

RINGKASAN

Eksplorasi bakteri tanah setelah aplikasi bakteri endofit akar padi didapatkan 15 isolat bakteri tanah. Bakteri tanah berperan dalam menyediakan unsur hara, melindungi tanaman dari infeksi patogen, serta menghasilkan hormon pertumbuhan, seperti IAA, pelarut fosfat, penambat nitrogen. Penelitian ini bertujuan untuk menyeleksi dan mengkarakterisasi isolat bakteri tanah untuk mengetahui potensinya sebagai agensia pengendali hayati *R. solani* dan pengaruhnya terhadap perkecambahan padi. Penelitian ini dilaksanakan dengan metode eksperimental di Laboratorium Perlindungan Tanaman, Fakultas Pertanian, Universitas Jenderal Soedirman. Penelitian dilakukan dengan dua tahapan yaitu uji pendahuluan untuk menyeleksi 15 isolat bakteri tanah dan eksperimen utama yaitu uji karakterisasi bakteri tanah terpilih dan uji pengaruh bakteri tanah terpilih terhadap perkecambahan padi yang dilakukan dengan enam perlakuan dan empat kali ulangan. Variabel yang diamati adalah seleksi isolat bakteri tanah, karakteristik fisiologi dan biokimia bakteri tanah potensial, serta pengaruh bakteri tanah potensial pada perkecambahan padi. Analisis data secara deskriptif dilakukan untuk menganalisis hasil pengujian karakteristik bakteri tanah potensial, sedangkan analisis menggunakan ANOVA dengan taraf kesalahan 5% dilakukan untuk hasil pengujian *in vitro* dan pengaruh bakteri tanah potensial pada perkecambahan padi. Hasil penelitian menunjukkan bahwa 15 isolat bakteri tanah yang diuji terhadap *R. solani* didapatkan 5 bakteri tanah potensial yaitu bakteri genus *Paenibacillus*, *Micrococcus*, *Streptomyces* dan *Actinomyces*. Uji antagonis bakteri tanah terhadap *R. solani* didapatkan daya hambat tertinggi yaitu sebesar 40,55% pada isolat P11 (*Paenibacillus*). Pada pengujian karakteristik fisiologi, pertumbuhan bakteri tertinggi umumnya diperoleh pada perlakuan NaCl 3% dan suhu 30°C, sedangkan pertumbuhan terendah terlihat pada suhu 8°C dan beberapa perlakuan pH. Hasil pengujian karakteristik biokimia seluruh isolat bakteri tanah potensial menunjukkan hasil positif pada uji siderofor, IAA, pelarutan fosfat, protease dan fermentasi karbohidrat, sedangkan aktivitas kitinase hanya ditemukan pada isolat P3 (*Micrococcus*) dan P10 (*Actinomyces*). Seluruh isolat bakteri tanah potensial juga memberikan pengaruh yang nyata terhadap kecepatan tumbuh benih, panjang akar, panjang tunas, bobot segar akar, bobot kering akar dan bobot kering tunas. Sementara itu, isolat bakteri tanah potensial tidak berpengaruh nyata terhadap daya kecambah dan bobot segar tunas.

SUMMARY

*This study explored soil bacteria obtained after the application of rice root endophytic bacteria, which resulted in 15 soil bacterial isolates. Soil bacteria play important roles in nutrient availability, plant protection against pathogen infection, and the production of plant growth-promoting substances. The objective of this study was to select and characterize soil bacterial isolates to determine their potential as biological control agents against *Rhizoctonia solani* and their effects on rice seed germination. This study was conducted using experimental methods at the Plant Protection Laboratory, Faculty of Agriculture, Jenderal Soedirman University. The study was carried out in two stages, namely preliminary tests to select 15 soil bacteria isolates and the main experiment, which consisted of characterisation tests of the selected soil bacteria and tests of the effect of the selected soil bacteria on rice germination, conducted with six treatments and four replicates. The variables observed were the selection of soil bacterial isolates, the physiological and biochemical characteristics of potential soil bacteria, and the effect of potential soil bacteria on rice germination. Descriptive data analysis was performed to analyse the results of testing the characteristics of potential soil bacteria, while analysis using ANOVA with a 5% error rate was performed for the results of in vitro testing and the effect of potential soil bacteria on rice germination. The results showed that among 15 soil bacterial isolates tested against *R. solani*, five potential isolates belonging to the genera *Paenibacillus*, *Micrococcus*, *Streptomyces*, and *Actinomyces* were obtained. The highest inhibition against *R. solani* was 40,55% by isolate P11 (*Paenibacillus*). Physiological characterization indicated that bacterial growth was generally highest at 3% NaCl and 30°C, and lowest at 8°C and under several pH treatments. Biochemical characterization showed that all potential isolates were positive for siderophore production, IAA production, phosphate solubilization, protease activity, and carbohydrate fermentation, while chitinase activity was only detected in isolates P3 (*Micrococcus*) and P10 (*Actinomyces*). All potential soil bacterial isolates significantly affected germination rate, root length, shoot length, fresh root weight, dry root weight and shoot dry weight, but had no significant effect on germination percentage and shoot fresh weight.*