

**POTENTIAL OF A CONSORTIUM OF *Bacillus* sp., *Pseudomonad fluorescent*, AND *Trichoderma* sp. IN ALTERNATIVE SOYBEAN MEDIA
ON *Ralstonia solanacearum* AND TOMATO (*Solanum lycopersicum* L.)
PLANT GROWTH**

SKRIPSI



Submitted by :

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**AGROTECHNOLGY STUDY PROGRAM
FACULTY OF AGRICULTURE
UNIVERSITY OF NATIONAL DEVELOPMENT "VETERAN" EAST JAVA
SURABAYA
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Surabaya, 09 December 2025

Who make a statement



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FOREWORD

The author expresses his gratitude the presence of Almighty God. Has always provided grace and convenience so that the writer can completing the writing of a skripsi entitled “ Potential of A Consortium *Bacillus* sp. *Pseudomonad fluorescent* and *Trichoderma* sp. in Alternative Soybean Media Against *Ralstonia solanacearum* and Tomato Plant Growth. This complitation would certainly not be possible to realize and completed well without any help, guidance and encouragement from various parties. Therefore, on this occasion the author would like to convey big thanks to :

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5. Friends who the author considers as his own family who are always there for me providing encouragement, prayers and support in compling this skipsi.

Author really hopes for constructive suggestion and criticism as evaluation material for this skripsi. Hopefully this skipsi can provide benefits in the dorm of information related to science and technology

Surabaya, 06 October 2024

Penulis

POTENSI KONSORSIUM *Bacillus* sp., *Pseudomonad fluorescent*, dan *Trichoderma* sp. DI MEDIA ALTERNATIF KEDELAI TERHADAP *Ralstonia solanacearum* DAN PERTUMBUHAN TANAMAN TOMAT (*Solanum lycopersicum* L.)

POTENTIAL OF A CONSORTIUM OF *Bacillus* sp., *Pseudomonad fluorescent*, AND *Trichoderma* sp. IN ALTERNATIVE SOYBEAN MEDIA ON *Ralstonia solanacearum* AND TOMATO (*Solanum lycopersicum* L.) PLANT GROWTH

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ABSTRAK

Penyakit layu bakteri yang disebabkan oleh *Ralstonia solanacearum* merupakan kendala utama dalam budidaya tomat (*Solanum lycopersicum* L.) di Indonesia, menyebabkan kerugian hingga 100%. Pengendalian hayati menggunakan mikroba antagonis seperti *Bacillus* sp., *Pseudomonad fluorescent*, dan *Trichoderma* sp. menjadi alternatif ramah lingkungan. Penelitian ini bertujuan untuk menguji potensi konsorsium ketiga mikroba tersebut di media alternatif kedelai terhadap *R. solanacearum* dan pertumbuhan tanaman tomat. Penelitian dilaksanakan di Screenhouse dan Laboratorium Kesehatan Tanaman UPN "Veteran" Jawa Timur dari November 2024 hingga Juli 2025 menggunakan metode uji *In Vitro* dan *In Vivo* dengan Rancangan Acak Lengkap (RAL). Pengujian *In Vitro* meliputi kompatibilitas dan antagonis, sedangkan pengujian *In Vivo* mengamati masa inkubasi, intensitas penyakit, dan aspek agronomis. Hasil pengujian *In Vitro* menunjukkan bahwa konsorsium *Trichoderma* sp., *Bacillus* sp., dan *Pseudomonad fluorescent* (TBP) kompatibel di media alternatif kedelai (Indeks Kompatibilitas 0,873) dan memiliki daya hambat tertinggi terhadap *R. solanacearum* dengan luas zona bening 17,2 mm, yang dikategorikan kuat. Mekanisme penghambatan tersebut diklasifikasikan sebagai bakteriostatik. Selanjutnya, hasil pengujian *In Vivo* menegaskan efektivitas konsorsium TBP yang terbaik. Perlakuan konsorsium ini memberikan masa inkubasi penyakit layu bakteri terpanjang, mencapai 18,38 hari, serta intensitas serangan penyakit terendah dan paling konsisten, yaitu 17,15 pada 35 HSI. Tidak hanya menekan penyakit, konsorsium TBP juga meningkatkan aspek agronomis secara signifikan, dibuktikan dengan tinggi tanaman tertinggi 58,54 cm, jumlah daun tertinggi 62,77, dan bobot basah buah tertinggi 136,00 gram. Secara keseluruhan, disimpulkan bahwa konsorsium *Trichoderma* sp., *Bacillus* sp., dan *Pseudomonad fluorescent* yang dibiakkan pada media alternatif kedelai memiliki potensi tinggi sebagai agens biokontrol untuk menekan penyakit layu bakteri *R. solanacearum* sekaligus meningkatkan pertumbuhan dan produksi tanaman tomat.

Kata Kunci : *Bacillus* sp., Pengendalian Hayati, *Pseudomonad fluorescent*, *Ralstonia solanacearum*, *Solanum lycopersicum*, *Trichoderma* sp.

ABSTRACT

Bacterial wilt disease caused by Ralstonia solanacearum is a major constraint in tomato (Solanum lycopersicum L.) cultivation in Indonesia, causing losses of up to 100%. Biological control using antagonistic microbes such as Bacillus sp., fluorescent Pseudomonad, and Trichoderma sp. is an environmentally friendly alternative. This study aimed to test the potential of a consortium of these three microbes in a soybean alternative medium against R. solanacearum and tomato plant growth. The research was conducted in the Screenhouse and Plant Health Laboratory of UPN "Veteran" East Java from November 2024 to July 2025 using In Vitro and In Vivo testing methods with a Completely Randomized Design (CRD). In Vitro testing included compatibility and antagonism, while In Vivo testing observed the incubation period, disease intensity, and agronomic aspects. The In Vitro test results showed that the consortium of Trichoderma sp., Bacillus sp., and fluorescent Pseudomonad (TBP) was compatible in the soybean alternative medium (Compatibility Index 0.873) and had the highest inhibitory effect against R. solanacearum with a clear zone area of 17.2 mm, which was categorized as strong. The inhibition mechanism was classified as bacteriostatic. Furthermore, the In Vivo test results confirmed the optimal effectiveness of the TBP consortium. This consortium treatment provided the longest bacterial wilt disease incubation period, reaching 18.38 days, as well as the lowest and most consistent disease incidence, at 17.15 at 35 DAI (Days After Inoculation). In addition to suppressing the disease, the TBP consortium also significantly improved the agronomic aspects, demonstrated by the highest plant height of 58.54cm, the highest number of leaves of 62.77, and the highest fruit fresh weight of 136.00 grams. In conclusion, the consortium of Trichoderma sp., Bacillus sp., and fluorescent Pseudomonad cultured on a soybean alternative medium has high potential as a biocontrol agent to suppress R. solanacearum bacterial wilt disease while increasing the growth and production of tomato plants.

Keywords : *Bacillus sp., Biocontrol, Fluorescent Pseudomonad, Ralstonia solanacearum, Solanum lycopersicum, Trichoderma sp.*

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