

INTISARI

Produktivitas tanaman dipengaruhi oleh kondisi lingkungan, baik biotik maupun abiotik. Adanya cekaman biotik dan abiotik akan menimbulkan respon ketahanan tanaman, diantaranya yaitu produksi hormon etilen yang diprekursori oleh *1-aminocyclopropana-1-carboxylate* (ACC). Biosintesis etilen yang berlebihan dalam jaringan tanaman akan menghambat perkembangan dan melemahkan ketahanan tanaman terhadap serangan patogen. Spesies bakteri *Acinetobacter* sp. 20B diketahui mampu menghasilkan enzim ACC-deaminase yang berperan dalam mendegradasi ACC menjadi ammonia dan α -ketobutirat, sehingga dapat mengurangi produksi etilen dalam jaringan tanaman. Penelitian ini bertujuan untuk mengisolasi gen ACC-deaminase (*acdS*) dari bakteri *Acinetobacter* sp. 20B dan diinsersikan kedalam bakteri endofit *Burkholderia* sp. G8, serta menguji fungsional *acdS* 20B pada G8 mutan. Isolasi gen *acdS* dari *Acinetobacter* sp. 20B dilakukan dengan kit komersial Wizard[®] Genomic DNA Purification Kit (Promega) dan diamplifikasi PCR menggunakan primer spesifik *acdS* 20B. Insersi gen *acdS* kedalam G8 dilakukan dengan metode konjugasi antara bakteri G8 tersebut dengan *E. coli* S17.1 yang telah ditransformasi pBSL202 berisi gen *acdS*. Uji fungsional gen *acdS* yang terinsersi kedalam G8 dilakukan dengan cara mengkultur G8 mutan kedalam media minimum bebas nitrogen (NFMM) yang ditambahkan dengan ACC. Hasil penelitian diperoleh gen *acdS* 20B berukuran 835bp yang berhasil dikloning kedalam pBSL202. Konjugasi menghasilkan 6 G8 mutan, masing-masing menunjukkan pertumbuhan pada media NFMM dengan penambahan ACC sebagai satu-satunya sumber nitrogen. Dapat disimpulkan bahwa gen *acdS* 20B dapat diisolasi dari *Acinetobacter* sp. 20B dan diinsersikan kedalam bakteri endofit G8, serta mampu mengubah kemampuan bakteri endofit tersebut dalam menggunakan substrat ACC.

Kata kunci: *1-aminocyclopropana-1-carboxylate* (ACC), ACC-deaminase (*acdS*), *Acinetobacter* sp. 20B, transposon, plasmid mTn5s

ABSTRACT

Crop productivity was influenced by environmental conditions, both biotic and abiotic. Their biotic and abiotic stresses caused plant's defence responses, for example hormone ethylene that is precursored by 1-aminocyclopropana-1-carboxylate (ACC). The excessiveness of biosynthesis of ethylene in plant tissues might inhibit the development of the plant and weakens the plant resistance towards pathogen attack. *Acinetobacter* sp. 20B was known to produce ACC-deaminase enzymes that play a role in degrading ACC into ammonia and α -ketobutyrate, so it can reduce the production of ethylene in plant tissues. This aim of this study was to isolate ACC-deaminase gene (*acdS*) from *Acinetobacter* sp. 20B and inserted it into the endophytic bacteria *Burkholderia* sp. G8. Futhermore, the functional of *acdS* 20B in the G8 mutants was also tested. Isolation of *acdS* genes from *Acinetobacter* sp. 20B performed with commercial kits Wizard® Genomic DNA Purification Kit (Promega) and PCR amplified using specific primers for *acdS* 20B. *AcidS* gene insertion into the G8 was conducted by conjugation between G8 bacteria and *E. coli* λ pir S17.1 that contained *acdS* genes. The functional assay of *acdS* genes that inserted into G8 was done by culturing the mutants into nitrogen-free minimum medium (NFMM) after addition of ACC. The results was obtained 835bp of *acdS* 20B gene and successfully cloned into pBSL202. The conjugation produced 6 G8 mutants, each showed growth in NFMM media with the addition of ACC as the sole source of nitrogen. It can be concluded that *acdS* 20B gene can be isolated from the *Acinetobacter* sp. 20B and inserted into the G8 endophytic bacteria, moreover it could alter the ability of endophytic bacteria in using the ACC substrate.

Keywords: 1-aminocyclopropana-1-carboxylate (ACC), ACC-deaminase (*acdS*), *Acinetobacter* sp. 20B, transposons, mTn5s plasmid