

Studi Aktivitas Biokontrol Mikroba Unggulan untuk Pengendalian Penyakit Hawar Daun Bakteri *Pantoea* sp. di Tanaman Bawang Merah (*Allium ascalonicum* L.) = Study of Biocontrol Activities of Featured Microbes for the Control of Bacterial Leaf Blight *Pantoea* sp. in Shallot (*Allium ascalonicum* L.) Plants

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Abstrak

Bawang merah (*Allium ascalonicum* L.) adalah komoditas sayuran dengan ancaman penyakit hawar daun bakteri yang disebabkan oleh *Pantoea* sp. dalam produksinya. Pemanfaatan agen biokontrol dari bakteri yang berasosiasi dengan akar tanaman berpotensi tinggi menghasilkan mekanisme penghambatan patogen pada tanaman. Penelitian ini bertujuan untuk memperoleh isolat bakteri agen biokontrol yang mampu menghambat pertumbuhan patogen *Pantoea* sp., mempelajari karakterisasi dan mekanisme aktivitas agen biokontrol dalam penghambatan patogen *Pantoea* sp., serta mengidentifikasi isolat bakteri agen biokontrol. Kultur bakteri kandidat agen biokontrol diisolasi dari tanah perakaran tanaman bawang merah di lahan pertanian bawang merah di Cirebon dan Majalengka, Jawa Barat, serta Brebes, Jawa Tengah. Pengujian aktivitas meliputi uji antagonisme dan karakterisasi aktivitas biokontrol (produksi enzim protease, kitinase, selulase, siderofor, hidrogen sianida, ammonia, peroksidase dan aktivitas katalase) secara *in vitro*. Identifikasi isolat bakteri agen biokontrol dengan dilakukan gen 16S rRNA dan dilanjutkan dengan pembuatan rekonstruksi pohon filogenetik. Berdasarkan hasil penelitian, diperoleh 5 isolat rizobakteri (I-8, L1-9, L1-12, BM-L3(2), dan BM-L3(3)) yang memiliki kemampuan antagonis terhadap patogen *Pantoea* sp. penyebab penyakit hawar daun bakteri pada bawang merah. Kelima isolat tersebut menunjukkan hasil positif pada uji aktivitas enzim protease, kitinase, selulase, siderofor, hidrogen sianida, ammonia, peroksidase dan aktivitas katalase. Hanya isolat BM-L3(2) yang tidak memiliki kemampuan dalam produksi enzim kitinase. Isolat BM-L3(2) dan BM-L3(3) teridentifikasi sebagai *Brevibacillus schisleri* dan *Bacillus* sp., sedangkan isolat I-8, L1-9, dan L1-12 teridentifikasi sebagai *Streptomyces rochei* berdasarkan sifat morfologi, analisis sekuens 16S rRNA, dan kekerabatan pada hasil rekonstruksi pohon filogeni.

.....Shallot (*Allium ascalonicum* L.) is vegetable commodity that has the threat of bacterial leaf blight caused by *Pantoea* sp. in its production. Utilization of biocontrol agents from bacteria associated with plant roots has high potential to produce pathogen inhibition mechanisms in plants. This research aims to obtain bacterial isolates of biocontrol agents that are able to inhibit the growth of *Pantoea* sp., study the characterization and mechanism activity of biocontrol agents, and identify bacterial of biocontrol agents. Bacterial of biocontrol agent candidates were isolated from root soil of shallot plants in Cirebon, Majalengka, and Brebes. The activity of the antagonism and biocontrol charaterization (enzyme production of protease, chitinase, cellulase, siderophore, HCN, ammonia, peroxidase and catalase) was tested by *in vitro*. Identification of biocontrol agent bacterial with the 16S rRNA gene was carried out and continued with phylogenetic tree reconstruction. Based on the results of the study, 5 rhizobacterial isolates (I-8, L1-9, L1-12, BM-L3(2), and BM-L3(3)) were obtained that have antagonism activity as biocontrol agent bacteria against the pathogen *Pantoea* sp. causing bacterial leaf blight in shallots. The five isolates showed positive results in the enzyme activity tests of protease, chitinase, cellulase, siderophore, hydrogen cyanide,

ammonia, peroxidase, and catalase. Only isolate BM-L3 (2) does not have the ability to produce chitinase enzyme. Isolates BM-L3(2) and BM-L3(3) were identified as *Brevibacillus schisleri* and *Bacillus* sp., while isolates I-8, L1-9, and L1-12 were identified as *Streptomyces rochei* based on morphological characters, 16S rRNA sequence analysis, and kinship on phylogeny tree reconstruction results.