INFORMATION OF DOCTORAL DISSERTATION

Research title: *Study on immobilization nitrogen-fixing bacteria in polyter and application in strawberry plants.*

Major: Veterinary Parasitology and Microbiology

Code: Biotechnology

PhD candidate: Nguyen Thuy Quy Tu

Course Duration: 2011

Research Supervisors: Pham S, PhD - Prof. Nguyen Thuy Huong, PhD.

Training institution: University of Technology, Viet Nam National University - Ho Chi Minh City

The main results of the thesis:

1. Initial success to create Biopolyter-Azotobacter by conducting fermentation in semi-solid state of *Azotobacter vinelandii* ATCC 12837 strain on polyter medium. Biopolyter-Azotobacter has grains shape, diameters range from 2-3 mm. By Response Surface Methodology (RSM) – Central Composite Designs (CCD) method, optimization to create 5 most important factors that affect to semi-solid state fermentation process to create Biopolyter-Azotobacter product are sucrose content (2.9%), temperature (31.5°C), pH (6.44), moisture content (61.04%), inoculum’s size (1.05%). Microbiology density received from experimental results is $3,987 \times 10^9$ CFU/g, 97% compatible with optimum model. The closely correlation of two calculations confirm the accuracy of model and the existence of optimal values.

2. Studying BioPA application in strawberry plantation, density of *Azotobacter* bacteria in polyter always maintain at $3,20 – 3,92 \times 10^9$ CFU/g
over 6 months monitoring period. The strawberries grow, develop well, flowering earlier 8-9 days, productivity higher at 11 – 17%, the Brix ratio the berries increase 3 – 4%, the quality of fresh berries increase by adding Biopolyter-Azotobacter in cultivation substract due to criteria on soluble dry matter, total sugar content, and vitamin C.

3. Based on the appearance, structure (SEM images), properties, and concentrations of the immobilized Azotobacter in Biopolyter-Azotobacter show: the bio product keep basic ployter properties – an agriculture moisture absorber, and meet standard of microbiology fertilizer in 15 months storage at room temperature (28-32°C) and cool temperature (15-20°C) show by these monitoring indicators: microbiology number in two conditions maintain at 0,30 – 1,28 × 10⁹ CFU/g, total nitrogen reach 7,25 mg/ 100 ml, IAA: 70,10 µg/ml, moisture at 11,21 – 11,40%.

The new scientific findings
Successfully studied the fixation of Azotobacter bacteria in traditional polyter medium by conducting fermentation in semi-solid state to create Biopolyter-Azotobacter. Biopolyter-Azotobacter has dual functions of agriculture moisture absorber and useful microbiology provider to plants. The research process conducted through phases: from fixation process, creation of product, quality evaluation and assessment of usage and impact to strawberries; to final stage of optimized quality of the product.