

## ABSTRAK

### STUDI PEMBERIAN *AERATED COMPOST TEA* SERAT BROMELAIN YANG DIINDUKSI INOKULUM *Aspergillus* sp. (Bio GGP 3) TERHADAP PENEKANAN *Phytophthora* sp. DAN PERTUMBUHAN TANAMAN PAKCOY (*Brassica rapa* L.)

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Serat limbah nanas (*Ananas comosus* (L.) Merr.) merupakan bagian yang sulit terurai sehingga diperlukan induser yang mampu mendegradasi selulosa pada serat nanas dengan baik. Enzim selulase yang dihasilkan fungi *Aspergillus* sp. mampu mempercepat proses penguraian dan mendukung perkembangan teknologi pengomposan yang ramah lingkungan, salah satunya adalah *Aerated Compost Tea* (ACT). ACT selain meningkatkan ketersediaan unsur hara tanah secara langsung, juga berfungsi sebagai biokontrol terhadap hama dan penyakit tanaman. Pakcoy (*Brassica rapa* L.) yang digunakan sebagai tanaman uji merupakan tanaman sayuran yang rentan terhadap infeksi penyakit busuk daun yang disebabkan oleh jamur *Phytophthora* sp. Tujuan penelitian ini adalah mengetahui pengaruh ACT serat bromelain yang diinduksi inokulum *Aspergillus* sp. terhadap pengendalian *Phytophthora* sp. pada tanaman pakcoy sekaligus pertumbuhan pakcoy. Penelitian ini dilaksanakan pada bulan Maret sampai Juni 2022 di Laboratorium Mikrobiologi, Fakultas Matematika dan Ilmu Pengetahuan Alam, Universitas Lampung. Penelitian ini terdiri dari 3 tahapan, pertama, analisis kimia dan biologi ACT serat bromelain. Kedua, uji *in vitro* ACT serat bromelain. Ketiga, uji *in vivo* ACT serat bromelain. Pengujian *in vitro* dan *in vivo* ACT serat bromelain dilakukan menggunakan Rancangan Acak Lengkap (RAL) 1 faktor, yaitu faktor ACT serat bromelain yang terdiri dari tiga level perlakuan komposisi kompos : air yaitu, 1:3; 1:4; dan 1:5 dengan waktu aerasi selama 48 jam. Data kualitas ACT (kimia dan biologi) dan uji *in vitro* dianalisis secara deskriptif. Data kuantitatif hasil uji *in vivo* dianalisis varian (ANOVA) dan apabila terdapat perbedaan nyata, analisis dilanjutkan dengan uji *Tukey* pada taraf nyata 5% untuk mengetahui perbedaan antar perlakuan. Hasil penelitian menunjukkan bahwa ACT serat bromelain yang diinduksi inokulum *Aspergillus* sp. (Bio GGP 3) memiliki kualitas kimia dan biologi yang lebih tinggi

dibandingkan perlakuan kontrol, dengan hasil tertinggi diperoleh dari perlakuan P1 yaitu 1 : 3 (100 gram kompos : 300 mL air). Hasil uji *in vitro* dan *in vivo* menunjukkan bahwa ACT serat bromelain dapat menghambat pertumbuhan *Phytophthora* sp. dan meningkatkan pertumbuhan tanaman pakcoy yang diinfeksi *Phytophthora* sp.. Perbandingan level perlakuan kompos : air terbaik pada semua parameter pengamatan morfologi dan fisiologi ditunjukkan oleh perlakuan P1, yaitu 1 : 3 (100 gram kompos : 300 mL air).

Kata Kunci: *Ananas comosus* (L.) Merr., *Aspergillus* sp., *Aerated Compost Tea*, *Brassica rapa* L., *Phytophthora* sp.

## ABSTRACT

### STUDY OF AERATED COMPOST TEA BROMELAIN FIBER INDUCED BY INOCULUM *Aspergillus* sp. (Bio GGP 3) AGAINST REPRESSION OF *Phytophthora* sp. AND GROWTH OF PAKCOY (*Brassica rapa* L.)

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(*Ananas comosus* (L.) Merr.) waste fiber is a part the difficult to decompose, so an inducer is needed that is able to degrade cellulose in pineapple fiber properly. The cellulase enzyme produced by the fungus *Aspergillus* sp. able to speed up the decomposition process and support the development of environmentally friendly composting technology, one of which is *Aerated Compost Tea* (ACT). ACT besides increasing the availability of soil nutrients directly, also functions as a biocontrol against plant pests and diseases. Pakcoy (*Brassica rapa* L.) used as the test plant is a vegetable that is susceptible to late blight infection caused by the fungus *Phytophthora* sp. The purpose of this study was to determine the effect of bromelain fiber ACT induced by *Aspergillus* sp. on the control of *Phytophthora* sp. in pakcoy plants as well as pakcoy growth. This research was conducted from March to June 2022 at the Microbiology Laboratory, Faculty of Mathematics and Natural Sciences, University of Lampung. This research consisted of 3 stages, first, chemical and biological analysis of bromelain fiber ACT. Second, the bromelain fiber ACT *in vitro* test. Third, the bromelain fiber ACT *in vivo* test. Testing *in vitro* and *in vivo* ACT of bromelain fiber was performed using Completely Randomized Design (RAL) 1 factor, namely the bromelain fiber ACT factor which consists of three treatment levels of compost composition : water, which is, 1:3; 1:4; and 1:5 with time aeration during 48 hours. ACT quality data (chemical and biological) and test *in vitro* analyzed descriptively. Quantitative data results test *in vivo* analysis of variance (ANOVA) and if there is a significant difference, the analysis is continued with the *Tukey test* at 5% significance level to determine differences between treatments. Results study show that ACT induced bromelain fiber inoculum *Aspergillus* sp. (Bio GGP 3) have quality chemical and more biology tall compared treatment control, with results highest obtained from treatment P1, which is 1 : 3 (100 grams of compost : 300 mL of water). Results test *in vitro* and *in vivo* show that bromelain fiber ACT can hinder growth *Phytophthora* sp. and increase growth plant infected pakcoy *Phytophthora* sp.

Comparison treatment level compost : water is best on all observation parameters morphology and physiology showed by treatment P1, which is 1 : 3 (100 grams of compost : 300 mL of water).

Keywords: *Ananas comosus* (L.) Merr., *Aspergillus* sp., *Aerated Compost Tea*, *Brassica rapa* L., *Phytophthora* sp.