



دانشگاه زابل

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Department of herbal medicine

Dissertation for obtaining a master's degree in the field of plant pathology

Control of *Phytophthora spp.* causing root and stem rot using RNAi technology

Supervisors:

Dr. Mojtabi Keikhasaber

Dr. Mohammad Amin Miri

Advisor:

Dr. Mehdi Pirnia

Dr. Shir Ahmad Sarani

Preparing and editing:

Azam Delavari Karizi

1403 Autum

Abstract

Phytophthora rot caused by *Phytophthora capsici* is one of the most destructive diseases in many plants from vegetables to trees, which in some species attacks the roots, aerial organs and even the fruit of the plant. One of the newest methods of fighting is the use of the RNAi process, during which the non-coding RNA/oligo DNAs of genes related to pathogenicity are turned off. In this research, double-stranded oligo DNA (a 30-nucleotide fragment synthesized from the Cesa3 gene) encapsulated and non-encapsulated to control the *Phytophthora capsici* fungus, which was used in the laboratory by targeting the cellulose synthase gene (Cesa3) of the fungus. Encapsulation was done by electrospraying with gelatin polymer and whey concentrate (WPC) and the products were evaluated in terms of physicochemical characteristics. Pathogenicity experiments with *Phytophthora capsici* spores at a concentration of 5×10^4 spores per milliliter mixed with 20 μ M oligo DNA encapsulated with the pathogen *Phytophthora capsici* were carried out as bait with hemp seeds on the roots in a completely randomized design. Evaluation of the development of the disease was done by daily recording of symptoms for two months and cultivation in CMA environment. After evaluating the disease severity index, disease development charts were drawn and the AUDPC index was calculated for each treatment. For statistical analysis, paired t-tests will be used on the data obtained from plant pollution measurements. After examining the pots for two months, the results showed that WPC containing Oligo DNA has the highest disease control rate. Cultivation in CMA medium also showed that the fungus progress was prevented in the plate containing pathogen and WPC-Oligo DNA microcapsule.

Key words: oligo DNA - RNAi technology - gene inhibition – microcapsule