

## INTISARI

### Pengaruh Inokulasi *Bacillus amyloliquefaciens* GMEKP1 terhadap Profil Komunitas Bakterioma Endofit Akar dan Metabolit Eksudat Akar Dua Varietas Tanaman Jagung

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Bakterioma endofit dapat meningkatkan pertumbuhan tanaman melalui berbagai metabolit yang dihasilkan. Perlakuan inokulasi *Bacillus amyloliquefaciens* GMEKP1 sejak fase biji diharapkan akan memengaruhi bakterioma endofit akar yang terekrut dari rizosfer, sehingga semakin memaksimalkan pertumbuhan tanaman. Komunitas bakterioma dipengaruhi oleh berbagai faktor, dimana salah satu faktor paling menentukan adalah genotipe tanaman. Penelitian ini bertujuan untuk menganalisis pengaruh inokulasi *B. amyloliquefaciens* GMEKP1 terhadap profil komunitas bakterioma akar dan metabolit eksudat akar dua varietas tanaman jagung. Biji jagung varietas srikandi kuning dan bisma diinokulasi *B. amyloliquefaciens* GMEKP1, kemudian ditanam masing-masing pada tanah entisol dengan kontrol tanpa perlakuan inokulasi. Penanaman dilakukan selama 45 hari di *greenhouse*. Parameter yang diamati pada penelitian ini meliputi tinggi tanaman, biomasa tanaman, komunitas bakterioma endofit akar dan metabolit eksudat akar yang dihasilkan. Analisis profil komunitas bakterioma akar dilakukan dengan *Next Generation Sequencing* (NGS) dengan target gen 16S rRNA pada daerah V3-V4. Analisis profil eksudat akar dengan analisis *Ultra High Performance Liquid Chromatography-High Resolution Mass Spectrometry* (UHPLC-HRMS). Hasil penelitian menunjukkan bahwa inokulasi *B. amyloliquefaciens* GMEKP1 dapat meningkatkan pertumbuhan pada varietas bisma, namun menghambat pertumbuhan pada varietas srikandi kuning. Perbedaan ini juga teramati melalui analisis komunitas bakterioma endofit, dimana pada srikandi kuning didominasi oleh genus *Morexella* sp. yang kemungkinan dapat menekan pertumbuhan tanaman melalui metabolit yang dihasilkan, sedangkan pada bisma dengan perlakuan inokulasi didominasi oleh *Massilia* sp. yang telah diketahui dapat membantu meningkatkan pertumbuhan tanaman. Inokulasi *B. amyloliquefaciens* GMEKP1 juga menyebabkan perbedaan konsentrasi metabolit pada eksudat akar yang kemungkinan memengaruhi pertumbuhan tanaman dan profil komunitas bakterioma endofit akar.

Kata kunci: *Bacillus amyloliquefaciens* GMEKP1, Bakteri endofit, Jagung, *Next Generation Sequencing* (NGS)

## ABSTRACT

### Effect of *Bacillus amyloliquefaciens* GMEKP1 Inoculation on Root Endophytic Bacteriome Community Profile and Root Exudate Metabolite of Two Maize Plant Varieties

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*Endophytic bacteriomes can enhance plant growth by producing various metabolites. Bacillus amyloliquefaciens GMEKP1 was inoculated since the seed phase, which is expected to affect the metabolite of root exudate and endophytic root bacteriome recruited from the rhizosphere, thus maximizing plant growth. The bacteriome community is influenced by various factors, and one of the most determining factors is plant genotype. This study aims to analyze the effect of B. amyloliquefaciens GMEKP1 inoculation on the endophytic root bacteriome community profile and root exudate of two varieties of maize. Maize seeds of yellow srikandi and bisma varieties were inoculated by B. amyloliquefaciens GMEKP1 as Plant Growth Promotion Rhizobacteria (PGPR), then planted respectively in entisol soil while control without inoculation treatment. Planting was done for 45 days in the greenhouse. Parameters examined in this study were plant height, plant biomass, endophytic root bacteriome community profile, and root exudate profile. Analysis of the bacteriome community profile was carried out by Next Generation Sequencing (NGS) with the target 16S rRNA gene in the V3-V4 region. The root exudate profile was analyzed by Ultra High-Performance Liquid Chromatography-High Resolution Mass Spectrometry (UHPLC-HRMS). The results showed that B. amyloliquefaciens GMEKP1 inoculation can increase growth in bisma varieties, but in yellow srikandi, the growth was slower than in the treatment without inoculation. This difference was also observed through the analysis of the endophytic root bacteriome community profile, where yellow srikandi was dominated by the genus Morexella sp. which might suppress plant growth through the metabolites produced, while in bisma with inoculation treatment, it was dominated by Massilia sp. which could help the increasing of growth. B. amyloliquefaciens GMEKP1 inoculation can change the concentration of each compound in root exudates in both varieties that effect on plant growth and endophytic root bacteriome community profile.*

**Keywords:** *Bacillus amyloliquefaciens GMEKP1, Endophytic bacteriome, maize, Next Generation Sequencing (NGS)*