

ABSTRACT

Chitinolytic bacteria is one of the potential biocontrol agents to control plant diseases caused by fungi. Its ability to produce extracellular enzyme is very potential to be developed for the control of plant diseases caused by fungi which its cell wall most composed by chitin. The objective of this research is to identify and explore the potential of chitinolytic bacteria in the rhizosphere of banana plants to get isolates that were able to suppress the development of banana wilt disease. In this study, soil sample for bacterial isolation was taken from the rhizosphere of banana plants which were enriched by chitosan and it could suppress the development of fusarium wilt disease. Bacterial isolates which showed the clear zone around the colony were used for *in vitro* antifungal assay on *Fusarium oxysporum* f. sp *cubense* (Foc). Molecular identification using 16S rRNA and *gyrB* genes were performed to identify isolates of chitinolytic bacteria which have the best inhibition on Foc. The results showed that the addition of chitosan could suppress the development of fusarium wilt, it was indicated by the low disease severity index. A total of 6 morphologically different chitinolytic bacteria were isolated from rhizosphere of banana plant which had chitosan application. Those chitinolytic bacteria isolates were A1, A2, A3, K2, K3 and K6. Based on *in vitro* antifungal assay on Foc, a potential isolate K2 which had the ability to inhibit the growth of Foc were selected for further studies. Double layer method showed that chitinolytic bacteria K2 isolate could suppress development of *Fusarium hypae* on PDA medium. The result of paper disc assay also showed that growth filtrate of K2 isolate had the strongest inhibition on fusarium than other isolates. BLAST result based on analysis sequence of 16S rRNA and *gyrB* genes showed that isolate K2 has a similarity with *Stenotrophomonas maltophilia*.

Keywords: Banana, Fusarium wilt, Chitinolytic bacteria

INTISARI

Bakteri kitinolitik merupakan salah satu agens biokontrol yang potensial untuk mengendalikan penyakit tumbuhan yang disebabkan oleh jamur karena kemampuannya dalam menghasilkan enzim ekstraseluler yang mampu mendegradasi dinding sel jamur yang sebagian besar tersusun oleh kitin. Penelitian ini bertujuan untuk mengisolasi dan mengkarakterisasi bakteri kitinolitik yang mempunyai potensi untuk mengendalikan penyakit layu fusarium pada tanaman pisang. Dalam penelitian ini sampel tanah untuk isolasi bakteri kitinolitik diambil dari rhizosfer tanaman pisang yang diperkaya kitosan dan mampu menekan perkembangan penyakit layu fusarium. Isolat bakteri yang mampu membentuk zona bening pada media kitin agar kemudian diuji kemampuan penghambatannya terhadap *Fusarium oxysporum* f.sp. *cubense* (Foc) secara *in vitro*. Isolat bakteri kitinolitik yang mampu menghambat pertumbuhan Foc diidentifikasi menggunakan sekuen gen 16S rRNA dan *gyr B*. Enam isolat bakteri kitinolitik A1, A2, A3, K2, K3 dan K6 diperoleh dari hasil isolasi tanah pada rhizosfer tanaman pisang yang diberi kitosan dan mampu menekan perkembangan penyakit layu fusarium. Keenam isolat bakteri tersebut mampu membentuk zona bening pada media kitin agar. Hasil uji penghambatan terhadap Foc menunjukkan bahwa isolat K2 mempunyai kemampuan menghambat pertumbuhan Foc secara *in vitro*. Hasil BLAST berdasarkan sekuen gen 16S rRNA dan *gyrB* menunjukkan bahwa isolat bakteri K2 termasuk kelompok *Stenotrophomonas maltophilia*.

Kata kunci : Pisang, Layu fusarium, Bakteri kitinolitik