RINGKASAN

Kelompok bakteri *Plant Growth Promoting Rhizobacteria* (PGPR) merupakan mikroorganisme pengkoloni akar yang menguntungkan dan dapat dimanfaatkan sebagai agensia biologis untuk membantu meningkatkan pertumbuhan dan ketahanan tanaman akibat cekaman lingkungan yang ekstrim. Salinitas merupakan salah satu faktor kondisi abiotik yang memberikan pengaruh kompleks seperti *stress* ion, *stress* osmotik, dan *stress* sekunder pada hampir setiap fase pertumbuhan dan perkembangan tanaman. Karakter salin sering dijumpai pada lahan yang terletak di sekitar pesisir pantai, dan saat ini telah banyak dialih manfaatkan sebagai lahan pertanian. Salah satunya, seperti lahan sawah pasang surut yang terletak diantara kawasan ekosistem mangrove Segara Anakan Cilacap. Penggunaan mikroorganisme menguntungkan dari kelompok bakteri PGPR yang diutamakan berasal dari sumber asalnya akan lebih memudahkan untuk beradaptasi dan berasosiasi dengan tanaman. Populasi bakteri kelompok PGPR yang beragam dan berasal dari rizosfer padi lahan sawah pasang surut diharapkan memiliki sifat toleran terhadap salinitas.

Tujuan penelitian ini yaitu untuk mengetahui populasi beberapa genus bakteri kandidat PGPR tanah perakaran padi lahan salin dan mengetahui karakteristik dan identitas isolat bakteri kandidat PGPR tanah perakaran padi lahan salin. Isolat bakteri yang diperoleh dikarakterisasi dan diidentifikasi mengacu pada *Bergeys Manual of Determinative Bacteriology 9th Edition*. Tahapan penelitian meliputi isolasi bakteri menggunakan medium selektif, uji ketahanan bakteri terhadap salinitas pada medium mengandung NaCl, uji penambatan nitrogen, uji pelarutan fosfat, uji produksi hormon tumbuh IAA, uji antagonisme terhadap jamur patogen, dan identifikasi isolat bakteri terpilih, serta mengelompokkan karakter setiap isolat terpilih sebagai bakteri potensial kandidat PGPR.

Hasil penelitian diperoleh sebanyak 10 isolat bakteri yang teridentifikasi sebagai spesies anggota genus *Azospirillum* (3 isolat), spesies anggota genus *Azotobacter* (6 isolat) dan spesies anggota genus *Marinococcus* (1 isolat). Kepadatan populasi *Azospirillum* spp., *Azotobacter* spp., dan *Marinococcus* sp., pada perakaran padi lahan salin secara berturut-turut adalah 74,36x10^5 (CFU/g), 19,8x10^5 (CFU/g), dan 6x10^5 (CFU/g). Seluruh isolat bakteri tersebut mampu menambat nitrogen dan melarutkan fosfat dengan nilai indeks pelarutan fosfat berkisar antara 104,57 sampai 299,58. Sebanyak 9 isolat bakteri (PSA1, PSA2, PSA3, PSA4, PSA5, PSA6, PAS7, PSA8, & PSA10) mampu tumbuh pada medium NB yang mengandung NaCl 5% dan satu isolat bakteri toleran terhadap NaCl 3% (PSA9). Sebanyak 3 isolat bakteri (PSA5, PSA8, & PSA10) mampu menghasilkan hormon tumbuh IAA pada medium salin sebesar 71,26 ppm; 45,38 ppm dan 35,6 ppm. Sebanyak 4 isolat bakteri (PSA1, PSA6, PSA8, & PSA10) memiliki kemampuan menghambat pertumbuhan cendawan patogen *Fusarium oxysporum*, dengan nilai persentase penghambatan (46,11%) dan *Rhizoctonia solani* dengan nilai persentase penghambatan (26,67%).

Kata kunci: PGPR, *Azospirillum* sp., *Azotobacter* sp., *Marinococcus* sp.,
Padi Lahan Salin.

SUMMARY

The group of bacterial *Plant Growth Promoting Rhizobacteria* (PGPR) is a beneficial root colonizing microorganism and can be used as a biological agent to help maintain plant growth and resistance to extreme environmental stresses. Salinity is one of the factors of abiotic condition that give complex effects such as stress ion, osmotic stress, and secondary stress in almost every phase of growth and development plant. Salinity characters are often found on the land located around the coast, and currently many have been used as agricultural land. One of them, such as tidal rice fields located between the mangrove ecosystem area of Segara Anakan Cilacap. The use of beneficial microorganisms from the PGPR bacterial group which is preferred from its original source will make it easier to adapt and associate with plants. The bacterial population of the various PGPR groups from the rhizosphere of tidal paddy field is expected to have salinity tolerance.

The purpose of this study was to determine the population of several genera of PGPR candidates in rice rhizospheric saline soil, the character, and identity of the bacterial itself. The bacterial isolates were characterized and identified refers to the *Bergeys Manual of Determinative Bacteriology 9th Edition.* The steps of this study were bacteria isolation with selective medium, bacterial resistance test for salinity in NaCl containing medium, nitrogen fixation test, phosphate solubilizing test, antagonism test for againts pathogenic fungi, identification of selected bacterial isolates, and grouping each isolate selected as potential bacteria PGPR candidates.

The results showed that 10 isolates of bacteria were identified as members of the *Azospirillum* genus (3 isolates), members of the *Azotobacter* genus (6 isolates), and members of the *Marinococcus* genus (1 isolate). Population density of *Azospirillum* spp, *Azotobacter* spp., and *Marinococcus* sp., on roots of paddy field saline were 74.36x10^5 (CFU/g), 19.8x10^5 (CFU/g), and 6x10^5 (CFU/g). All bacterial isolates were characterized as nitrogen fixing bacteria and phosphate solubilizing with the range of phosphate dissolution index value is 104.57 to 299.58. A total of 9 bacterial isolates (PSA1, PSA2, PSA3, PSA4, PSA5, PSA6, PAS7, PSA8, & PSA10) had were able to grow on nutrient broth medium containing 5% NaCl and one bacterial isolate (PSA9) which had a salinity resistance level of 3% NaCl. A total of 3 bacterial isolates (PSA5, PSA8, & PSA10) having the ability to produce IAA growth hormone in saline medium of 71.26 ppm, 45.38 ppm and 31.56 ppm. A total of 4 bacterial isolates (PSA1, PSA6, PSA8 & PSA10) having the ability to inhibit the growth of *Fusarium oxysporum* pathogenic fungi, with the inhibitory percentage values (46.11%) and *Rhizoctonia solani* with the inhibition percentage values (26.67%).

Keyword: PGPR, *Azospirillum* sp., *Azotobacter* sp., *Marinococcus* sp., Salinity of rice field.