

Intisari

Tanggapan Fisiologis Rhizobakteri Osmotoleran terhadap Cekaman Kegaraman (Natrium Klorida) dan Kemasaman dengan Toksisitas Aluminium Sulfat

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Rhizobakteri merupakan bakteri yang dapat membantu pertumbuhan tanaman dalam keadaan tercekam. Penelitian ini bertujuan untuk mengetahui pengaruh cekaman ganda yaitu kegaraman dan kemasaman terhadap pertumbuhan dan fisiologis rhizobakteri osmotoleran. Analisis pertumbuhan sel dilakukan dengan metode spektrofotometer OD 420 nm sedangkan analisis metabolit rhizobakteri dilakukan dengan GC-MS (Gas Chromatography Mass Spectrophotometer). Rhizobakteri osmotoleran yang digunakan adalah isolat Al-19 yang diisolasi dari tanah perakaran Graminae. Sel ditumbuhkan pada medium LB (Luria Bertani) dengan perlakuan 1,8 M NaCl untuk menghasilkan cekaman kegaraman dan $\text{Al}_2(\text{SO}_4)_3$ pada berbagai konsentrasi (200 ppm, 500 ppm, 700 ppm dan 1000 ppm) untuk menghasilkan cekaman kemasaman. Semakin tinggi cekaman kemasaman yang diberikan maka kerapatan semakin rendah. Berdasarkan hasil GC-MS terdapat beberapa senyawa spesifik yang hanya muncul pada salah satu perlakuan. Pada kontrol senyawa yang muncul antara lain Octadecane, Tetradecane, dan Hexadecane; pada LB + 1,8 M NaCl + 200 ppm $\text{Al}_2(\text{SO}_4)_3$ yaitu proline; dan LB + 1,8 M NaCl + 700 ppm $\text{Al}_2(\text{SO}_4)_3$ yaitu 13-Oxabicyclo [10.1.10] Tridecane dan *Hexadecanoic acid*. Bentuk adaptasi rhizobakteri osmotoleran terhadap cekaman ganda yaitu pertumbuhan yang lambat, muncul osmoprotektan, dan perubahan komposisi fosfolipid.

Kata kunci: rhizobakteri osmotoleran, cekaman kegaraman, cekaman kemasaman, fisiologi

Abstract

Physiological Response of Osmotolerant Rhizobacteria toward Salinity (Sodium Chloride) and Acidity with Alluminium Sulfate Toxicity

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Rhizobacteria is a group of bacteria that live in the surrounding plant root. Osmotolerant rhizobacteria has been known to help plant growth from environmental stress, especially drought stress. The purposes of the research was to determine the double stress effect of salinity and acidity on the growth and physiology of osmotolerant rhizobacteria. Cell growth was analysed by using spectrophotometer at OD 420 nm, while the cellular metabolites were analysed by using GC-MS (Gas Chromatography Mass Spectrophotometer). Osmotolerant rhizobacteria used was Al-19 isolated from Graminae rhizosphere. Cells were grown in LB media (Luria Bertani) supplemented 1,8 M NaCl to make salinity stress and $\text{Al}_2(\text{SO}_4)_3$ with varied concentrations (200 ppm, 500 ppm, 700 ppm and 1000 ppm) to make acid stress. This results of this study demonstrated that the higher acid concentration, the lower cell density. GC-MS results demonstrated that several specific compounds were detected under non-stress (control) condition, i.e; Octadecane, Tetradecane, dan Hexadecane; under salinity and acid stress proline (LB + 1,8 M NaCl + 200 ppm $\text{Al}_2(\text{SO}_4)_3$) was detected while; condition of stress, 13-Oxabicyclo [10.1.10] Tridecane and Hexadecanoic acid (LB + 1,8 M NaCl + 700 ppm $\text{Al}_2(\text{SO}_4)_3$) were detected. It was observed that the adaptation from osmotolerant rhizobacteria were manifested by slower growth and phospholipid composition changes.

Keywords; osmotolerant rhizobacteria, salinity stress, acid stress, physiology