

RINGKASAN

Penyakit bulai yang disebabkan oleh jamur *Peronosclerospora maydis* merupakan penyakit utama tanaman jagung yang mampu menyebabkan kehilangan hasil hingga 100%. Penggunaan fungisida kimia sintetik masih menjadi teknik pengendalian utama untuk mengatasi penyakit tersebut. Penggunaan fungisida kimia sintetik secara tidak bijaksana menyebabkan dampak negatif bagi lingkungan. Oleh karena itu, diperlukan alternatif pengendalian hayati yang efektif dan ramah lingkungan. Penggunaan biopestisida berbasis *Bacillus* sp. BKR 9, *Bacillus amyloliquefaciens* BBR3, *Bacillus subtilis* BKR5 merupakan cara pengendalian penyakit bulai yang potensial. Namun demikian, formulasi biopestisida belum banyak dilakukan, sehingga diperlukan formulasi biopestisida hayati yang memanfaatkan bakteri antagonis *Bacillus* sp. BKR 9, *B. subtilis* BKR 5, *B. amyloliquefaciens* BBR 3 dengan kaldu keong dan air kelapa. Tujuan dari penelitian ini yaitu untuk mengetahui efektivitas formula biopestisida *Bacillus* sp. BKR 9, *B. subtilis* BKR 5, *B. amyloliquefaciens* BBR 3 dalam mengendalikan penyakit bulai dan pengaruhnya terhadap pertumbuhan tanaman jagung.

Penelitian ini dilaksanakan di rumah kaca dan Laboratorium Perlindungan Tanaman Fakultas Pertanian Universitas Jenderal Soedirman selama 4 bulan dari September hingga Desember 2023. Perlakuan yang diuji adalah kemampuan isolat *Bacillus* sp. BKR 9, *B. subtilis* BKR 5, *B. amyloliquefaciens* BBR 3 dengan formula kaldu keong dan kombinasi kaldu keong+air kelapa dalam mengendalikan penyakit bulai. Penelitian ini menggunakan Rancangan Acak Kelompok (RAK) dengan 17 perlakuan 3 ulangan. Variabel yang diamati yaitu masa inkubasi, intensitas penyakit, efektivitas pengendalian, laju infeksi, AUDPC, kandungan saponin, tanin, dan glikosida. Variabel yang diamati pada komponen pertumbuhan yaitu tinggi tanaman, jumlah daun, panjang akar, bobot segar, dan bobot kering tanaman jagung.

Hasil penelitian menunjukkan bahwa biopestisida *Bacillus* sp. BKR 9 formula keong + air kelapa dan konsorsium *Bacillus* sp. BKR 9 + *B. subtilis* BKR 5 + *B. amyloliquefaciens* BBR 3 formula keong merupakan perlakuan terbaik mampu menunda masa inkubasi sebesar 22,5 dan 21,8 hsi dan menekan intensitas penyakit bulai sebesar 71,4%. Perlakuan *Bacillus* sp. BKR 9 formula keong + air kelapa merupakan perlakuan terbaik dalam meningkatkan komponen pertumbuhan seperti tinggi tanaman sebesar 55,9%, jumlah daun sebesar 30,9%, panjang akar 52,2%, bobot segar sebesar 69,2% dan bobot kering sebesar 78,1%.

SUMMARY

The downy mildew disease caused by fungus *Peronosclerospora maydis* is a major threat to corn crops, leading to yield losses of up to 100%. The primary control method is still synthetic chemical fungicides, but their unsustainable use causes environmental harm. Therefore, effective and eco-friendly biological control alternatives are needed. Biopesticides based on *Bacillus* spp., such as *Bacillus* sp. BKR 9, *B. subtilis* BKR 5, and *B. amyloliquefaciens* BBR 3, are potential solutions for controlling downy mildew. However, their formulations are not widely available, necessitating further development using snail broth and coconut water.

This research was conducted in the greenhouse and Plant Protection Laboratory of the Faculty of Agriculture at Universitas Jenderal Soedirman for four months, from September to December 2023. The study tested the effectiveness of *Bacillus* sp. BKR 9, *B. subtilis* BKR 5, and *B. amyloliquefaciens* BBR 3 with snail broth and a combination of snail broth and coconut water against downy mildew. The experimental design used was a Randomized Block Design (RBD) with 17 treatments and 3 replications. Observed variables included incubation period, disease intensity, control effectiveness, infection rate, AUDPC, and levels of saponins, tannins, and glycosides. Growth parameters measured were plant height, leaf number, root length, fresh weight, and dry weight.

The results showed that the biopesticide *Bacillus* sp. BKR 9 with snail broth and coconut water, as well as the consortium of *Bacillus* sp. BKR 9, *B. subtilis* BKR 5, and *B. amyloliquefaciens* BBR 3 with snail broth, were the best treatments. They delayed the incubation period by 22.5 and 21.8 days, respectively, and reduced disease intensity by 71.4%. The *Bacillus* sp. BKR 9 treatment with snail broth and coconut water significantly enhanced growth parameters, increasing plant height by 55.9%, leaf number by 30.9%, root length by 52.2%, fresh weight by 69.2%, and dry weight by 78.1%