



Maestría en Ingeniería en Diseño de Bioprocesos

Title

**Biological control of phytophthora capsici using
consortium of isolate fungi from "poblano chili plant"**

Author

José Ángel Sánchez Gres

Contributor

Eduardo Molina Gayosso

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“Biological control of *Phytophthora capsici* using consortium of isolate fungi from “poblano chili plant”

Student's name José Ángel Sánchez Gres
 Advisor: Eduardo Molina Gayosso

Abstrac:

Production losses caused by *Phytophthora capsici* chile's are highly regarded. It is proposed to face this problem by generating tolerance in populations of poblano chili using consortia of fungi isolated from poblano chili plants tolerant to this disease. These fungi will be characterized and used as antagonistic to *Phytophthora capsici*.

Introduction

In the town of Santa Ana Xalmimilulco , Puebla. In a Land located at km 98 on the federal Huejotzingo - Texmelucan road. A 600 m . Big Cola Company . Chile crops are significantly affected by a disease whose symptoms are observed at the base of the stem and root; however little is known about the behavior of this disease in this place [2] .

Oomycete *Phytophthora capsici* is a soil which attacks the plant at any vegetative plant both young and adult , invades the rootlets and progresses gradually until the plant dies [3]. This type of disease causes a large percentage of infected plants ranging from 30 to 70 % of total crop [1] .

Therefore this paper aims to test the biological control of *Phytophthora capsici* is possible by consortia of fungi isolated from poblano chili plants tolerant to this disease of which were isolated from the root.

Objectives:

General objective:

To verify the biological control of *Phytophthora capsici* with the ground in the soil , by consortium of isolate fungi from chili plant.

Specific objectives:

1. Isolate and characterize fungi from healthy chili plant's root
2. Estimate its antagonistic capacity against *Phytophthora capsici* .
3. Make experiments on biological control field in poblano chili plants using the consortium of definite fungi.
4. Evaluate the levels of control of root diseases caused by *Phytophthora capsici* .

Results

Field detected with the "evil seed"

The field is located in Santa Ana Xalmimilulco Huejotzingo, Puebla (Land located at 98 km height in federal Huejotzingo - Texmelucan road. 600 m. Big Cola Company)



Samples of plants resistant to the "evil seed"



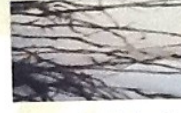
Roots of plants resistant to the "evil seed"



Samples of plants with disease "evil seed"



Roots of plants with disease "evil seed"



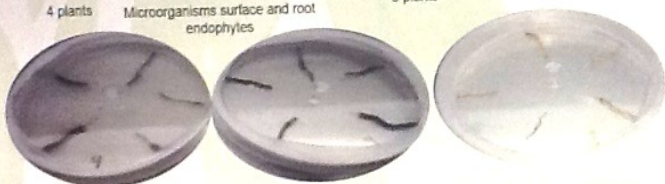
Planting roots of resistant plants "evil seed"

Planting roots of resistant plants "evil seed"

4 plants

Microorganisms surface and root endophytes

3 plants

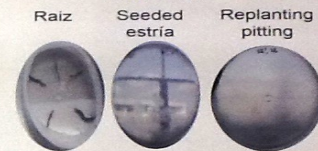


Results

Endophytes



Surface



Root planting, seeding by striations and pitting for the isolation of microorganisms

Conservation Endophytes and Surface



Conservation of microorganisms in eppendorf tubes

Germination test

Endophytes



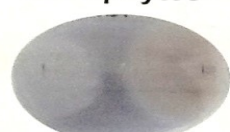
Surface



It is determined whether the isolated microorganism allowed to germinate chili seeds

Antagonism test

Endophytes



% Inhibition: $100 \times (R_2 - R_1) / R_1$

Surface



% Of Colonization: $[(DCAP/DSP) \times 100]$



Conclusions

The results show the damage caused by *P. capsici* in poblano chili plants was identified as the cause of death of these plants.

26 and 44 fungal endophytes surface roots poblano chili plants tolerant to the disease were isolated. Which were purified and preserved.

In the germination test of 25 of these fungal endophytes were positive (seed germination) and only one negative. And on the surface 44 fungi were positive (seed germination) in its entirety.

In the test of antagonism endophytic fungi 85% of them are antagonistic to *P. capsici* and surface fungi only 65% is antagonistic to *P. capsici*.

Drawing thesis : 60%
 objective 1: 90%
 objective 3: 30%

Article : in review
 objective 2: 50%
 objective 4: slope

Reference

[1] Velásquez V R M, M Medina A, J J Luna R (2001) Sintomatología y géneros de patógenos asociados con las pudriciones de la raíz del chile (*Capsicum annuum* L.) en el Norte-Centro de México. *Rev. Mex. Fitopatol.* 19: 175-181.

[2] Aguilar R V H, T Corona T, S H Morán B (2006) Chiles nativos (*Capsicum* spp., Solanaceae) de los estados de Puebla y Morelos. In: *Avances de Investigación de la Red de Hortícolas del SINAREFI*. P López L, S Montes H (eds) Libro Científico Núm. 1. Campo Experimental Bajío INIFAP Celaya, Guanajuato, México pp 28-58

[3] Fernández P S P, C L Biles, M E Waugh, K Onsurez-Waugh, G Rodríguez A, C M Liddell (2004) Characterization of southern New Mexico *Phytophthora capsici* Leonian isolates from pepper (*Capsicum annuum* L.). *Rev. Mex. Fitopatol.* 22: 82-89.



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