storage for 90 days. Interaction between types of carrier and temperatures was found. N at 20 kg/rai had the highest effect on growth and yield of brockaleli followed by N at 10 kg/rai, *Azotobacter vinelandii* CK-KS-2, *A. vinelandii* CK-KS-3, mixed cultures, *A. vinelandii* PR-NDD-1, *A. vinelandii* CHI-KK-2, and *A. vinelandii* CK-NDD-1 and control, respectively. Azotobacter promoted plant growth, yield, day to first flowering and total K in brockaleli flower in greenhouse experiment. N at 10 kg/rai had the most effect on growth and yield of plant in field experiment followed by N at 5 kg/rai, *A. vinelandii* CHI-KK-2, *A. chroococcum* LET-NDD-3, *A. vinelandii* CH-KS-3, *A. vinelandii* CK-KS-2, and *A. vinelandii* PR-NDD-1, and control, respectively. The result indicated that 44.44 % of bacterial species promoted better plant growth than that of N at 5 kg/rai. *A. vinelandii* CHI-KK-2, *A. vinelandii* CK-KS-3, *A. vinelandii* CK-KS-2, and *A. vinelandii* PR-NDD-1 were high effective strains which promoted plant growth both in greenhouse and field experiments and have shown a potential to reduce the use of nitrogenous chemical fertilization in sustainable agriculture in the future.

Student's signature

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