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Testing Long Soaking of Pepper Seeds Locally Infected with The Fungus *Colletotrichum capsici* by *Trichoderma Harzianum*

Pengujian Lama Perendaman Benih Cabai Lokal yang Terinfeksi Jamur *Colletotrichum capsici* dengan *Trichoderma harzianum*

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ABSTRACT

This research aims to determine the viability of local chili seeds infected with Colletotrihum capsici with different soaking times using Trichoderma harzianum. The design used was a Compltely Randomized Design (CRD) consisting of 5 treatments and 4 replications, namely local chili seeds infected with C. capsici mushrooms soaked with T. harzianum suspension for 2 hours, 4 hours, 5 hours, 8 hours, Control (without soaking with T. harzianum suspension). The parameters observed were the percentage of local chili seed germination, Vigor index (IV) local chili seeds, seedling height. The results that the immersion of local chili seeds infected wit C. capsici fungi affected the seed germination, vigor index and heigh chili seedling. The best soaking time is local chili seeds that are soaked for 8 hours.

Keywords*: seed local chili, different soaking, Colletotrichum capsici, Trichoderma harzianum*

ABSTRAK

Penelitia ini bertujuan untuk mengetahui viabilitas benih cabai lokal yang terinfeksi *Colletotrichum capsici* dengan lama perendaman yang berbeda menggunakan *Trichoderma harzianum*. Rancangan yang digunakan adalah Rancangan Acak Lengkap (RAL) yang terdiri dari 5 perlakuan dan 4 ulangan, yaitu benih cabai lokal yang terinfeksi jamur *C. capsici* direndam dengan suspensi *T.harzianum* 2 jam, 4 jam, 6 jam, 8 jam, dan kontrol (tanpa perendaman dengan suspensi *T. harzianum*. Parameter yang diamati adalah persentase perkecambahan benih cabai lokal, Indeks Vigor (IV) benih cabai lokal, dan tinggi tanaman. Dari hasil penelitian yang dilakukan dapat disimpulkan bahwa perendaman benih cabai lokal yang terinfeksi jamur *C. capsici* memberikan pengaruh terhadap perkecambahan benih, indeks vigor, dan tinggi tanaman cabai. Lama perendaman terbaik terdapat pada benih cabai lokal yang direndam selama 8 jam.

Kata kunci: benih cabai lokal, lama perendaman, Colletotrichum capsici, Trichoderma harzianum

INTRODUCTION

Pepper plants (Capsicum annum L.) is one of the vegetable commodities that are needed by almost all people from different walks of life. Chili comes from the world's tropical and subtropical parts of the American Continent, particularly Colombia, South America, and spread to Latin America. Evidence of the cultivation of chili was first found in the tread of the excavation history of Peru and sisaan seeds that have been aged more than 5000 years BC in a cave in Tehuacan, Mexico. The spread of chili peppers to the entire world including countries in Asia, such as Indonesia carried out by the Spaniards and Portuguese (Harpenas dan Dermawan, 2014).

Productivity of red chilies both in quality and quantity of such disturbed because of the attack of the disease anthracnose. The disease is caused by the fungus Colletotrichum and can cause losses in yield up to 65% (Hersanti, *et al.,* 2001). The fungus Colletotrichum can infect the plant organs of red pepper, especially the fruit. This fungal infection on

the fruit of red pepper is characterized by initial symptoms in the form of small spots that are colored blackish and slightly curved. Further attacks resulted in the fruit is wrinkled, dry and rot (Syamsudin, 2007).

Treat seed to control disease anthracnose is generally done by using fungicides, synthetic, however, the use of synthetic pesticides began to be reduced with increasing public awareness of the dangers of the use of chemical pesticides to the environment and health. Therefore, the biological agents into one of the alternative replacement chemicals. Treatment invigorasi priming combined with agents of biocontrol (biopriming) is able to increase the viability and vigor of seeds as well as lowering the infection of the pathogen C. capsici (Kumalasari, 2005).

The purpose of this research is to determine the viability of pepper seeds local infected C. capsici with long immersion using a different T. harzianum.

MATERIALS AND METHODS

Research Time and place of implementation

This research was conducted at Experimental Garden of the Faculty of Agriculture of Universitas Graha Nusantara Padangsidimpuan. Schedule the study began in August – October 2019.

Research Materials and Tools

The materials used in this research is the seeds of peppers locally infected with Colletotrichum capsici, soil, distilled water, compost.

The tool used is the tray, tweezers, aqua glass, Erlenmeyer, hand sprayer, knife, and stationery.

Research Experimental Design

The design used in this research is Complete Random Design (RAL) consisting of 5 treatments and 4 replications. Treatment is a long soaking of pepper seeds the city with the suspension of the fungus T. harzianum as follows :

A. T1 (Soaking 2 Hours)
B. T2 (Soaking 4 Hours)
C. T3 (Soaking 6 Hours)
D. T4 (Soaking 8 Hours)
E. Control (without immersion with a suspension of T. harzianum)

The Data were processed statistically using the analysis of the fingerprint of variance and Tukey test on the real level of 5% .

Preparation of the pepper seed of local infected with the fungus Colletotrichum capsici

The seeds of peppers local infected infected with Colletotrichum capsici obtained from the Village Sibanggor. The seeds are taken and sorted to see the condition of the seeds of chili will be treated. Seed treated seed showed symptoms of the disease anthracnose. Then seed the chilies soaked and dikering concrete.

Preparation of growing media

Land was taken from the burning waste, then in the sifter and mixed with compost with a ratio of 1 : 1. After both are well mixed and put into each tray.Penanam benih cabai lokal yang terinfeksi jamur *Colletotrichum capsici*

Seeds chili city that has been clean, then put into each Erlenmeyer flask that has been filled with a suspension of T. harzianum and soaked appropriate treatment.

The observed parameters

The Percentage Of Germination Of Pepper Seeds Local

Seed germination (DB), illustrates the potential viability of the seed (Sadjad et al. 1999), calculated based on the percentage of germinated normal (KN) first count that is 5 days after planting (hst) and second (7 hst) by the formula:

$$DB = \frac{\sum \text{KN Countn I + KN Count II}}{\sum \text{the seeds are planted}} \times 100\%$$

The index of Vigor (IV) of Pepper Seeds Local

The index of vigor (IV), describes the vigor of the growing speed (Copeland & McDonald 1995), calculated based on the percentage of sprouts to normal on the first count (7 hst) by the formula **:**

$$IV = \frac{\sum \text{KN Count I}}{\sum \text{the seeds are planted}} \times 100\%$$

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Plant height of pepper (cm)

Shoots high measured from the surface of the ground until the shoots high and observations done every 5 days until the seedling age of 25 days after planting.

RESULTS AND DISCUSSIONS

The Percentage Of Germination

The results showed that the application of various treatment long soaking of pepper seeds local infected mushroom C. capsici with mushrooms T. harzianum obtained different results in each treatment. The test results further the percentage of germination of pepper seeds local an infected can be seen in Table 1. In Table 1, it is seen that the long soaking of pepper seeds local infected C. capsici by T. harzianum showed the results are not significantly different. The value of the percentage of seed germination of chili local lowest on the treatment of immersion 2 hours which is 68,75 %. and show the results are not significantly different with other treatments. The percentage of germination of seeds of chilli local was highest on the treatment of immersion of 8 hours i.e. 87.50 japanese % and show the results are not significantly different with the treatment of other. The response from the application T. harzianum is with increasing percentage germination, plant height, and dry weight and germination time is short on vegetable crops (Baker *et al.,* 1984; Chang *et al.,* 1986, Paulitz *et al.,* 1986).

Table 1. The percentage of seed germination of chili local to long immersion with the use of the fungus T. harzianum.

Treatment	The percentage of germination (%)
T1	68,75 a
T2	73,75 a
T3	77,50 a
T4	87,50 a
Control (without immersion with a suspension of T. harzianum)	86,25 a

The index of Vigor (IV) of Pepper Seeds Local

The results of the research shows from a variety of treatment long soaking pepper seed local with T. harzianum showed different results between treatment. In Table 2 is seen that the vigor of pepper seeds local to long immersion with the use of the fungus T. harzianum showed results different between treatment. The vigor was highest in seed treatment of chilli local soaked for 8 hours, 73,75% and low contained in the treatment soaked for 2 hours that is 26,25%.

Table 2. The vigor of pepper seeds locally are infected with the disease anthracnose to a long immersion by using the fungi T. harzianum

Treatment	The vigor (%)
T1	26,25 a
T2	30,00 a
T3	41,25 a
T4	73,75 b
Control (without immersion with a suspension of T. harzianum)	62,25 b

Jegathambigai *et al.,* (2009) reported that seed treatment with Trichoderma to improve the germination of 24,03%, the vigor of the seedlings by 23,29% and reduce the incidence of leaf spot. According to Doni et al (2014) stated that the average index of the vigor of rice seeds with treatment of Trichoderma spp. ranges from 655,73 be 1016,56 compared with the control. The vigor of millet increased with the application of the fungus Trichoderma viride to a concentration of 50% and then decreased with the concentration of 75% less than control (Hassan *et al,* 2014).

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Plant height of Pepper (cm)

The results showed that different treatment long soaking of pepper seeds locally using a suspension of the fungus T. harzianum On plant height of chili there are results which do not differ in any treatment.

Table 3. The effect of long soaking of pepper seeds local infected disease anthracnose by using the fungi T. harzianum against plant height.

Treatment	Plant Height (cm)
T1	11,75 a
T2	13,35 a
T3	12,50 a
T4	15,15 a
Control (without immersion with a suspension of T. harzianum)	11,42 a

In Table 3 it is seen that the best results on plant height of chilli contained in the treatment of 8 hours i.e. 15, 15 cm, while the lowest yield found in control treatment i.e. 11,42 cm. of the parameters of plant height treatment control is not the traditional food of the real compared to the other treatment.. The plant on the land that was given a T. harzianum increased the growth of which can be seen from the increase in the germination, flowering and weight of the plants (Chang and Baker, 1986). Research Suwahyono (2003) showed that T. harzianum secretes substances active kind of a hormone auxin that stimulates the formation of lateral roots.

CONCLUSIONS

From the results of research conducted it can be concluded that soaking the seeds of peppers local infected mushroom C. capsici give effect to the germination of pepper seeds locally, the vigor, and plant height of chili. The best long immersion contained in the seeds of peppers local soaked for 8 hours.

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