

Intisari

Kekeringan merupakan suatu cekaman bagi tanaman padi yang memicu sintesis etilen secara berlebihan dan berdampak pada penghambatan pertumbuhan dan produktivitas tanaman. Bakteri penghasil ACC deaminase dapat mengurangi jumlah etilen di dalam tanaman dengan mengubah ACC (*Amino—1-cyclopropane-1-carboxylate*) sebagai prekursor etilen menjadi α -ketobutirat dan amonia, sehingga dapat mendukung pertumbuhan tanaman. Penelitian ini bertujuan untuk mengetahui pengaruh inokulasi bakteri penghasil ACC deaminase (ACCD) terhadap pertumbuhan tanaman padi varietas Situ Bagendit di tanah Regosol yang tercekam kekeringan. Taraf kekeringan yang digunakan adalah kadar air tanah pada TLP (titik layu permanen, $pF = 4.2$), KLP yakni 75% kapasitas Lapangan, dan KL (kapasitas Lapangan, $pF = 2.54$). Strain bakteri yang digunakan adalah *Pseudomonas putida* (PIR3), *Stenotrophomonas maltophilia* (PIR5), *Lysinibacillus pakistanensis* (PIC5), *Bacillus aryabhatai* (PIC11), dan *Raoultella terrigena* (PCM8). Tanaman padi diinokulasi campuran bakteri ACCD tersebut, kemudian dibandingkan dengan perlakuan tanpa inokulasi. Parameter pertumbuhan yang diamati meliputi tinggi tanaman, kandungan klorofil daun, dan bobot tanaman. Visualisasi keberadaan bakteri penghasil ACCD pada akar tanaman diamati dengan *Scanning Electron Microscope* (SEM). Hasil penelitian menunjukkan bahwa inokulasi bakteri ACCD mampu meningkatkan secara signifikan tinggi tanaman berturut-turut pada taraf kekeringan TLP, KLP, dan KL hingga 24,36%, 7,02%, dan 8%; meningkatkan kandungan klorofil daun hingga 80,36%, 1,66%, dan 4,01%; serta berat kering tanaman hingga 78,79%, 46,61%, dan 44,39%. Bakteri penghasil ACCD yang diinokulasikan mampu mengkoloni perakaran tanaman padi. Berdasarkan hasil tersebut dapat disimpulkan bahwa inokulasi bakteri ACCD dapat meningkatkan secara signifikan pertumbuhan padi Situ Bagendit di tanah regosol yang tercekam kekeringan.

Kata kunci : Padi var. Situ Bagendit, regosol, cekaman kekeringan, Bakteri ACC deaminase

Abstract

Drought stress is a challenge for rice plants that triggers excessive ethylene synthesis, resulting in growth inhibition and reduced plant productivity. Bacteria producing ACC deaminase can reduce the amount of ethylene in plants by converting ACC (1-aminocyclopropane-1-carboxylate), a precursor to ethylene, into α -ketobutyrate and ammonia, thereby supporting plant growth. This study aims to determine the effect of inoculating ACC deaminase-producing bacteria (ACCD) on the growth of rice var. Situ Bagendit in Regosol under drought stress. The drought levels used are the soil water content at PWP (permanent wilting point, $pF = 4.2$), HFC (75% Half field capacity), and FC (field capacity, $pF = 2.54$). The bacterial strains used are *Pseudomonas putida* (PIR3), *Stenotrophomonas maltophilia* (PIR5), *Lysinibacillus pakistanensis* (PIC5), *Bacillus aryabhatai* (PIC11), and *Raoultella terrigena* (PCM8). Rice plants were inoculated with a mixture of ACCD-producing bacteria and compared with non-inoculated treatment. Growth parameters observed include plant height, leaf chlorophyll content, and plant weight. Presence of ACCD-producing bacteria on plant roots was observed using Scanning Electron Microscope (SEM). The results showed that inoculation with ACCD-producing bacteria significantly increased plant height at TLP, KLP, dan KL drought levels respectively by up to 24.36% , 7.02%, and 8%; increased leaf chlorophyll content by up to 80.36%, 1.66%, and 4.01%; and dry weight of plants by up to 78.79%, 46.61%, and 44.39%. Inoculated ACCD-producing bacteria were able to colonize the root of rice plants. Based on these results, it can be concluded that ACCD bacterial inoculation can significantly increase the growth of rice var. Situ Bagendit in regosol soil under drought stress.

Keywords : Rice var. Situ Bagendit, regosol, drought stress, ACC deaminase producing bacteria.