

RINGKASAN

Antraknosa merupakan penyakit utama cabai rawit baik pada tanaman maupun di buah pascapanen yang disebabkan oleh *Colletotrichum capsici*. Penyakit ini dapat mengakibatkan kerugian sebesar 60-80%. Secara umum pengendalian penyakit tersebut menggunakan pestisida kimia yang memiliki dampak negatif jika digunakan secara berkelanjutan. Diperlukan alternatif pengendalian salah satunya dengan menggunakan *Pseudomonas* kelompok *fluorescens* sebagai agensia hayati. Penelitian ini bertujuan mengisolasi dan mengkarakterisasi bakteri *Pseudomonas* kelompok *fluorescens* asal rizosfer putri malu dataran menengah, serta mengetahui potensinya sebagai bakteri PGPR, menghambat mikroba patogen dan mengendalikan penyakit antraknosa pada cabai rawit.

Penelitian ini dilakukan di Laboratorium Perlindungan Tanaman, Universitas Jenderal Soedirman pada bulan November 2024-Juni 2025. Pengambilan sampel rizosfer putri malu dari 3 lokasi dataran menengah, yaitu Desa Karangtengah dan Desa Karangmangu, Kecamatan Baturaden, Kabupaten Banyumas, dan Desa Pengalusan, Kecamatan Mrebet, Kabupaten Purbalingga. Sampel diisolasi dan dikarakterisasi, diuji hipersensitif, dan diuji PGPR. Uji antagonisme terhadap jamur patogen (*Colletotrichum capsici*, *Fusarium oxysporum*, *Rhizoctonia solani*.) dan bakteri patogen (*Xanthomonas oryzae* dan *Ralstonia solanacearum*) dalam Rancangan Acak Lengkap dengan 11 perlakuan 2 kali ulangan. Uji terhadap penyakit antraknosa buah cabai rawit menggunakan Rancangan Acak Kelompok terdiri atas 7 perlakuan (kontrol, fungisida, serta aplikasi isolat PFR1.1, PFR2.2, PFR2.3, PFR3.1, dan PFR3.2) diulang 4 kali. Variabel yang diamati yaitu daya hambat terhadap patogen, masa inkubasi, luas infeksi, bobot sampah, dan kadar gula.

Hasil penelitian menunjukkan bahwa *Pseudomonas* kelompok *fluorescens* memiliki karakter berbentuk bulat, bentuk sel basil, elevasi rata, tepi halus, ukuran koloni 1-5 mm, berwarna kuning kehijauan, berpendar, Gram negatif, menghasilkan enzim oksidase dan sifat katalase. Isolat terbaik, yaitu PFR2.2 menghambat *C. capsici* dengan persentase penghambatan di atas 60%, PFR3.2 menghambat *R. solani* persentase penghambatan di atas 50%, PFR2.2 menghambat *F. oxysporum* dengan persentase penghambatan di atas 60%, PFR3.4 menghambat *X. oryzae* dengan diameter zona hambat 2,49 mm, serta PFR2.2 dan PFR2.3 menghambat *R. solanacearum* masing-masing besar diameter zona hambat 2,53 mm. Isolat *Pseudomonas* kelompok *fluorescens* PFR1.1 merupakan isolat terbaik karena mampu menurunkan persentase luas gejala pada buah cabai sebesar 88% dibandingkan kontrol. Hal ini menunjukkan bahwa *Pseudomonas* kelompok *fluorescens* berpotensi sebagai agensia hayati. Pada umumnya kadar gula pada buah akan meningkat seiring dengan tingkat kematangan buah. Hasil penelitian menunjukkan bahwa perlakuan *Pseudomonas* kelompok *fluorescens* tidak berbeda nyata dengan kontrol. Hal ini diduga bahwa aplikasi agensia hayati seperti bakteri *Pseudomonas* kelompok *fluorescens* tidak memengaruhi pembentukan glukosa pada buah cabai rawit.

SUMMARY

Anthracnose is the main disease affecting chili peppers, both in plants and in post-harvest fruits, caused by Colletotrichum capsici. This disease can result in losses of 60-80%. Generally, control of this disease involves the use of chemical pesticides, which have negative impacts if used continuously. An alternative control method is needed, one of which is the use of Pseudomonas fluorescens group as a biological agent. This study aims to isolate and characterize Pseudomonas fluorescens bacteria from the rhizosphere of medium-altitude chili plants, as well as to determine their potential as PGPR bacteria, inhibit pathogenic microorganisms, and control anthracnose disease in chili peppers.

This study was conducted at the Plant Protection Laboratory, Jenderal Soedirman University, from November 2024 to June 2025. Rhizosphere samples of the sensitive plant were collected from three locations in the midland region: Karangtengah Village and Karangmangu Village, Baturaden Subdistrict, Banyumas Regency, and Pengalusan Village, Mrebet Subdistrict, Purbalingga Regency. The samples were isolated and characterized, tested for hypersensitivity, and tested for PGPR. Antagonism tests against pathogenic fungi (Colletotrichum capsici, Fusarium oxysporum, Rhizoctonia solani) and pathogenic bacteria (Xanthomonas oryzae and Ralstonia solanacearum) were conducted using a Completely Randomized Design with 11 treatments and 2 replications. The test for anthracnose disease in chili peppers used a Randomized Block Design consisting of 7 treatments (control, fungicide, and application of isolates PFR1.1, PFR2.2, PFR2.3, PFR3.1, and PFR3.2) repeated 4 times. The variables observed were inhibitory activity against pathogens, incubation period, infection area, waste weight, and sugar content.

The results showed that P. fluorescens group has a round shape, bacillus cell shape, flat elevation, smooth edges, colony size 1-5 mm, greenish yellow, fluorescent, Gram negative, produces oxidase enzymes and catalase properties. The best isolate, namely PFR2.2 inhibits C. capsici with an inhibition percentage above 60%, PFR3.2 inhibits R. solani with an inhibition percentage above 50%, PFR2.2 inhibits F. oxysporum with an inhibition percentage above 60%, PFR3.4 inhibits X. oryzae with an inhibition zone diameter of 2.49 mm, and PFR2.2 and PFR2.3 inhibit R. solanacearum each with an inhibition zone diameter of 2.53 mm. P. fluorescens group isolate PFR1.1 is the best isolate because it is able to reduce the percentage of symptom area on chili fruit by 88% compared to the control. This indicates that P. fluorescens has the potential to be a biological agent. Generally, sugar content in fruit increases with fruit ripeness. The results showed that the P. fluorescens treatment was not significantly different from the control. This suggests that the application of biological agents such as P. fluorescens bacteria does not affect glucose production in cayenne peppers.