



ABSTRACT

CHARACTERIZATION OF SOFT ROT BACTERIA OF SHALLOT IN JAVA

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Shallot is very important spice vegetable and the production in Indonesia is only about 9-11 ton/ha or about a half of the potential production at about 20 ton/ha. The production constrains including plant diseases in the field or leading to destroy the product in the storage. This research is conducted to identify bacterial pathogens associated with soft rot disease of shallot in the field and in the storage. The medium of nutrient agar was used to isolate bacteria from the samples obtained from several shallot production centers in Java and 65 isolates were collected. The first soft rots bacterial selection was conducted for gram negative followed by inoculation on shallot bulb, onion bulb and potato tuber resulted on the number of 25 isolates were selected. Rep-PCR using BOX-A1R and ERIC primers were conducted resulted on 10 groups of isolates. Tobacco hypersensitivity tests was further conducted and only 1 rep-PCR cluster consisting 6 isolates were positive while the other 9 cluster isolates were negative. One isolate from the positive of tobacco hypersensitive reaction cluster resulted on the highest homology with *Pectobacterium carotovorum* based on the 16S-rDNA sequence from the gene bank. This *P. carotovorum* cluster consisting 6 isolates were further identified using genes of *gyrB* and *rpoD* resulted on the identical pattern closely related to *P.c.* subsp. *carotovorum*. The other 7 clusters of rep-PCR resulted on the identification of *Enterobacteria cloaceae*, *Klebsiella pneumonia.*, *Providencia stuartii.*, *Pseudomonas aeruginosa*, *Serratia marcescens* and *Stenotrophomonas maltophila* based on the sequence of the 16S-rDNA. This research is conducted further on the discovery of *E. cloaceae* and *S. maltophila* associated with shallot in Indonesia since those species are quite diverse as human pathogens, plant pathogens or biological control agents.

Key words: Shallot soft rot bacteria, *Pectobacterium carotovorum* subsp. *carotovorum*, *Enterobacteria cloaceae*, *Stenotrophomonas maltophila*



INTISARI

KARAKTERISASI BAKTERI BUSUK LUNAK PADA TANAMAN BAWANG MERAH DI JAWA

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Bawang merah merupakan tanaman hortikultura yang penting dan diproduksi di Indonesia dengan hasil produksi kurang lebih 9-11 ton/ha atau setengah dari produksi potensial yaitu 20 ton/ha. Penyakit tanaman merupakan salah satu kendala dari penurunan produksi bawang merah yang merusak hingga ditempat penyimpanan. Penelitian ini bertujuan untuk mengidentifikasi bakteri patogen yang menyebabkan penyakit busuk lunak pada bawang merah di lapangan maupun ditempat penyimpanannya. Isolasi bakteri penyebab busuk lunak diisolasi dengan medium nutrient agar, dan diperoleh 65 isolat bakteri yang dikumpulkan dari pusat penanaman bawang merah di Jawa. Bakteri penyebab busuk lunak di seleksi melalui pengujian reaksi gram hingga uji patogenisitas pada umbi bawang merah, bawang Bombay dan umbi kentang. Hasil seleksi tersebut menunjukkan 25 isolat dapat menyebabkan busuk lunak pada umbi bawang merah, bawang Bombay dan kentang dan diseleksi dengan metode Rep-PCR menggunakan primer BOX-A1R dan ERIC menunjukkan ada 10 grup isolate yang berbeda. Enam isolat diantaranya Xt, DKR, Str, CT, M4.3 dan M4.5 positif pada pengujian hipersensitiv di daun tembakau dengan virulensi tertinggi dalam menyebabkan busuk lunak pada umbi bawang merah, bawang Bombay dan kentang. Analisis filogenetik berdasarkan gen 16S-rDNA menunjukkan isolat uji memiliki kedekatan dengan *Pectobacterium carotovorum* isolate Xt, *Enterobacteria cloaceae* isolate NGA2P, *Klebsiella pneumonia* isolate BW1.2, *Providencia stuartii* isolate PV2, *Pseudomonas aeruginosa* P.K1K, *Serratia marcescens* isolate TV1 and *Stenotrophomonas maltophilia* isolate M10. Identifikasi berdasarkan gen *gryB* dan *rpoD* pada enam isolat terbaik juga menunjukkan isolat tersebut merupakan *Pectobacterium carotovorum* subsp. *carotovorum*. Penelitian ini juga menunjukkan adanya asosiasi antara *E. cloaceae* dan *S. maltophilia* pada tanaman bawang merah Indonesia.

Key words: Bakteri busuk lunak, *Pectobacterium carotovorum* subsp. *carotovorum*, *Enterobacteria cloaceae*, *Stenotrophomonas maltophilia*