



## INTISARI

### KARAKTER EKOLOGI DAN FISILOGI BAKTERI PENGHASIL ACC DEAMINASE

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Penurunan pertumbuhan dan produktivitas tanaman dapat disebabkan oleh cekaman lingkungan yang menginduksi sintesis etilen berlebih. Terdapat bakteri penghasil *1-aminocyclopropane-1-carboxylate deaminase* (ACCD) yang mampu menurunkan kadar etilen tanaman dengan cara menguraikan prekursor etilen, *1-aminocyclopropane-1-carboxylic acid* (ACC) menjadi ammonia dan  $\alpha$ -ketobutirat. Penelitian ini bertujuan untuk mengetahui karakter ekologi (faktor pH, suhu, aerobisitas), dan fisiologi (pelarutan fosfat, penggunaan sumber karbon, antagonisme patogen), serta ketahanan terhadap logam berat bakteri penghasil ACCD. Karakterisasi ekologi dan fisiologi 13 strain bakteri dilakukan dengan metode kualitatif. Strain bakteri yang digunakan adalah *Sphingobacterium multivorum* BK1, *Bacillus aryabhatai* TW7, *Pseudomonas putida* KS16.2, *Lysinibacillus pakistanensis* PIC5, *Pantoea dispersa* CK4, *Pantoea agglomerans* KB6.2, *Stenotrophomonas maltophilia* PIR5, *Stenotrophomonas maltophilia* PCM8, *Pseudomonas monteilii* KS12, *Enterobacter ludwigii* KW3, *Pseudomonas putida* PIR 3C, *Bacillus aryabhatai* PIC11, dan *Bacillus mycoides* CBW2. Hasil penelitian menunjukkan bahwa strain bakteri tumbuh optimum pada pH 6–8, suhu 25–30 °C, dan bakteri bersifat aerob sampai fakultatif anaerob. Strain bakteri memiliki Indeks Pelarutan Fosfat antara 1,10–3,04. Semua strain bakteri tidak memiliki daya antagonistik terhadap *Xanthomonas oryzae* pv. *oryzae* dan *Ralstonia solanacearum*. Semua strain bakteri dapat menggunakan glukosa, sukrosa, selulosa dan manitol sebagai sumber karbon dan energi. Strain bakteri memiliki toleransi terhadap  $\text{Cr}^{6+}$  antara 100–300 mg.L<sup>-1</sup>.

Kata kunci : cekaman lingkungan, ACC deaminase, karakter ekologi dan fisiologi



## ABSTRACT

### ECOLOGICAL AND PHYSIOLOGICAL CHARACTERS OF ACC DEAMINASE-PRODUCING BACTERIA

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The decrease of plant growth and productivity may be due to environmental stress that induce excessive ethylene synthesis. ACCD (*1-aminocyclopropane-1-carboxylate* deaminase)-producing bacteria are known to decrease crop ethylene levels by converting the ethylene precursor, *1-aminocyclopropane-1-carboxylic acid* (ACC) to ammonia and  $\alpha$ -ketobutyrate. This study was aimed at understanding the ecological (pH, temperature, aerobicity), physiological (phosphate solubility, carbon sources utilization, pathogen antagonism) and heavy metal tolerance characters of ACCD-producing bacteria. Ecological and physiological characterisation of 13 ACCD-producing bacterial strains was conducted by qualitative method. The bacterial strains used were *Sphingobacterium multivorum* BK1, *Bacillus aryabhatai* TW7, *Pseudomonas putida* KS16.2, *Lysinibacillus pakistanensis* PIC5, *Pantoea dispersa* CK4, *Pantoea agglomerans* KB6.2, *Stenotrophomonas maltophilia* PIR5, *Stenotrophomonas maltophilia* PCM8, *Pseudomonas monteilii* KS12, *Enterobacter ludwigii* KW3, *Pseudomonas putida* PIR 3C, *Bacillus aryabhatai* PIC11, and *Bacillus mycoides* CBW2. It was observed that all bacterial strains demonstrated optimal growth at pH 6-8, temperature 25–30 °C, and oxygen requirement of aerobic to facultative anaerobic. It was also noted that all strains have Phosphate Solubilizing Index between 1,10–3,04. In terms of antagonistic properties, all bacterial strains were found incapable of inhibiting *Xanthomonas oryzae* pv. *oryzae* and *Ralstonia solanacearum* growth. All bacterial strains were capable of using glucose, sucrose, cellulose and mannitol as the source of carbon and energy. In addition, all bacterial strains also demonstrated Cr<sup>6+</sup> tolerance up to 100–300 mg.L<sup>-1</sup>.

Keyword : environmental stress, ACC deaminase, character of ecology and physiology