KARAKTERISASI DAN IDENTIFIKASI AKTINOBAKTERIA INDIGENOS SEBAGAI AGENS BIOKONTROL (*Xanthomonas oryzae* pv. *oryzae*) DAN AKTIVITAS ENZIM PERTAHANAN TANAMAN PADI

TESIS

Oleh

Muhammad Fadil

2120281002

Dosen Pembimbing:

1. **Dr. Yulmira Yanti, Ssi. MP**
2. **Dr. Ir. Ujang Khairul, MP**

PROGRAM STUDI S2 PROTEKSI TANAMAN
FAKULTAS PERTANIAN
UNIVERSITAS ANDALAS
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KARAKTERISASI AKTINOBAKTERIA INDIGENOS SEBAGAI AGENS BIOKONTROL (*Xanthomonas oryzae* pv. *oryzae*) SERTA RESPON FISIOLOGIS PERTAHANAN TANAMAN PADI

ABSTRAK

Xanthomonas oryzae pv. *oryzae* (Xoo) merupakan patogen penyebab hawar daun bakteri pada tanaman padi, penyakit hawar daun bakteri menyebabkan kehilangan hasil antara 74-80%. Penggunaan Aktinobakteria sebagai agensia hayati merupakan alternatif pengendalian *Xanthomonas oryzae* pv. *oryzae*. Penelitian bertujuan untuk mengetahui kemampuan antagonis Aktinobakteria indigenos yang berperan sebagai agens biokontrol terhadap *Xanthomonas oryzae* pv. *oryzae* secara in-vitro, mengetahui produksi enzim pertahanan tanaman padi yang di introduksi isolat Aktinobakteria indigenos sebagai agens biokontrol penyakit HDB, dan mengetahui jenis isolat Aktinobakteria indigenos yang diidentifikasi berdasarkan gen 16S rRNA. Penelitian terdiri 3 tahap yaitu; I) Kemampuan antagonis isolat Aktinobakteria. II) Aktivitas enzim pertahanan tanaman padi yang diintroduksi Aktinobakteria (Peroksidase, polyphenol oksidase, phenylalanin amonia lyase). III) Identifikasi molekuler. Hasil uji antagonis menunjukkan 10 isolat Aktinobakteria indigenos terbukti mampu menekan perkembangan Xoo dengan 5 isolat yang menunjukkan rata-rata zona hambat tertinggi yaitu APRD 3I211, APRP 1I121, APRP 3I212, dan APRP 2S121, dan APRP 1I213. 5 isolat mampu dalam produksi enzim protease, dan enzim amilase. Introduksi Aktinobakteria pada tanaman padi mempengaruhi aktivitas enzim pertahanan tanaman padi yang ditandai dengan terjadinya peningkatan aktivitas enzim pertahanan yaitu peroksidase, polyphenol oksidase, dan phenylalanin amonia lyase. Aktinobakteria uji memiliki kemiripan dengan *Streptomyces* sp., kode APRD 3I211 memiliki kemiripan sebesar 97,60%, APRP 1I121 memiliki kemiripan sebesar 98,51%, APRD 1I122 memiliki kemiripan sebesar 97,50%, APRP 3I212 memiliki kemiripan sebesar 98,65% dan APRP 2S121 memiliki kemiripan sebesar 98,20%.

Kata kunci: Gen 16S rRNA, Hawar daun bakteri, Indigenos, Pohon Filogenetik, Aktivitas enzim pertahanan, Enzim Protease, Enzim Amilase.

CHARACTERIZATION OF INDIGENOUS ACTINOBACTERIA AS BIOCONTROL AGENTS *(Xanthomonas oryzae* pv. *oryzae)* AND RICE DEFENSE PHYSIOLOGICAL RESPONSES

ABSTRACT

Xanthomonas oryzae pv. *oryzae* is a pathogen that causes bacterial leaf blight on rice plants, bacterial leaf blight causes yield losses between 74-80%. The use of actinobacteria as biological agents is an alternative to control *Xanthomonas oryzae* pv. *oryzae*. The aim of this study was to determine the ability of the antagonist of Aktinobacteria indigenos to act as a biocontrol agent against *Xanthomonas oryzae* pv. *oryzae* in vitro, to determine the production of the defense enzymes of rice plants introduced by isolates of Actinobacteria indigenos, and to determine the type of isolates of Actinobacteria indigenos which were identified based on the 16S rRNA gene. The research consists of 3 stages, namely; I) Antagonistic ability of Actinobacteria isolates. II) Activity of rice plant defense enzymes introduced by actinobacteria (peroxidase, polyphenol oxidase, phenylalanine ammonia lyase). III) Molecular identification. The results of the antagonist test showed that 10 isolates of indigenous Actinobacteria were proven to be able to suppress the development of Xoo with 5 isolates showing the highest average inhibition zone, namely APRD 3I211, APRP 1I121, APRP 3I212, and APRP 2S121, and APRP 1I213. 5 isolates were capable of producing protease and amylase enzymes. The introduction of actinobacteria in rice plants affects the activity of rice plant defense enzymes which is characterized by an increase in the activity of rice plant defense enzymes, namely peroxidase, polyphenol oxidase, and phenylalanine ammonia lyase. Test Actinobacteria have similarities with dengan *Streptomyces* sp., code APRD 3I211 have a similarity of 97.60%, APRP 1I121 has a similarity of 98.51%, APRD 1I122 has a similarity of 97.50%, APRP 3I212 has a similarity of 98.65% and APRP 2S121 were 98.20% similar to.

Key words: 16S rRNA gene, Bacterial leaf blight, Indigenos, Phylogenetic tree, Defense enzyme activity, Protease enzyme, Amylase enzyme.