

RINGKASAN

Penyakit antraknosa yang disebabkan oleh jamur *Colletotrichum* sp. merupakan salah satu penyakit utama pada buah cabai rawit (*Capsicum frutescens* L.), baik sebelum maupun setelah panen. Kerugian akibat penyakit ini dapat menurunkan mutu dan daya simpan buah secara nyata. Penggunaan agensia hayati seperti *Pseudomonas fluorescens* endofit menjadi alternatif pengendalian yang lebih ramah lingkungan dibandingkan fungisida kimia. Akar tanaman putri malu (*Mimosa invisa* Mart. ex Colla) diketahui memiliki potensi sebagai sumber isolat *P. fluorescens* endofit, khususnya di dataran menengah. Penelitian ini bertujuan untuk mengisolasi dan mengkarakter isolat *P. fluorescens* endofit dari akar putri malu dataran menengah serta mengevaluasi kemampuannya sebagai agensia hayati dalam mengendalikan antraknosa pada buah cabai rawit pascapanen, serta potensinya sebagai *Plant Growth Promoting Endophyte* (PGPE).

Penelitian dilaksanakan dari bulan Mei 2024 hingga Maret 2025 di Laboratorium Perlindungan Tanaman Fakultas Pertanian Universitas Jenderal Soedirman. Isolasi dilakukan dari akar putri malu sehat di tiga lokasi dataran menengah di Banyumas dan Purbalingga. Isolat yang diperoleh dikarakter secara morfologi, mikroskopis, dan biokimia. Uji antagonis dilakukan terhadap *Colletotrichum* sp. secara *in vitro*, dan uji PGPE dilakukan pada benih cabai rawit. Tiga isolat terbaik dari hasil uji dipilih untuk diuji lanjut melalui metode *detach fruit* guna melihat kemampuannya menekan gejala antraknosa pada buah cabai rawit dengan kontrol dan fungisida yang diulang 5 kali. Variabel yang diamati meliputi panjang akar, bobot segar kecambah, bobot segar akar, masa inkubasi, luas serangan, dan indeks sampah. Data dianalisis menggunakan sidik ragam (ANOVA) taraf 5%, dan dilanjutkan dengan uji DMRT 5% jika terdapat perbedaan nyata.

Hasil eksplorasi menghasilkan 11 isolat *P. fluorescens* endofit. Berdasarkan karakterisasi dan uji antagonis, tiga isolat terbaik yang dipilih adalah PFE 15, PFE 21, dan PFE 31. Ketiga isolat ini menunjukkan kemampuan menekan pertumbuhan patogen dengan daya hambat sebesar 16,00–75,00 %. Pada uji PGPE, isolat PFE 15 menunjukkan hasil paling mendekati kontrol dalam hal pertumbuhan benih. Pada uji *detach fruit*, ketiga isolat menekan luas serangan hingga 13 % dan menurunkan indeks kerusakan buah hingga 15% dibandingkan kontrol. Penelitian ini menunjukkan bahwa *P. fluorescens* endofit dari akar putri malu dataran menengah memiliki potensi sebagai agensia hayati untuk pengendalian antraknosa pada cabai rawit pascapanen. Temuan ini dapat menjadi dasar dalam pengembangan biofungisida yang ramah lingkungan dan berkelanjutan.

SUMMARY

Anthracnose disease caused by the fungus Colletotrichum sp. is one of the main diseases affecting chili peppers (Capsicum frutescens L.), both before and after harvest. Losses due to this disease can significantly reduce fruit quality and shelf life. The use of biological agents such as endophytic Pseudomonas fluorescens is an environmentally friendly alternative to chemical fungicides. The roots of the sensitive plant (Mimosa invisa Mart. ex Colla) are known to have potential as a source of endophytic P. fluorescens isolates, particularly in midland areas. This study aims to isolate and characterize endophytic P. fluorescens isolates from the roots of medium-altitude sensitive plants, evaluate their ability as biological agents in controlling anthracnose in post-harvest chili peppers, and assess their potential as Plant Growth Promoting Endophytes (PGPE).

The research was conducted from May 2024 to March 2025 at the Plant Protection Laboratory, Faculty of Agriculture, Jenderal Soedirman University. Isolation was carried out from healthy sensitive plant roots in three midland locations in Banyumas and Purbalingga. The isolates obtained were characterized morphologically, microscopically, and biochemically. Antagonistic tests were conducted against Colletotrichum sp. in vitro, and PGPE tests were performed on chili pepper seeds. The three best isolates from the tests were selected for further testing using the detach fruit method to assess their ability to suppress anthracnose symptoms on chili pepper fruits, with controls and fungicides repeated five times. The variables observed included root length, fresh weight of seedlings, fresh weight of roots, incubation period, lesion area, and debris index. Data were analyzed using analysis of variance (ANOVA) at the 5% level, followed by DMRT at 5% if significant differences were found.

The exploration resulted in 11 isolates of endophytic P. fluorescens. Based on characterization and antagonistic testing, the three best isolates selected were PFE 15, PFE 21, and PFE 31. These three isolates demonstrated the ability to suppress pathogen growth with an inhibitory rate of 16.00%–75.00%. In the PGPE test, isolate PFE 15 showed results closest to the control in terms of seed growth. In the fruit detachment test, the three isolates reduced the extent of infection by up to 13% and lowered the fruit damage index compared to the control. This study indicates that endophytic P. fluorescens from the roots of medium-altitude sensitive plants has potential as a biological agent for controlling anthracnose in post-harvest chili peppers. These findings could serve as a basis for developing environmentally friendly and sustainable biofungicides.