



INTISARI

Penyakit bulai yang disebabkan oleh *Peronosclerospora maydis*, merupakan salah satu penyakit penting pada tanaman jagung. Kehilangan hasil akibat penyakit ini dapat mencapai 100%. *Trichoderma* spp. selain sebagai agens pengendali hayati juga memiliki kemampuan menginduksi ketahanan tanaman. Penelitian ini bertujuan untuk: 1). mengetahui potensi *Trichoderma* spp. dalam menekan perkembangan penyakit bulai 2). mengetahui mekanisme *Trichoderma* spp. sebagai penginduksi ketahanan pada tanaman jagung. Penelitian ini dilaksanakan bulan Oktober 2015 sampai Juli 2016 bertempat di Rumah Kaca dan Laboratorium milik Departemen Hama dan Penyakit Tumbuhan Fakultas Pertanian Universitas Gadjah Mada. Tahapan penelitian meliputi; pengambilan sampel, isolasi, pemurnian, karakterisasi, identifikasi morfologi dan molekuler, serta pengujian *Trichoderma* spp. sebagai penginduksi ketahanan terhadap penyakit bulai. Parameter yang diamati adalah persentase dan intensitas penyakit bulai, pengaruh pertumbuhan tanaman, dan penanda ketahanan; *reactive oxygen species* (ROS), lignifikasi, dan analisis kandungan klorofil. Terdapat 4 isolat *Trichoderma* (JMA1, JMA2, KMA, dan STA) hasil isolasi dari akar tanaman jagung yang diuji kemampuannya sebagai penginduksi ketahanan. Hasil identifikasi diperoleh bahwa *Trichoderma* isolat JMA1 dan STA masing-masing memiliki hubungan kekerabatan dekat dengan *Trichoderma asperellum* isolat GWGI (1) dan *Trichoderma asperellum* isolat Tasp26. Hasil pengamatan persentase dan intensitas penyakit terendah ditunjukkan oleh perlakuan aplikasi *Trichoderma* isolat KMA, yakni mampu menurunkan persentase tanaman sakit hingga 88.89% dan intensitas penyakit hingga 77.78%, serta berbeda nyata dengan kontrol positif (tanaman tanpa perlakuan *Trichoderma* dan diinokulasi patogen). Pengamatan perkembangan tanaman menunjukkan bahwa aplikasi *Trichoderma* isolat JMA2 memberikan pengaruh yang lebih baik, namun secara umum tidak berbeda nyata dengan perlakuan JMA1, KMA, dan STA. Mekanisme *Trichoderma* isolat JMA1, JMA2, KMA, dan STA dalam menginduksi ketahanan jagung terhadap penyakit bulai adalah memicu produksi ROS dan menyebabkan terjadinya lignifikasi pada daerah disekitar stomata pada jaringan daun. Selain itu, intensitas penyakit bulai dan kandungan klorofil memiliki persamaan linier $Y = -0,0063x + 1,0857$ dengan koefisien korelasi (r) sebesar 0,8032, sehingga semakin tinggi intensitas penyakit bulai maka kandungan klorofil semakin rendah.

Kata Kunci: Bulai, induksi ketahanan, ROS, lignifikasi, kandungan klorofil



ABSTRACT

Downy mildew caused by *Peronosclerospora maydis*, is the most important disease of maize. Decreasing production caused by downy mildew was reported as much as 100%. *Trichoderma* spp., is a potensial fungi which can be used as biocontrol agents and plant inducer. This study aimed to: 1). know the potency of *Trichoderma* spp. to reduce downy mildew disease 2). know the mechanism of *Trichoderma* spp. as resistance inducer on maize 3). know a relationship between disease intensity and chlorophyll content. This research was conducted in October 2015 until July 2016 at the Greenhouse and Laboratory of the Department of Plant Protection, Faculty of Agriculture, Universitas Gadjah Mada. Step of this research were; sampling, isolation, purification, characterization, identification, and test of *Trichoderma* spp. on inducing plant resistance to downy mildew. Paramaters in this research were; disease percentage, disease intensity, growth of plants, resistance markers: reactive oxygen species (ROS), lignification, and analysis of chlorophyll. There were four isolates of *Trichoderma* (JMA1, JMA2, KMA, and STA) isolated from the roots of maize and tested for there resistance inducer. The identification results showed that *Trichoderma* STA and JMA1 isolates each has a relationship with *Trichoderma asperellum* GWGI (1) isolates and *Trichoderma asperellum* Tasp26 isolates respectively. *Trichoderma* KMA isolates applications provided significant impact to decrease the percentage and disease intensity, which reduced disease percentage up to 88.89%, and disease intensity up to 77.78%. It was not significantly different from other *Trichoderma* treated plants and healthy plants, but significantly different from the positive control (untreated platns and with pathogen inoculation). *Trichoderma* JMA2 isolate had a greater impact on the development of plant growth, but in general it was not significantly different from the treatment of JMA1 and STA. Mechanism of *Trichoderma* isolates JMA1, JMA2, KMA, and the STA in inducing resistance to downy mildew were triggering the production of ROS and causing lignification in the area around the stomata of leaf tissue. In addition, disease intensity and chlorophyll content have linear regression with $Y = -0,0063x + 1,0857$, and correlation coefficient of 0.8032, so that the higher of disease intensity, the lower of its chlorophyll content.

Keywords: downy mildew, induce resistance, ROS, lignification, chlorophyll