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Profil Komunitas Bakteri Rizosfer Tanah dan Respons Pertumbuhan Tanaman Cabai (Capsicum frutescens L.) 'Ori 212' Terinfeksi Begomovirus Akibat Pemberian Biofertilizer
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PROFIL KOMUNITAS BAKTERI RIZOSFER TANAH DAN RESPONS PERTUMBUHAN TANAMAN CABAI RAWIT (*Capsicum frutescens* L.) 'Ori 212' TERINFEKSI *BEGOMOVIRUS* AKIBAT PEMBERIAN *BIOFERTILIZER*

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INTISARI

Cabai rawit (*Capsicum frutescens* L.) merupakan komoditas hortikultura bernilai penting, tetapi produktivitasnya dapat terganggu oleh infeksi *Begomovirus*. *Biofertilizer* berpotensi mendukung pemulihan tanaman terinfeksi melalui peningkatan ketersediaan hara, aktivitas mikroba rizosfer, dan perbaikan status fisiologis tanaman. Penelitian ini bertujuan untuk menganalisis pengaruh pemberian *biofertilizer* terhadap gejala, kandungan klorofil, respons pertumbuhan, dan komunitas bakteri rizosfer tanaman cabai rawit 'Ori 212' yang terinfeksi *Begomovirus*. Perlakuan terdiri atas tanaman terinfeksi *Begomovirus* dengan *biofertilizer* 100% dosis 15 L/ha [100B(+)] dan kontrol terinfeksi tanpa *biofertilizer* [K(+)]. Pengamatan dilakukan selama 14 hari terhadap skor gejala, *disease severity*, kandungan klorofil relatif, tinggi tanaman, jumlah daun, dan lebar daun. Komunitas bakteri rizosfer dianalisis menggunakan *metabarcoding* 16S rRNA berbasis *Oxford Nanopore Technology*, dilanjutkan dengan analisis bioinformatika untuk komposisi taksonomi, *alpha diversity*, dan *beta diversity*. Hasil penelitian menunjukkan bahwa *biofertilizer* menurunkan *disease severity* dari 85% menjadi 65% dengan *biocontrol efficacy* sebesar 23,53%, serta meningkatkan kandungan klorofil relatif sebesar 15,418 ± 6,610. Perlakuan 100B(+) juga menghasilkan respons pertumbuhan lebih baik dibandingkan kontrol pada tinggi tanaman, jumlah daun, dan lebar daun. Profil taksonomi menunjukkan perbedaan dominansi taksa, yaitu dominansi *Pseudomethylobacillus aquaticus* pada K(+) dan dominansi *Vicinamibacter silvestris* pada perlakuan 100B(+). *Alpha diversity* menunjukkan peningkatan signifikan pada *Shannon index*, *Simpson index*, dan *Pielou evenness*, sedangkan *Observed taxa* tidak berbeda signifikan. *Beta diversity* menunjukkan pemisahan struktur komunitas yang signifikan berdasarkan *Bray-Curtis* (R^2 = 0,809; p = 0,032) dan *Jaccard* (R^2 = 0,486; p = 0,028). Hasil ini menunjukkan bahwa *biofertilizer* 100% dosis 15 L/ha berkaitan dengan penurunan gejala visual, peningkatan klorofil relatif, perbaikan pertumbuhan vegetatif, dan perbedaan struktur komunitas bakteri rizosfer pada tanaman cabai rawit terinfeksi *Begomovirus* dibandingkan kontrol.

KATA KUNCI: *Begomovirus*, *biofertilizer*, cabai, klorofil, ONT, rizosfer

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RHIZOSPHERE SOIL BACTERIAL COMMUNITY PROFILE AND GROWTH RESPONSE OF *BEGOMOVIRUS*-INFECTED CHILI PEPPER (*Capsicum frutescens* L.) 'Ori 212' DRIVEN BY BIOFERTILIZER TREATMENT

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ABSTRACT

Chilli pepper (*Capsicum frutescens* L.) is an important horticultural commodity; however, its productivity can be impaired by *Begomovirus* infection. This viral infection can induce yellow leaf curl symptoms, reduce plant physiological capacity, and potentially alter plant interactions with rhizosphere microbial communities. Biofertilizer may support the recovery of infected plants by improving nutrient availability, rhizosphere microbial activity, and plant physiological status. This study aimed to analyze the effect of *biofertilizer* application on disease symptoms, chlorophyll content, growth response, and rhizosphere bacterial communities of *Begomovirus*-infected chili pepper 'Ori 212'. The treatments consisted of *Begomovirus*-infected plants treated with 100% biofertilizer at a dose of 15 L/ha [100B(+)] and infected control plants without biofertilizer application [K(+)]. Observations were conducted for 14 days on symptom score, disease severity, relative chlorophyll content, plant height, number of leaves, and leaf width. Rhizosphere bacterial communities were analyzed using 16S rRNA metabarcoding based on Oxford Nanopore Technology, followed by bioinformatics analysis of taxonomic composition, alpha diversity, and beta diversity. The results showed that biofertilizer reduced disease severity from 85% to 65%, with a biocontrol efficacy of 23.53%, and increased relative chlorophyll content by 15.418 ± 6.610. The 100B(+) treatment also produced better growth responses than the control in terms of plant height, number of leaves, and leaf width. The taxonomic profile showed a shift in taxon dominance; the control was dominated by methylotrophic bacteria such as *Pseudomethylobacillus aquaticus*, whereas the 100B(+) treatment was dominated by *Vicinamibacter silvestris*. Alpha diversity showed significant increases in the Shannon index, Simpson index, and Pielou evenness, whereas Observed taxa did not differ significantly. Beta diversity showed significant separation of community structure based on Bray-Curtis ($R^2 = 0.809$; $p = 0.032$) and Jaccard ($R^2 = 0.486$; $p = 0.028$). These results indicate that 100% biofertilizer at a dose of 15 L/ha was associated with reduced visual symptoms, increased relative chlorophyll content, improved vegetative growth, and altered rhizosphere bacterial community structure in *Begomovirus*-infected chili pepper compared to control.

KEY WORDS: *Begomovirus*, biofertilizer, chili, chlorophyll, ONT, rhizosphere