

RINGKASAN

Penyakit moler disebabkan oleh *Fusarium oxysporum* f. sp. *cepae*. Patogen ini menyerang dari akar tanaman dengan menimbulkan gejala berupa daun meliuk, berwarna hijau pucat, layu, serta pembusukan pada akar dan umbi. Pengendalian penyakit ini diperlukan untuk menghambat perkembangan penyakit sehingga tanaman bawang merah dapat berproduksi secara optimal. Pengendalian penyakit ini dapat dilakukan secara hayati, yaitu dengan pembuatan formula biopestisida berbasis *Bacillus subtilis* NPA6. Penelitian ini bertujuan untuk 1) Mencirikan formula cair dan padat biopestisida *B. subtilis* NPA6, 2) Mengetahui kemampuan formula cair dan padat biopestisida *B. subtilis* NPA6 untuk pengendalian penyakit tular tanah bawang merah, dan 3) Mengevaluasi pengaruhnya terhadap pertumbuhan dan hasil tanaman.

Penelitian dilakukan di Laboratorium Perlindungan Tanaman Fakultas Pertanian Universitas Jenderal Soedirman dan lahan di Desa Linggasari, Kecamatan Kembaran, Kabupaten Banyumas dengan ketinggian tempat 117 mdpl. Penelitian dilaksanakan mulai bulan Mei sampai Agustus 2024. Tahap awal pada penelitian ini, yaitu tahap penyiapan bakteri *B. subtilis* NPA6, dilanjutkan dengan tahap pembuatan formula biopestisida cair dan padat *B. subtilis* NPA6, tahap pengolahan tanah, pemasangan mulsa, dan penanaman bawang merah, dilanjutkan tahap perlakuan formula biopestisida cair dan padat *B. subtilis* NPA6, pengamatan patosistem, serta pengamatan dan evaluasi pertumbuhan tanaman. Penelitian ini dilakukan dengan menggunakan metode eksperimental dengan rancangan acak kelompok (RAK) yang terdiri atas 4 perlakuan, yaitu P0, P1, P2, dan P3. Setiap perlakuan diulang sebanyak 6 kali, sehingga terdapat 24 petak perlakuan. Variabel yang diamati adalah masa inkubasi, insidensi penyakit, intensitas penyakit, laju infeksi, *Area Under the Disease Progress Curve* (AUDPC), tinggi tanaman, jumlah daun, bobot segar tanaman, bobot kering tanaman, jumlah umbi per tanaman, bobot umbi per tanaman, laju pertumbuhan tanaman (LPT), evaluasi keberadaan *B. subtilis* NPA6 dalam tanah setelah aplikasi, dan evaluasi bakteri endofit *B. subtilis* NPA6 dari akar bawang merah.

Hasil penelitian ini menunjukkan bahwa pencampuran bahan-bahan untuk pembuatan formula cair dan padat dengan suspensi *B. subtilis* NPA6 dalam media NB menghasilkan biopestisida *B. subtilis* NPA6 yang siap diaplikasikan di lapangan. Aplikasi formula padat biopestisida *B. subtilis* NPA6 mampu mengendalikan penyakit moler dengan efektivitas sebesar 34,02%. Aplikasi formula cair biopestisida *B. subtilis* NPA6 memberikan pengaruh terhadap pertumbuhan tanaman, yaitu bobot kering tanaman, bobot segar umbi per tanaman, bobot kering umbi per tanaman, dan laju pertumbuhan tanaman.

SUMMARY

*Moller disease is caused by *Fusarium oxysporum* f. sp. *cepae*. This pathogen attacks the roots of the plant by causing symptoms such as twisted leaves, a pale green color, wilting, and rotting of the roots and bulbs. Control of this disease is needed to inhibit its development so that shallot plants can produce optimally. Control of this disease can be done biologically, namely by creating a biopesticide formula based on *Bacillus subtilis* NPA6. This research aims to 1) Develop liquid and solid formulas of *B. subtilis* NPA6 biopesticide, 2) Determine the ability of the liquid and solid formulas of biopesticide *B. subtilis* NPA6 to control soil-borne diseases of shallot, and 3) Evaluate its effect on plant growth and yield.*

*The research was conducted at the Plant Protection Laboratory of the Faculty of Agriculture, Jenderal Soedirman University, and on land in Linggasari Village, Kembaran District, Banyumas Regency, with an altitude of 117 meters above sea level. The research was conducted from May to August 2024. The initial stage of this study was the preparation of *B. subtilis* NPA6 bacteria, followed by the preparation of liquid and solid biopesticide formulas of *B. subtilis* NPA6, tillage, mulching, and planting shallots, followed by the treatment with liquid and solid biopesticide formulas of *B. subtilis* NPA6, observation of pathosystems, and observation and evaluation of plant growth. This research was conducted using an experimental method with a Randomized Complete Block Design (RCBD) consisting of 4 treatments, namely P0, P1, P2, and P3. Each treatment was repeated 6 times, resulting in 24 treatment plots. The variables observed were incubation period, disease incidence, disease intensity, infection rate, Area Under the Disease Progress Curve (AUDPC), plant height, number of leaves, plant fresh weight, plant dry weight, number of bulbs per plant, bulb weight per plant, plant growth rate (LPT), evaluation of the presence of *B. subtilis* NPA6 in the soil after application, and evaluation of endophytic bacteria *B. subtilis* NPA6 from shallot roots.*

*The results of this study showed that mixing the ingredients for making liquid and solid formulas with a suspension of *B. subtilis* NPA6 in NB media produced *B. subtilis* NPA6 biopesticides that were ready to be applied in the field. The application of the solid formula of biopesticide *B. subtilis* NPA6 was able to control moler disease with an effectiveness of 34.02%. The application of the liquid formula of biopesticide *B. subtilis* NPA6 influenced plant growth, namely plant dry weight, fresh weight of tubers per plant, dry weight of tubers per plant, and plant growth rate.*