APLIKASI KOMPOSIT BIOPESTISIDA EKSTRAK DAUN KEMANGI *(Ocimum basilicum L.)* DENGAN BIONUTRIEN S-367B PADA TANAMAN BROKOLI (*Brassica oleracea var. italica*)

SKRIPSI

diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Sarjana Sains
Program Studi Kimia

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Skripsi ini diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Sains pada Program Studi Kimia Fakultas Pendidikan Matematikan dan Ilmu Pengetahuan Alam

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KATA PENGANTAR

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Skripsi ini disusun untuk memenuhi salah satu syarat memperoleh gelar Sarjana Sains pada Program Studi Kimia, Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam Universitas Pendidikan Indonesia. Penelitian dari skripsi ini dilatarbelakangi oleh pentingnya mencari alternatif yang ramah lingkungan untuk membasmi hama dan penyakit pada tanaman sehingga secara ekonomi tidak akan merugikan petani dan tidak akan mencemari lingkungan.

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ABSTRAK

Pengendalian hama yang ramah lingkungan dan aman bagi kesehatan penting dalam budidaya sayuran untuk menjaga produktivitas dan keamanan pangan. Salah satu upaya yang dilakukan adalah menggunakan pestisida alami yang berasal dari tumbuhan. Daun kemangi *(Ocimum basilicum L.)* berpotensi sebagai biopestisida karena mengandung banyak senyawa bioaktif yang memiliki aktivitas insektisida, antifungi, antimikroba, dan antioksidan. Penelitian ini bertujuan untuk mengetahui pengaruh aplikasi komposit biopestisida ekstrak daun kemangi dengan Bionutrien S-367B pada tanaman brokoli terhadap pertumbuhan tinggi, panjang daun, lebar daun, laju pertumbuhan, dan massa hasil panen brokoli. Tahapan penelitian ini meliputi tahap ekstraksi dari daun kemangi, analisis ekstrak daun kemangi seperti uji fitokimia, total fenolik dengan spektrofotometer UV-Vis dan karakterisasi gugus fungsi dengan spektrofotometer FTIR, serta tahap aplikasi komposit biopestisida ekstrak daun kemangi dengan bionutrien S-367B, dan pengamatan pertumbuhan brokoli. Pada tahap aplikasi, tanaman brokoli diaplikasikan komposit biopestisida ekstrak daun kemangi dengan bionutrien S-367B dosis 5 mL; 7,5 mL; dan 10 mL dalam 1000 mL air. Hasil penelitian uji fitokimia menunjukkan ekstrak daun kemangi terdapat senyawa alkaloid, flavonoid, saponin, dan tanin, serta kadar total fenolik sebesar 27,624 ± 1,468 mg GAE/g, dan karakterisasi gugus fungsi menunjukkan bahwa senyawa aktif yang terkandung di dalamnya merupakan senyawa turunan fenol dan non-fenolik. Hasil analisis pertumbuhan tinggi (33,85 cm), panjang daun (38,33 cm), dan konstanta laju pertumbuhan brokoli (0,4862 minggu^{-1}) terbesar diperoleh perlakuan komposit biopestisida ekstrak daun kemangi dengan bionutrien S-367B 50% dosis 7,5 mL/L. Sedangkan lebar daun terbesar diperoleh perlakuan komposit biopestisida ekstrak daun kemangi dengan bionutrien S-367B 50% dosis 10 mL/L sebesar 23,50 cm, serta massa hasil panen brokoli terbesar diperoleh perlakuan komposit biopestisida ekstrak daun kemangi dengan bionutrien S-367B 50% dosis 7,5 mL/L, yaitu sebesar 921,33 ± 64,89 gram.

Kata kunci: Daun kemangi, bionutrien S-367B, brokoli, laju pertumbuhan, massa panen.

ABSTRACT

Environmentally friendly and health-safe pest control is important in vegetable cultivation to maintain productivity and food safety. One approach is the use of plant-derived pesticides. Basil leaves (Ocimum basilicum L.) have potential as a biopesticide because they contain many bioactive compounds with insecticidal, antifungal, antimicrobial, and antioxidant activities. This study aimed to determine the effect of applying a biopesticide composite of basil leaf extract with bionutrien S-367B on broccoli plants with respect to plant height, leaf length, leaf width, growth rate, and harvested mass of broccoli. The research stages include extraction of basil leaves. Analysis of the basil leaf extract such as phytochemical screening, total phenolics by UV-Vis spectrophotometer, and functional group characterization by FTIR spectroscopy, as well as aplication of the basil leaf extract biopesticide composite with bionutrien S-367B, and observation of broccoli growth. Application used biopesticide composite of basil leaf extract with bionutrien S-367B at doses of 5 mL; 7,5 mL; and 10 mL in 1000 mL of water. Phytochemical test detected alkaloids, flavonoids, saponins and tannins, with a total phenolic content of 27,624 ± 1,468 mg GAE/g, and FTIR indicated that the active compounds present are phenolic derivatives and non-phenolic compounds. Analysis results for plant height (33,85 cm), leaf length (38,33 cm), and growth rate constant of broccoli (0,4862 week^{-1}) were highest in the treatment of the biopesticide composite of basil leaf extract with 50% bionutrien S-367B at a dose 7,5 mL/L^{-1}. Meanwhile, the largest leaf width was obtained in the treatment of the biopesticide composite of basil leaf extract with 50% bionutrien S-367B at 10 mL/L, measuring 23,50 cm, and the highest harvested mass of broccoli was obtained in the treatment of the biopesticide composite of basil leaf extract with 50% bionutrien S-367B at a dose 7,5 mL/L, which was 921,33 ± 64,89 g.

Keywords: *Basil leaf, bionutrien S-367B, broccoli, growth rate, harvest mass*.

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