

RINGKASAN

Tanaman cabai rawit termasuk dalam tanaman yang memiliki produktivitas tertinggi dengan jumlah produksi yang besar. Infeksi patogen pada benih menyebabkan pembusukan serta perubahan biokimia, memengaruhi kemampuan benih untuk berkecambah, serta menjadi sumber inokulum pada tanaman dewasa. Perlakuan benih menjadi jalan untuk melakukan perbaikan kualitas benih dengan salah satu alternatif yaitu metabolit sekunder jamur *Trichoderma harzianum* T10, yang diformulasikan dengan nama Bio T10. Tujuan penelitian ini untuk mengetahui potensi Bio T10 terhadap peningkatan kesehatan benih dan daya kecambah benih.

Penelitian dilaksanakan pada bulan Oktober 2024-Januari 2025. Penelitian dilaksanakan di lahan pertanaman cabai rawit, Laboratorium Agronomi dan Hortikultura, Laboratorium Perlindungan Tanaman, dan *screen house* Fakultas Pertanian Universitas Jenderal Soedirman, Purwokerto, Kabupaten Banyumas, Provinsi Jawa Tengah. Penelitian dilakukan dalam dua tahap, yaitu *in vitro* dan *in planta*, penelitian secara *in vitro* menggunakan rancangan acak lengkap 2 faktor terdiri atas kombinasi faktor konsentrasi (kontrol, 5, 10, dan 15 mL/L) dan faktor lama perendaman (30 dan 60 menit) dengan 4 kali ulangan dan setiap unit terdiri atas 50 benih, dan penelitian secara *in planta* dilaksanakan dengan menggunakan rancangan acak kelompok sesuai perlakuan pada penelitian *in vitro* dengan 5 bibit setiap unitnya. Variabel yang diamati yaitu identifikasi patogen tular-benih, kejadian penyakit, daya kecambah, kecepatan berkecambah, panjang akar, tinggi tanaman, jumlah daun, bobot segar bibit, dan bobot kering bibit.

Berdasarkan penelitian yang telah dilaksanakan, teridentifikasi pada benih bergejala terdapat patogen tular-benih yaitu *Colletotrichum gloeosporioides* (Penz) Sacc., penyebab penyakit antraknosa cabai. Aplikasi konsentrasi 15 mL/L Bio T10 merupakan konsentrasi terbaik dalam meningkatkan kesehatan benih cabai rawit, yang ditunjukkan dengan penurunan persentase kejadian penyakit sebesar 96 %. Konsentrasi tersebut juga mampu meningkatkan daya kecambah sebesar 141 %, kecepatan berkecambah sebesar 100,87 %, panjang akar sebesar 27,25 %, tinggi tanaman sebesar 62,89 %, jumlah daun sebesar 33 %, bobot basah sebesar 154,54 %, dan bobot kering sebesar 113,33 % dibandingkan kontrol. Lama perendaman 60 menit mampu meningkatkan daya kecambah sebesar 27,56 %, kecepatan berkecambah sebesar 28,57 %, panjang akar sebesar 6,63 %, dan tidak berbeda nyata pada uji *in planta*. Kombinasi terbaik pada konsentrasi 15 mL/L Bio T10 dengan lama perendaman 60 menit, yang mampu meningkatkan daya kecambah sebesar 410 %, kecepatan berkecambah sebesar 520 %, panjang akar sebesar 42,2 %, tinggi tanaman sebesar 71,8 %, jumlah daun sebesar 42,2 %, bobot basah sebesar 205 %, dan bobot kering sebesar 240 %.

SUMMARY

*Bird's eye chili is one of the most productive crops with a large amount of production. Pathogen infection in seeds causes decay and biochemical changes, affects the ability of seeds to germinate, and becomes a source of inoculum in adult plants. Seed treatment is a way to improve seed quality with one of the alternatives, namely the secondary metabolites of the fungus *Trichoderma harzianum* T10, which is formulated under the name Bio T10. The purpose of this study was to determine the potential of Bio T10 to improve seed health and seed germination.*

The research was carried out from October 2024 to January 2025. It was conducted in cayenne pepper plantations, the Agronomy and Horticulture Laboratory, the Plant Protection Laboratory, and the screen house of the Faculty of Agriculture, Jenderal Soedirman University, Purwokerto, Banyumas Regency, Central Java Province. The research was carried out in two stages, namely in vitro and in planta research. The in vitro research used a completely randomized design with 2 factors consisted of factor combination between Bio T10 concentration (control, 5, 10, and 15 mL L⁻¹) and soaking time (30 and 60 minutes) with 4 replicates and 50 seeds per unit, while the in planta research was conducted using a randomized block design according to the treatments used in the in vitro research, with 5 seedlings per unit. The variables observed were identification of seed-borne pathogens, disease incidence, germination rate, germination speed, root length, plant height, number of leaves, fresh seedling weight, and dry seedling weight.

*Based on the research that was carried out, it was identified that seeds showing symptoms during in vitro observation contained a seed-borne pathogen from the T0P1 treatment, namely *Colletotrichum gloeosporioides* (Penz.) Sacc., which causes anthracnose disease in chili plants. The results showed that the application of *T. harzianum* T10 was able to improve the health of cayenne pepper seeds. The Bio T10 concentration of 15 mL/L of water was the best concentration, reducing disease incidence by 96%, increasing germination rate by 141%, germination speed by 100.87%, root length by 27.25%, plant height by 62.89%, number of leaves by 33%, fresh weight by 154.54%, and dry weight by 113.33% compared to the control. The best soaking treatment, with a soaking duration of 60 minutes, was able to increase germination rate by 27.56%, germination speed by 28.57%, and root length by 6.63%, although it did not differ significantly in the in planta treatment. The best combination is at a concentration of 15 mL/L Bio T10 with a soaking time of 60 minutes, which is able to increase germination by 410%, germination speed by 520%, root length by 42.2%, plant height by 71.8%, number of leaves by 42.2%, wet weight by 205%, and dry weight by 240%.*