PENGARUH BAKTERI ENDOFIT TERHADAP PERTUMBUHAN TANAMAN GINSENG JAWA (*Talinum paniculatum* Gaertn.) PADA KONDISI CEKAMAN KEKERINGAN

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ABSTRAK

Penelitian ini bertujuan untuk mengevaluasi peran bakteri endofit dalam meningkatkan toleransi dan pertumbuhan tanaman ginseng jawa (*Talinum paniculatum* Gaertn.) yang dipaparkan pada kondisi cekaman kekeringan. Cekaman kekeringan merupakan salah satu faktor abiotik utama yang menghambat produktivitas tanaman obat di lahan kering. Bakteri endofit diharapkan mampu memitigasi dampak negatif tersebut melalui mekanisme fisiologis maupun biokimia. Metode penelitian ini menggunakan rancangan acak kelompok (RAK) faktorial yang terdiri dari dua faktor. Faktor pertama yaitu kontrol tanpa endofit, endofit kode GJ-3, GJ-12 dan endofit campuran GJ-3 dan GJ-12. Faktor kedua adalah tingkat ketersediaan air (kapasitas lapang 100%, 75%, 50%, dan 25%) dengan 3 ulangan. Hasil penelitian menunjukkan bahwa terdapat interaksi dari pemberian bakteri endofit, secara signifikan yang mampu meningkatkan pertumbuhan tanaman pada kapasitas lapang 50% dan 75%. Pemberian bakteri endofit berpengaruh pada indeks tumbuh, panjang akar, dan bobot segar. Dimana perlakuan bakteri endofit campuran GJ-3 dan GJ-12 secara konsisten menunjukkan nilai tertinggi dibandingkan dengan perlakuan kontrol tanpa endofit , bakteri endofit GJ-3, serta bakteri endofit GJ-12. Hal ini mengindikasikan adanya peran bakteri dalam membantu tanaman beradaptasi pada lingkungan ekstrem. Berdasarkan hasil tersebut, penggunaan bakteri endofit terutama endofit campuran GJ-3 dan GJ-12 berpotensi menjadi agen hayati untuk budidaya ginseng jawa di lahan marginal atau daerah dengan ketersediaan air terbatas.

Kata Kunci: Bakteri Endofit, Cekaman Kekeringan, Ginseng Jawa, Pertumbuhan Tanaman.

THE EFFECT OF ENDOPHYTIC BACTERIA ON THE GROWTH OF JAVA GINSENG (*Talinum paniculatum* Gaertn.) UNDER DROUGHT STRESS CONDITIONS

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ABSTRACT

This study aimed to evaluate the role of endophytic bacteria in enhancing the drought tolerance and growth of Java ginseng (*Talinum paniculatum* Gaertn.) under drought stress conditions. Drought stress is one of the major abiotic factors limiting the productivity of medicinal plants cultivated in dryland areas. Endophytic bacteria are expected to mitigate the adverse effects of drought through various physiological and biochemical mechanisms. The experiment was arranged in a factorial Randomized Complete Block Design (RCBD) consisting of two factors. The first factor was endophytic bacterial treatment, comprising a control without endophytic bacteria, endophytic isolate GJ-3, endophytic isolate GJ-12, and a mixed inoculation of GJ-3 and GJ-12. The second factor was water availability, represented by four field capacity levels (100%, 75%, 50%, and 25%), with three replications. The results demonstrated a significant interaction between endophytic bacterial application and water availability, indicating that endophytic bacteria significantly enhanced plant growth at 50% and 75% field capacity. Endophytic bacterial inoculation significantly affected the growth index, root length, and fresh weight of Java ginseng. Among all treatments, the mixed inoculation of endophytic isolates GJ-3 and GJ-12 consistently produced the highest values compared with the control, GJ-3 alone, and GJ-12 alone. These findings suggest that endophytic bacteria play an important role in improving plant adaptation to drought stress and other adverse environmental conditions. Therefore, the application of endophytic bacteria, particularly the mixed inoculation of GJ-3 and GJ-12, has considerable potential as a biological agent for the cultivation of Java ginseng in marginal lands or areas with limited water availability.

Keywords: Drought Stress, Endophytic Bacteria, Java Ginseng, Plant Growth.