

RINGKASAN

Mentimun (*Cucumis sativus* L.) merupakan salah satu jenis sayuran lelabuan yang sudah banyak dikonsumsi oleh masyarakat Indonesia. Salah satu penyakit penting pada tanaman mentimun adalah penyakit rebah semai yang disebabkan patogen *Pythium* sp. Sampai saat ini belum dapat dilakukan pengendalian yang efektif, sehingga diperlukan alternatif pengendalian lain yang lebih efektif dan ramah lingkungan yaitu dengan pemanfaatan metabolit sekunder *Trichoderma harzianum*. Produksi metabolit sekunder dipengaruhi oleh kondisi pH medium. Penelitian ini bertujuan untuk mengetahui pH medium efektif pada produksi metabolit sekunder *T. harzianum* T10, pengaruh pemberian metabolit sekunder *T. harzianum* T10 untuk mengendalikan penyakit rebah semai, dan pertumbuhan bibit tanaman mentimun.

Penelitian ini dilaksanakan pada bulan November 2018 sampai Maret 2019 di laboratorium Perlindungan Tanaman dan di *screen house*, Fakultas Pertanian Universitas Jenderal Soedirman. Uji *in vitro* dilakukan dengan Rancangan Acak Lengkap dengan 9 perlakuan dan 3 ulangan. Perlakuan yang diuji yaitu pH medium 5; 3; 3,5; 4; 4,5; 5,5; 6; 6,5; dan 7. Rancangan percobaan pada uji *in planta* yaitu Rancangan Acak Kelompok dengan 4 kali ulangan dan 8 perlakuan. Perlakuan yang diuji, yaitu kontrol, fungisida (mancozeb), metabolit sekunder pH 5 dan 5,5 masing-masing konsentrasi 5, 10, dan 15%. Variabel yang diamati meliputi kepadatan konidium, daya hambat, daya kecambah, enzim kitinase, enzim β -1,3-glukanase, masa inkubasi, kejadian penyakit, AUDPC, jumlah daun, tinggi tanaman, panjang akar, dan bobot segar tanaman.

Hasil penelitian menunjukkan bahwa 1) pH medium yang efektif pada produksi metabolit sekunder *T. harzianum* T10 yaitu pH 5 dan 5,5 dengan masing-masing kepadatan konidium $1,09 \times 10^8$ dan $4,2 \times 10^7$ konidium mL^{-1} , daya hambat 76,8 dan 75,6%, adanya enzim β -1,3-glukanase, dan kitinase; 2) pemberian metabolit sekunder *T. harzianum* T10 pada medium pH 5 dan 5,5 dengan konsentrasi 5, 10, dan 15% masing-masing mampu menekan penyakit rebah semai ditunjukkan dengan memperlama masa inkubasi selama 42 hari, menurunkan kejadian penyakit sebesar 100%, dan nilai AUDPC sebesar 0% hari apabila dibandingkan kontrol dan 3) pemberian metabolit sekunder *T. harzianum* T10 pada medium pH 5 dan 5,5 dengan konsentrasi 5, 10, dan 15% mampu meningkatkan tinggi tanaman berturut-turut sebesar 53,85, 55,1, 58,23, 62,19, 56,02, dan 54,98%, jumlah daun berturut-turut sebesar 40,63, 38,7, 42,42, 53,66, 44,12, dan 44,12%. panjang akar berturut-turut sebesar 61,58, 63,49, 62,95, 68,05, 67,7, dan 56,57%, dan bobot segar tanaman berturut-turut sebesar 60,25, 69,3, 66,48, 71,39, 70,52, dan 70,32% apabila dibandingkan kontrol.

SUMMARY

Cucumber (*Cucumis sativus* L.) is one of cucurbites consumed in Indonesia. One of important cucumber diseases is damping-off caused by *Pythium* sp. Recently, control of the diseases is not effective, so that the more effective and environmental friendly control alternative are needed that is the use of secondary metabolites derived from *Trichoderma harzianum*. Production of the secondary metabolites is influenced by pH on medium condition. This research aimed to determine the effective pH medium on production of *T. harzianum* T10 secondary metabolites, the effect of the *T. harzianum* T10 secondary metabolites application on controlling the diseases, and on cucumber seedling growth.

The research was conducted from November 2018 to March 2019 at the Laboratory of Plant Protection and the screen house, Faculty of Agriculture, Jenderal Soedirman University. *In vitro* test used completely randomized design with 3 replicates and 9 treatments, consisted of pH 5; 3; 3.5; 4; 4.5; 5.5; 6; 6.5; and 7. *In planta* test used randomized block design with 4 replicates and 8 treatments, consisted of control, fungicide (mancozeb), secondary metabolites in pH 5 and 5.5 with concentration of 5, 10 and 15% each. Variables observed were conidial density, inhibition ability, germination ability, chitinase, β -1,3-glucanase, incubation period, disease incidence, AUDPC, number of leaves, crop height, root length, and crop fresh weight.

Result of the research showed that: 1) the effective pH medium on production of *T. harzianum* T10 secondary metabolites was pH 5 and 5.5 indicated by conidial density of 1.09×10^8 and 4.2×10^7 conidium mL⁻¹, inhibition ability of 76.8 and 75.6%, β -1,3-glucanase, and chitinase, respectively; 2) application of the *T. harzianum* T10 secondary metabolites on pH 5 and 5.5 with a concentration of 5, 10, and 15% could decrease the disease incidence by lengthening the incubation period as 42 days, degress disease incidence as 100% and AUDPC 0% days compared to controls respectively; and 3) application the *T. harzianum* T10 secondary metabolites on pH 5 and 5.5 with a concentration of 5, 10, and 15% could increase crop height as 53.85, 55.1, 58.23, 62.19, 56.02, and 54.98%, respectively, number of leaves 40.63, 38.7, 42.42, 53.66, 44.12, and 44.12%, respectively, root lengths as 61.58, 63.49, 62.95, 68.05, 67.7, and 56.57%, respectively, and crop fresh weight as 60.25, 69.3, 66.48, 71.39, 70.52, and 70.32%, respectively, compared to controls.