

RINGKASAN

Bawang merah (*Allium ascalonicum* L.) merupakan salah satu komoditas hortikultura yang memiliki nilai ekonomi tinggi dan banyak digunakan sebagai bahan pangan. Peningkatan konsumsi bawang merah di Indonesia sejalan dengan pertumbuhan penduduk dan ekonomi nasional. Namun, dalam proses budidayanya, bawang merah rentan terhadap gangguan patogen tular tanah, seperti *Fusarium oxysporum* f.sp. *cepae*, yang dapat menyebabkan penyakit layu fusarium.

Penelitian ini bertujuan untuk 1. Mengetahui potensi formula cair dan padat *Bacillus* sp. BM1 dan BM3 dalam pertumbuhan bawang merah. 2. Mengevaluasi potensi formula cair dan padat *Bacillus* sp. BM1 dan BM3 terhadap pengendalian layu Fusarium. 3. Mendapatkan formula cair dan padat terbaik sebagai pengendali penyakit dan pemacu pertumbuhan bawang merah. Penelitian dilaksanakan di Desa Linggasari, Kecamatan Kembaran, Kabupaten Banyumas, serta di Laboratorium Perlindungan Tanaman, Fakultas Pertanian, Universitas Jenderal Soedirman, pada Mei hingga Oktober 2024.

Formula padat disusun menggunakan bahan pembawa berupa tepung tapioka, kompos, CaCO_3 , dan gula pasir, sedangkan formula cair menggunakan air cucian beras, terasi, gula pasir, *carboxymethyl cellulose* (CMC), dan CaCO_3 . Penelitian menggunakan rancangan acak kelompok (RAK) nonfaktorial dengan lima perlakuan, masing-masing diulang lima kali.

Hasil penelitian menunjukkan bahwa formula cair dan padat *Bacillus* sp. BM1 dan BM3 terbukti berpotensi dalam mendukung pertumbuhan tanaman bawang merah varietas Bima Brebes, dengan peningkatan signifikan pada parameter tinggi tanaman. Formula cair berbahan dasar air cucian beras *Bacillus* sp. BM3 memberikan hasil terbaik pada variabel hasil, dibandingkan dengan kontrol. Selain itu, formula tersebut juga efektif dalam menekan penyakit layu fusarium dengan menurunkan intensitas penyakit hingga 9,452%, menekan laju infeksi ($B = 0,003$ unit/hari), serta menghasilkan nilai *Area Under the Disease Progress Curve* (AUDPC) yang rendah ($B = 9,685\% \cdot \text{hari}$), dengan efektivitas pengendalian mencapai 89,10%.

Dengan demikian, formula cair air cucian beras *Bacillus* sp. BM3 dinyatakan sebagai formula terbaik karena secara konsisten mampu meningkatkan pertumbuhan tanaman dan menekan penyakit layu fusarium, sehingga berpotensi sebagai agensia hayati yang aplikatif dan berkelanjutan dalam budidaya bawang merah.

SUMMARY

Shallot (*Allium ascalonicum* L.) is a high-value horticultural commodity widely used as a culinary spice. The consumption of shallots in Indonesia has increased along with population growth and economic development. However, shallot cultivation is vulnerable to soil-borne pathogens, such as *Fusarium oxysporum* f.sp. *cepae*, which can cause Fusarium wilt and adversely affect crop productivity.

This study aimed to identify, evaluate, and determine the most effective liquid and solid formulations of *Bacillus* sp. BM1 and BM3 as plant growth promoters and biological control agents against Fusarium wilt in shallot plants. The research was conducted from May to October 2024 in Linggasari Village, Kembaran Subdistrict, Banyumas Regency, and in the Plant Protection Laboratory, Faculty of Agriculture, Universitas Jenderal Soedirman.

The solid formulations were prepared using tapioca flour, compost, CaCO_3 , and granulated sugar as carriers, while the liquid formulations were composed of rice washing water, fermented shrimp paste (terasi), granulated sugar, carboxymethyl cellulose (CMC), and CaCO_3 . A non-factorial randomized block design (RBD) with five treatments and five replications was employed, resulting in a total of 25 experimental plots.

The results showed that both liquid and solid formulations of *Bacillus* sp. BM1 and BM3 significantly promoted the growth of shallot plants (cv. Bima Brebes), particularly in terms of plant height. The liquid formulation containing *Bacillus* sp. BM3 based on rice washing water provided the highest performance in yield-related parameters compared to the control. Furthermore, this formulation effectively suppressed Fusarium wilt disease, reducing disease intensity to 9.452%, lowering the infection rate ($B = 0.003$ units/day), and resulting in a low Area Under the Disease Progress Curve (AUDPC) value ($B = 9.685\% \cdot \text{days}$), with a control efficacy of 89.10%.

In conclusion, the liquid formulation of *Bacillus* sp. BM3 based on rice washing water was identified as the most effective treatment, as it consistently enhanced plant growth and suppressed Fusarium wilt. This indicates its strong potential as an applicable and sustainable biological control agent in shallot cultivation.