POTENSI PSEUDOMONAD FLUORESEN YANG DIISOLASI DARI FILOSFER DAUN PADI VARIETAS RENTAN SEBAGAI AGEN
PENGENDALI XANTHOMONAS ORYZAE PV. ORYZAE
Juraiz Adli Faizin, Prof. Dr. Ir. Triwidodo Arwiyanto, M.Sc
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

INTISARI

POTENSI PSEUDOMONAD FLUORESEN YANG DIISOLASI DARI FILOSFER DAUN PADI VARIETAS RENTAN SEBAGAI AGEN PENGENDALI *XANTHOMONAS ORYZAE* PV. *ORYZAE*

Juraiz Adli Faizin dan Triwidodo Arwiyanto

Jurusan Proteksi Tanaman, Fakultas Pertanian,

Universitas Gadjah Mada

Penyakit Hawar Daun Bakteri (HDB), yang disebabkan oleh *Xanthomonas oryzae* pv. *oryzae* (Xoo), merupakan kendala utama dalam produksi padi. Pengendalian hayati menggunakan bakteri antagonis kelompok Pseudomonad fluoresen dari filosfer tanaman menjadi alternatif manajemen yang ramah lingkungan. Penelitian ini bertujuan mengisolasi Pseudomonad fluoresen dari filosfer daun padi varietas rentan serta mengevaluasi potensinya dalam menekan perkembangan Xoo secara in vitro dan in vivo. Isolasi dilakukan menggunakan media selektif King's B. Uji antagonisme dilakukan secara in vitro menggunakan metode *overlay,* di mana isolat ditumbuhkan dengan cara dititik, diinkubasi selama 3 hari, lalu dilapisi agar yang dicampur suspensi Xoo. Karakterisasi biokimia meliputi uji KOH, fermentasi karbohidrat, katalase, reduksi nitrat, dan uji oksidase. Penekanan penyakit dievaluasi secara in vivo berdasarkan nilai masa inkubasi, insidensi penyakit, intensitas penyakit, laju infeksi penyakit dan *Area Under Disease Progress Curve* (AUDPC). Hasil uji KOH menegaskan seluruh isolat merupakan bakteri Gram-negatif dan non-fermentatif. Karakteristik katalase positif dan reduksi nitrat menandakan sifat aerob khas Pseudomonas, sedangkan hasil oksidase negatif menunjukkan variasi teknis atau umur budaya bakteri. Secara in vitro, isolat terbukti memiliki kemampuan antagonisme terhadap Xoo. Pengujian secara in vivo menunjukkan kombinasi varietas padi dan jenis isolat berpengaruh signifikan terhadap penekanan penyakit. Aplikasi isolat unggul (PfU) pada varietas Mekongga secara nyata paling efektif menekan perkembangan HDB dengan masa inkubasi paling lambat (8,17 hari), insidensi terendah (33,33%), intensitas penyakit terkecil (0,20%), laju infeksi terendah (0,022 unit/hari), serta nilai AUDPC minimum (14,71 %-hari). Sebaliknya, perkembangan penyakit paling parah dijumpai pada varietas Ciherang tanpa perlakuan (kontrol Xoo) dengan masa inkubasi tercepat (6,00 hari), insidensi mencapai 100%, intensitas penyakit 6,02%, laju infeksi 0,166 unit/hari, dan nilai AUDPC tertinggi (81,92 %-hari). Penelitian ini menyimpulkan bahwa filosfer padi varietas menyimpan rentan isolat Pseudomonas fluoresen berpotensi sebagai agen pengendali hayati HDB.

Kata kunci: *Xanthomonas oryzae* pv. *oryzae*, Pseudomonad fluoresen, Filosfer, Antagonisme, AUDPC.

UNIVERSITAS
GADJAH MADA
POTENSI PSEUDOMONAD FLUORESEN YANG DIISOLASI DARI FILOSFER DAUN PADI VARIETAS RENTAN SEBAGAI AGEN PENGENDALI XANTHOMONAS ORYZAE PV. ORYZAE
Juraiz Adli Faizin, Prof. Dr. Ir. Triwidodo Arwiyanto, M.Sc
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

ABSTRACT

POTENTIAL OF FLUORESCENT PSEUDOMONADS ISOLATED FROM THE PHYLLOSPHERE OF SUSCEPTIBLE RICE LEAVES AS A CONTROL AGENT FOR *XANTHOMONAS ORYZAE* PV. *ORYZAE*

Juraiz Adli Faizin and Triwidodo Arwiyanto

Departement of Plant Protection, Faculty of Agriculture,

Gadjah Mada University, Yogyakarta

Bacterial Heart Blight (BB) disease, caused by *Xanthomonas oryzae* pv. *oryzae* (Xoo), is a major constraint in rice production. Biological control utilizing antagonistic bacteria from the fluorescent pseudomonads group isolated from the plant phyllosphere serves as an eco-friendly management alternative. This study aimed to isolate fluorescent pseudomonads from the phyllosphere of a susceptible rice variety and to evaluate their potential to suppress Xoo development both in vitro and in vivo. Isolation was performed using King's B selective medium. The in vitro antagonism test was conducted using the overlay method, where isolates were spot-inoculated, incubated for 3 days, and subsequently overlaid with agar containing Xoo suspension. Biochemical characterization included the KOH test, carbohydrate fermentation, catalase, nitrate reduction, and oxidase tests. Disease suppression was evaluated in vivo based on incubation period, disease incidence, disease severity, infection rate, and Area Under Disease Progress Curve (AUDPC) values.The KOH test confirmed that all isolates were Gram-negative and non-fermentative. The positive catalase and nitrate reduction characteristics indicated the typical aerobic nature of Pseudomonas, whereas the negative oxidase results suggested technical variations or the age of the bacterial culture. Under in vitro conditions, the isolates demonstrated antagonistic capability against Xoo. The in vivo testing showed that the combination of rice varieties and bacterial isolates significantly influenced disease suppression. The application of the superior isolate (PfU) on the Mekongga variety was significantly the most effective in suppressing BB development, yielding the longest incubation period (8.17 days), lowest disease incidence (33.33%), lowest disease severity (0.20%), lowest infection rate (0.022 units/day), and minimum AUDPC value (14.71%-day). Conversely, the most severe disease development was observed in the untreated Ciherang variety (Xoo control), exhibiting the shortest incubation period (6.00 days), 100% disease incidence, 6.02% disease severity, the highest infection rate (0.166 units/day), and the highest AUDPC value (81.92%-day). This study concludes that the phyllosphere of susceptible rice varieties harbors potential fluorescent pseudomonads isolates to be developed as biological control agents against BB.

Keywords: *Xanthomonas oryzae* pv. *oryzae*, Fluorescent pseudomonads, Phyllosphere, Antagonism, AUDPC.