

## ABSTRAK

### UJI EFEKTIVITAS *AERATED COMPOST TEA* SERAT BROMELAIN YANG DIINDUKSI INOKULUM *Trichoderma* sp. (Bio GGP 2) TERHADAP PENEKANAN PATOGEN *Xanthomonas campestris* pv. *campestris* DAN PERTUMBUHAN TANAMAN BUNCIS (*Phaseolus vulgaris* L.)

Oleh

SESTI EDINA MERISCA

Industri nanas di Indonesia mengalami perkembangan yang cukup tinggi. Dalam kegiatan produksinya dihasilkan limbah produk nanas seperti serat bromelain yang dapat dimanfaatkan sebagai bahan kompos. Kompos adalah hasil penguraian bahan organik yang telah mengalami pelapukan. Untuk mempercepat pengomposan diperlukan penambahan inokulum sebagai induser, salah satunya inokulum *Trichoderma* sp. yang bersifat lignoselulolitik. Pemanfaatan *Trichoderma* sp. dalam proses pengomposan dan agen pengendali hayati, mendukung penemuan teknologi baru yang ramah lingkungan, yaitu *Aerated Compost Tea* (ACT) yang diketahui memiliki manfaat ganda untuk tanaman, yaitu dapat menekan pertumbuhan patogen serta meningkatkan pertumbuhan tanaman. Penelitian ini bertujuan untuk mengetahui kualitas kimia, biologi, serta efektivitas ACT serat bromelain yang diinduksi inokulum *Trichoderma* sp. (Bio GGP 2) terhadap penekanan pertumbuhan *X. campestris* pv. *campestris* dan pertumbuhan tanaman buncis yang diinfeksi *X. campestris* pv. *campestris*. Penelitian ini dilaksanakan pada bulan Februari 2022 sampai Mei 2022 di Laboratorium Mikrobiologi FMIPA Universitas Lampung. Penelitian ini terdiri dari 3 tahapan pengujian ACT serat bromelain, yaitu uji kualitas kimia dan biologi, uji *in vitro*, dan uji *in vivo* ACT serat bromelain terhadap penekanan pertumbuhan *X. campestris* pv. *campestris* dan pertumbuhan tanaman buncis. Pengujian *in vitro* dan *in vivo* ACT serat bromelain menggunakan RAL 1 faktor, dengan faktor perlakuan adalah ACT serat bromelain menggunakan kompos : air yaitu, 1:3; 1:4; dan 1:5 dengan waktu aerasi selama 72 jam. Data kualitatif hasil uji kualitas dan uji *in vitro* ACT disajikan dalam bentuk deskriptif. Data kuantitatif hasil uji *in vivo* ACT serat bromelain dianalisis ragam menggunakan ANOVA. Perbedaan antar perlakuan dilakukan uji *Tukey* pada taraf nyata 5%. Hasil penelitian menunjukkan bahwa ACT serat

bromelain yang diinduksi inokulum *Trichoderma* sp. (Bio GGP 2) memiliki kualitas kimia dan biologi yang lebih tinggi dibandingkan perlakuan kontrol, dengan hasil tertinggi ditunjukkan perlakuan P1 yaitu 1 : 3 (100 gram kompos : 300 mL air). Data hasil penelitian menunjukkan bahwa ACT serat bromelain mampu menekan pertumbuhan *X. campestris* pv. *campestris* dan meningkatkan pertumbuhan tanaman buncis yang diinfeksi *X. campestris* pv. *campestris*. Perbandingan konsentrasi kompos : air yang terbaik ditunjukkan pada perlakuan P1, yaitu 1 : 3 (100 gram kompos : 300 mL air).

Kata Kunci: *Aerated Compost Tea* (ACT), *Phaseolus vulgaris* L.,  
*Trichoderma* sp., *Xanthomonas campestris* pv. *campestris*

## ABSTRACT

### EFFECTIVENESS TEST OF AERATED COMPOST TEA BROMELAIN FIBER INDUCED BY INOCULUM *Trichoderma* sp. (BIO GGP 2) AGAINST REPRESSION OF THE PATHOGEN *Xanthomonas campestris* pv. *campestris* AND GROWTH OF BEAN (*Phaseolus vulgaris* L.)

By

SESTI EDINA MERISCA

The pineapple industry in Indonesia is experiencing a fairly high development. In the production of pineapple waste products such as bromelain fiber which can be used as compost material. Compost is the result of decomposition of organic matter that has undergone weathering. To encourage composting, it is necessary to add inoculum as inducer, one of which is *Trichoderma* sp. which is lignocellulolytic. Utilization of *Trichoderma* sp. in the composting process and biological control agents, supports the discovery of new environmentally friendly technology, namely Aerated Compost Tea (ACT) which is known to have dual benefits for plants, namely to suppress the growth of pathogens and increase plant growth. This study aims to determine the chemical quality, biology, and effectiveness of bromelain fiber ACT induced by *Trichoderma* sp. (Bio GGP 2) against growth suppression of *X. campestris* pv. *campestris* and the growth of chickpea plants infected with *X. campestris* pv. *campestris*. This research was carried out from February 2022 to May 2022 at the Laboratory of Microbiology, FMIPA, University of Lampung. This study consisted of 3 stages of bromelain fiber ACT testing, namely chemical and biological quality tests, in vitro tests, and in vivo bromelain fiber ACT tests on growth suppression of *X. campestris* pv.

*campestris* and growth of chickpeas. In vitro and in vivo testing of bromelain fiber ACT using 1 factor RAL, with treatment factor is bromelain fiber ACT using compost: water, namely, 1:3; 1:4; and 1:5 with aeration time of 72 hours. Qualitative data from the quality test and in vitro ACT test results are presented in descriptive form. Quantitative data from bromelain fiber ACT in vivo test results were analyzed for variance using ANOVA. The difference between treatments was carried out by the Tukey test at a 5% significance level. The results showed that the bromelain fiber ACT induced by *Trichoderma* sp. (Bio GGP 2) has a higher chemical and biological quality than the treatment, with the results shown by treatment P1 which is 1: 3 (100 grams of compost: 300 mL of water). The research data showed that bromelain fiber ACT was able to suppress the growth of *X. campestris* pv. *campestris* and increased the growth of chickpea plants infected with *X. campestris* pv. *campestris*. Comparison of the best concentration of compost : water was shown in treatment P1, which was 1: 3 (100 grams of compost: 300 mL of water).

Keywords: *Aerated Compost Tea* (ACT), *Phaseolus vulgaris* L., *Trichoderma* sp., *Xanthomonas campestris* pv. *campestris*