RINGKASAN

Salah satu penyebab penurunan dari produktivitas cabai di Indonesia selain karena pengaruh lingkungan dan juga kualitas benih adalah adanya patogen pada tanaman maupun benih. Penyakit antraknosa menyebabkan kerugian hasil panen hingga 80% jika kondisi lingkungan mendukung pertumbuhan patogen. Salah satu cara untuk mengendalikan penyakit ini yaitu dengan menggunakan agensia hayati berupa *Pseudomonas fluorescens* yang berasal dari tanah sekitar tanaman putri malu. Penelitian ini bertujuan untuk 1. Mengisolasi dan mengkarakter bakteri rizosfer *Pseudomonas fluorescens,* 2. Mengetahui potensi antagonis patogen, 3. Mengetahui potensi sebagai *Plant Growth Promoting Rizobacteria*, 4. Efektivitasnya dalam mengendalikan penyakit antraknosa.

Penelitian ini dilakukan di Laboratorium Perlindungan Tanaman Fakultas Pertanian Universitas Jenderal Soedirman di Karangwangkal, Purwokerto Utara. Penelitian ini dimulai bulan Juni 2024 sampai dengan Juni 2025. Penelitian dimulai dengan eksplorasi bakteri antagonis Genus *Pseudomonas* kelompok *fluorescens* pada tanah sekitaran putri malu. Pengambilan sampel dilakukan di Karangwangkal, Kembaran, dan Binangun. Isolasi dilakukan pada medium padat dan dikarakter berdasarkan bentuk koloni, sel, dan biokimia. Isolat *Pseudomonas fluorescens* kemudian diuji terhadap *Colletotrichum capsici, Fusarium oxysporum,* dan *Rhizoctonia solani* serta bakteri *Xanthomonas oryzae* dan *Ralstonia solanacearum*. Pengujian PGPR dilakukan pada benih mentimun. Tiga isolat terbaik diaplikasikan pada buah cabai rawit, diamati kemampuan menghambat penyakit dengan 5 ulangan dan kontrol dan fungisida. Rancangan Acak Lengkap digunakan serta variabel berupa luas serangan, indeks sampah, dan kadar gula. Data *in vivo* pada buah cabai dianalisis dengan anova 5% dan apabila berbeda nyata dilanjut dengan DMRT taraf kesalahan 5%.

Hasil eksplorasi diperoleh 14 isolat dengan karakter sel berbentuk batang, bersifat gram negatif, dengan uji katalase dan oksidase positif. Berdasarkan uji antagonis dan PGPR diperoleh 3 isolat terbaik yaitu Clp 1.1, Clp 1.2, dan Clp 1.4 yang ditunjukkan dengan hasil penghamatan terhadap jamur dan bakteri patogen dengan besar daya hambat lebih dari 50% dibanding kontrol. Pada PGPR ketiga isolat tersebut menunjukkan hasil yang baik dengan panjang akar lebih dari 5 cm. Persentase peningkatan panjang akar dari perlakuan Clp 1.1; Clp 1.2; Clp 1.3; dan Clp 1.4 terhadap kontrol masing-masing yaitu 25,10; 46,6; 42,3; dan 57,35%. Hasil pengujian pada cabai menunjukkan perlakuan paling baik dalam menghambat yaitu isolat Clp 1.1 yaitu 67,4% dibandingkan kontrol. Pada pengujian indeks sampah, perlakuan Clp 1.1, Clp 1.2, dan Clp 1.4 rata-rata adalah 0,36; 0,45; dan 0,50 gram dibandingkan dengan kontrol seberat 0,51 gram. Pengujian kadar gula antara kontrol dan perlakuan tidak memiliki perbedaan nyata yaitu kontrol berkisar 2,7-3,2 brix dan perlakuan 2,5-3 brix.

SUMMARY

One of the factors contributing to the decline in chili productivity in Indonesia, in addition to environmental influences and seed quality, is the presence of pathogens in plants or seeds. Anthracnose disease, also known as patek, can cause crop losses of up to 80% if environmental conditions favor pathogen development. One method of controlling this disease is by using biological agents such as Pseudomonas fluorescens, which can be isolated from soil around Mimosa invisa (sensitive plant). This study aims to isolate rhizospheric P. fluorescens, evaluate its potential as an antagonist against pathogens, assess its function as a Plant Growth-Promoting Rhizobacteria (PGPR), and determine its effectiveness in controlling anthracnose disease.

The research was conducted at the Plant Protection Laboratory, Faculty of Agriculture, Universitas Jenderal Soedirman, located in Karangwangkal, North Purwokerto. The study took place from June 2024 to June 2025. The research began with exploration of antagonistic bacteria in the soil around the mimosa plant Mimosa invisa, followed by isolation using solid medium and characterization based on colony morphology, cell shape, and biochemical tests. The Pseudomonas fluorescens isolates were then tested against Colletotrichum, Fusarium, Rhizoctonia spp., as well as bacterial pathogens Xanthomonas and Ralstonia spp. PGPR testing was also conducted using cucumber seeds.Three of the best-performing isolates were selected and applied to cayenne pepper fruits (Capsicum frutescens), and their ability to suppress disease was observed through five replications using untreated control and fungicide-treated samples as comparisons. The study employed a Completely Randomized Design (CRD) with variables including disease severity, disease index, and sugar content. The in vivo data on chili fruits were analyzed using ANOVA at a 5% significance level, and if significant differences were found, the analysis was continued with DMRT at a 5% error level.

From the exploration, 14 isolates were obtained, all rod-shaped, Gram-negative, and positive for catalase and oxidase tests. Based on antagonistic and PGPR assays, three superior isolates Clp 1.1, Clp 1.2, and Clp 1.4 were identified. The percentage of root length effectiveness of treatments Clp 1.1, Clp 1.2, Clp 1.3, and Clp 1.4 compared to the control were 25.10%, 46.6%, 42.3%, and 57.35%, respectively. The test results on chili plants showed that the best inhibitory effect was observed in the Clp 1.1 isolate, with 67.4% inhibition compared to the control. In the waste index test, the average values for Clp 1.1, Clp 1.2, and Clp 1.4 treatments were 0.36, 0.45, and 0.50 grams, respectively, compared to the control at 0.51 grams. Furthermore, in the sugar content test, no significant difference between the control and the treatments, with the control ranging from 2.7 to 3.2 Brix and the treatments from 2.5 to 3 Brix.