

## RINGKASAN

*Alternaria alternata* merupakan fungi patogen penyebab berbagai penyakit pada tanaman hortikultura. Kerugian yang ditimbulkan akibat serangan *A. alternata* berpengaruh terhadap budidaya tanaman hortikultura dan jumlah produksi hasil panen yang berkurang sebesar 5-78%. Pengendalian patogen *A. alternata* umumnya menggunakan fungisida, salah satunya fungisida berbahan aktif benomyl. Fungisida benomyl dapat digunakan untuk pengendalian *A. alternata* karena termasuk fungisida sistemik dengan spektrum yang luas. Meskipun penggunaan fungisida dapat secara efektif dan berhasil dalam mengendalikan fungi patogen, namun penggunaan fungisida berkelanjutan secara tidak bijaksana dapat menimbulkan resistansi patogen dan akumulasi residu pada tanaman. Solusi berdasarkan permasalahan tersebut dapat dilakukan pengendalian secara hayati sebagai alternatif pengendalian yang ramah lingkungan. Penelitian terkait kombinasi *Trichoderma* sp. dengan fungisida sudah mulai dikembangkan untuk pengendalian patogen yang lebih efektif dibandingkan dengan penggunaan pengendalian secara tunggal. Penelitian ini bertujuan untuk mengetahui dosis fungisida benomyl yang kompatibel dengan pertumbuhan *Trichoderma* spp., dosis fungisida benomyl yang efektif dalam menghambat pertumbuhan patogen *A. alternata*, serta pengaruh penggunaan kombinasi *Trichoderma* spp. dan fungisida benomyl dalam menghambat pertumbuhan fungi patogen *A. alternata*.

Penelitian ini dilaksanakan di Laboratorium Mikologi dan Fitopatologi Fakultas Biologi Universitas Jenderal Soedirman selama 4 bulan (Juli-Oktober 2023). Penelitian ini menggunakan metode eksperimental dengan Rancangan Acak Lengkap (RAL). Variabel bebas berupa jenis agen pengendalian yaitu fungi antagonis *Trichoderma* spp. isolat 1 dan isolat 2, serta fungisida benomyl dalam beberapa dosis diantaranya 0 ppm, 1 ppm, 2 ppm, 3 ppm, 4 ppm, 5 ppm, dan 6 ppm. Variabel terikat yaitu pertumbuhan miselium isolat fungi patogen *A. alternata*. Parameter utama yang diamati yaitu diameter koloni fungi *Trichoderma* spp. dan *A. alternata*, luas koloni fungi patogen *A. alternata*, serta parameter pendukung yaitu pH medium kontrol dan perlakuan. Data yang diperoleh dianalisis menggunakan analisis varian ANOVA dengan uji lanjut Beda Nyata Terkecil (BNT) dan uji Duncan dengan bantuan *software* SPSS.

Hasil penelitian menunjukkan *Trichoderma* sp. isolat 1 kompatibel dengan fungisida benomyl pada dosis 0 – 4 ppm, sedangkan *Trichoderma* sp. isolat 2 kompatibel dengan fungisida benomyl pada dosis 0 – 5 ppm. Dosis efektif perlakuan tunggal fungisida dalam menghambat pertumbuhan *A. alternata* adalah 6 ppm. Kombinasi *Trichoderma* spp. dan fungisida benomyl secara efektif dapat menghambat pertumbuhan fungi patogen *A. alternata* dengan nilai HR berkisar antara 96,82% – 98,16%.

Kata Kunci: *Alternaria alternata*, fungisida benomyl, kompatibilitas, *Trichoderma* spp.

## SUMMARY

*Alternaria alternata* is a pathogenic fungus that causes various diseases in horticultural plants. Losses caused by *A. alternata* attacks affect the cultivation of horticultural crops and the amount of crop production is reduced by 6 – 78%. Control of the *A. alternata* pathogen generally uses fungicides, one of which is a fungicide containing the active ingredient benomyl. Benomyl fungicide can be used to control *A. alternata* because it is a systemic fungicide with a broad spectrum. Although the uses of fungicides can be effective and successful in controlling fungal pathogens, unwise continued use of fungicides can lead to pathogen resistance and residue accumulation in plants. The solution based on these problems can be biological control as an environmentally friendly control alternative. Research related to the combination of *Trichoderma* sp. with the fungicides have begun to be developed to control pathogens more effectively than using single controls. This study aims to determine the dose of benomyl fungicide that is compatible with the growth of *Trichoderma* spp., the dose of benomyl fungicide that is effective in inhibiting the growth of pathogen *A. alternata*, and the effect of using a combination of *Trichoderma* spp. and the fungicide benomyl in inhibiting the growth of the pathogenic fungus *A. alternata*.

This research was carried out at the Mycology and Phytopathology Laboratory, Faculty of Biology, Jenderal Soedirman University for 4 months (July-October 2023). This research used an experimental method with a Completely Randomized Design (CRD). The independent variable is the type of control agent, namely the antagonist fungus *Trichoderma* spp. isolate 1 and isolate 2, as well as the fungicide benomyl in several concentrations including 0 ppm, 1 ppm, 2 ppm, 3 ppm, 4 ppm, 5 ppm dan 6 ppm. The dependent variable is the mycelium growth of the pathogenic fungus isolate *A. alternata*. The main parameters observed were the length of the colony diameter of the fungus *Trichoderma* spp. dan *A. alternata*, colony area of the pathogenic fungus *A. alternata* as well as supporting parameters, namely the pH of the control and treatment media. The data obtained were analyzed using ANOVA (Analysis of Variance) with the Least Significant Difference (LSD) further test and Duncan's test with the help of SPSS software.

The results showed that *Trichoderma* sp. isolate 1 is compatible with the fungicide benomyl at a dose level of 0 – 4 ppm, while *Trichoderma* sp. isolate 2 is compatible with the fungicide benomyl at a dose level of 0 – 5 ppm. The effective dose of a single fungicide treatment in inhibiting the growth of *A. alternata* is 6 ppm. Combination of *Trichoderma* spp. and the fungicide benomyl can effectively inhibit the growth of the pathogenic fungus *A. alternata* with HR values ranging from 96.82% – 98.16%.

Keywords: *Alternaria alternata*, benomyl fungicide, compatibility, *Trichoderma* spp.