

INFORMATION OF DOCTORAL DISSERTATION

Thesis name: Study on synthesis of silver nanoparticles solution for controlling *Corynespora* leaf fall disease on rubber trees causing by *Corynespora cassiicola*.

Major: Biotechnology

Major code: 62.42.02.01

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Course duration: 2011

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

The main results of the thesis

1. *C. cassiicola* was isolated and some growth characteristics of *C. cassiicola* were identified as development and the best spore growth on rubber leaf agar media at pH 6.5, temperature of 29 ° C.

2. Four types of biological product against *C. cassiicola* were created, including *B. subtilis* suspension with a bacterial density of 2.2×10^9 cells/ml; *B. thuringiensis* suspension with a bacterial density of 1.6×10^9 cells/ml; The silver nanoparticles solution synthesized from *B. subtilis* intracellular fluid had an average particle size from 7 to 12 nm, with the stabilization being about 20 days; The silver nanoparticles/chitosan solution had an average particle size from 5 to 15 nm, with the stabilization being about 12 months.

3. Investigation of fungal inhibitory effect In in vitro conditions, *C. cassiicola* resistance of *B. subtilis* and *B. thuringiensis* were 45.67 % and 33.04 %, respectively. The antifungal effect of silver nanoparticles solution synthesized from *B. subtilis* intracellular fluid was 66.30 % at 90 ppm. The antifungal effect of silver nanoparticles/chitosan solution reached from 52.08 % to 100.00 % when silver nanoparticle size decreased from 15 to 5 nm, at a concentration of 50 ppm. At the 90 ppm of concentration, the antifungal effect of silver nanoparticles/chitosan solution with an

average particle size 10 nm (reached 100.00 %) was slightly higher than the silver nanoparticles solution synthesized from *B. subtilis* intracellular fluid with an average particle size 7 nm (reached 66.30 %).

4. Survey of the ability to prevent and treat *Corynespora* leaf fall disease on rubber trees in nurseries: the treatment of AgNPs /chitosan solution with an average particle size 10 nm being the best preventative effect at a concentration of 2.5 ppm with the infected leaves of 34.27 % after 28 days of *C. cassiicola* infection (defence effect). For the elimination effect, the treatment of AgNPs /chitosan solution at a concentration of 12.5 ppm was able to reduce from 50.00 % to 6.67 % of infected leaves; from 50,00 % to 6.75 % of infected trees and from 22.13 % to 15.03 % of infection index after 28 days of treatment.

The new scientific findings

1. Determining the effect of chitosan molecular weight and deacetylation to the size of silver nanoparticles.
2. Initial determination of the effect of silver nanoparticles on *C. cassiicola* mycelium by SEM image.
3. Constructing process to create a silver nanoparticles/chitosan solution with the size of various particles by using chitosan as a stabilizer by the gamma ray irradiation method.
4. Demonstrating the effectiveness of silver nanoparticles/chitosan solution for *Corynespora* leaf fall disease on rubber trees in nurseries.

Research Supervisors

PhD candidate