Intisari

Salah satu tanggapan tanaman menghadapi cekaman lingkungan, faktor biotik dan abiotik, adalah mensintesis hormon etilen yang menghambat pertumbuhannya. Terdapat bakteri endofitik atau rhizosferik penghasil ACC deaminase yang mengubah ACC (*1-aminocyclopropane-1-carboxylic acid*), prekursor sintesis etilen, sehingga menurunkan hormon etilen tanaman. Penelitian ini ditujukan untuk memperoleh bakteri penghasil ACC deaminase yang diisolasi dari perakaran tanaman teh dan kakao. Isolasi dilakukan dengan metode *surface plating* pada medium nutrien agar. Seleksi kualitatif dilakukan berdasarkan pertumbuhan isolat pada medium minimal dengan ACC sebagai sumber nitrogen, dan seleksi kuantitatif berdasarkan uji aktivitas ACC deaminase. Karakterisasi dilakukan melalui pengamatan morfologi dan resistensi isolat terhadap antibiotik Ampisilin, Kanamisin, dan *Ciprofloxacin*. Identifikasi isolat dilakukan dengan pengurutan basa nitrogen gen 16S rRNA. Isolasi dan seleksi mendapatkan 3 isolat penghasil ACC deaminase, yaitu KS 12, KS 16.2, dan TW 7, yang memiliki aktivitas ACC deaminase antara 450,61 - 774,51 nmol NH_4^+.mg^{-1}.jam^{-1}. Semua isolat KS merupakan bakteri gram negatif dengan MIC 5, 160, dan 2 ppm berturut-turut terhadap antibiotik Kanamisin, Ampisilin, dan *Ciprofloxacin*, sedangkan isolat TW 7 merupakan bakteri gram positif dengan MIC 5, 20, 10 ppm berturut-turut terhadap antibiotik Kanamisin, Ampisilin, dan *Ciprofloxacin*. Berdasarkan urutan basa nitrogen gen 16S rRNA, isolat KS 12 dan KS 16.2 teridentifikasi sebagai *Pseudomonas* sp., sedangkan isolat TW 7 teridentifikasi sebagai *Bacillus* sp.

Kata kunci: teh, kakao, etilen, ACC deaminase, *Pseudomonas*, *Bacillus*

Abstract

One of plant responses to environmental stresses, biotic and abiotic factors, is by synthesising ethylene hormone that inhibits their growth. A group of ACC deaminase-producing endophytic or rhizospheric bacteria is known to convert ACC (1-aminocyclopropane-1-carboxylic acid), an ethylene precursor, to α-ketobutyrate and ammonium, thereby reducing the synthesis of ethylene. This study was aimed at obtaining ACC deaminase-producing bacteria isolated from plant roots of tea and cocoa. Isolation was conducted by surface plating on nutrient agar medium. Qualitative selection was based on the growth of isolates on minimal medium supplemented with ACC as the nitrogen source, followed by a quantitative selection based on ACC deaminase activity assay. Characterisation of the selected isolates was done through morphological observation and their resistance to the antibiotic Kanamycin, Ampicilin, and Ciprofloxacin. Identification of the isolates was carried out by sequencing of 16S rRNA gene. Isolation and selection of the isolates resulted in 3 ACC deaminase-producing isolates (KS 12, KS 16.2, and TW 7), which have the ACC deaminase activity of 450,61 - 774,51 nmol NH_4^+.mg^{-1}.h^{-1}. All KS isolates were Gram-negative with MIC against Kanamycin, Ampicillin, Ciprofloxacin of 5, 160, and 2 ppm, while TW 7, a Gram-positive, demonstrated MIC against the same antibiotics of 5, 20, and 10 ppm, respectively. Based 16S rRNA gene sequence, KS 12 and KS 16.2 isolates were identified as *Pseudomonas* sp., whereas TW 7 isolate was identified as *Bacillus* sp.

Keywords: tea, cocoa, ethylene, ACC deaminase, *Pseudomonas*, *Bacillus*