

**APLIKASI KOMPOSIT BIOPESTISIDA EKSTRAK DAUN KELOR  
(*Moringa oleifera* L.) DENGAN BIONUTRIEN S-367B PADA TANAMAN  
BROKOLI (*Brassica oleracea* var. *italica*)**



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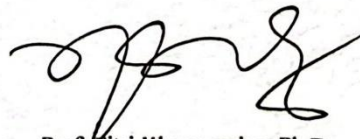


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## ABSTRAK

Pengendalian hama yang ramah lingkungan dan aman bagi kesehatan sangat perlu dilakukan. Salah satu upaya tersebut adalah penggunaan pestisida berbahan alami yang berasal dari tumbuhan atau biopestisida. Daun kelor memiliki potensi besar untuk digunakan sebagai biopestisida karena mengandung senyawa aktif yang berpotensi sebagai zat antibakteri. Penelitian ini bertujuan untuk mengetahui pengaruh ekstrak daun kelor (*Moringa oleifera*. L) dengan Bionutrien S-367B yang diterapkan pada tanaman brokoli (*Brassica oleracea*. L) terhadap pertumbuhan, laju pertumbuhan, dan hasil panen pada brokoli. Tahapan penelitian ini meliputi yaitu tahap ekstraksi dari daun kelor, tahap analisis ekstrak daun kelor meliputi uji fitokimia, uji total fenolik, dan karakterisasi gugus fungsi dengan spektrofotometri FTIR, tahap aplikasi campuran ekstrak daun kelor dan bionutrien S-367B, tahap pengamatan pertumbuhan tanaman brokoli. Pada tahap aplikasi, bagi tanaman kelompok perlakuan diaplikasikan campuran ekstrak daun kelor dan bionutrien S-367B dosis 5 mL; 7,5 mL; dan 10 mL dalam 1000 mL. Hasil penelitian menunjukkan bahwa pada uji fitokimia menunjukkan hasil positif pada uji alkaloid, flavonoid, saponin, dan tanin. Total fenol pada ekstrak daun kelor mengandung sebesar  $20,079 \pm 0,701$  mg GAE/g. Karakterisasi gugus fungsi ekstrak daun kelor menunjukkan bahwa senyawa aktif yang terkandung di dalamnya merupakan senyawa turunan fenol dan non-fenolik. Pertumbuhan panjang daun dan laju pertumbuhan tanaman brokoli tertinggi diperoleh oleh kelompok perlakuan 75% dengan dosis 5 mL/L secara berurutan yaitu 37 cm untuk panjang dan  $0,5495 \text{ minggu}^{-1}$  untuk konstanta laju pertumbuhan dibandingkan kontrol pelarut masing-masing sebesar 29,33 cm untuk panjang dan  $0,2604 \text{ minggu}^{-1}$  untuk konstanta laju pertumbuhan. Lebar daun brokoli tertinggi diperoleh oleh kelompok perlakuan 50% dengan dosis 5 mL/L sebesar 22,33 cm dibandingkan kontrol sebesar 19,33 cm. Tinggi tanaman terbesar diperoleh oleh kelompok perlakuan 75% dengan dosis 10 mL/L sebesar 35,67 cm dibandingkan dengan kontrol pelarut sebesar 24 cm. Massa hasil panen tanaman brokoli tertinggi diperoleh oleh kelompok perlakuan 75% dengan dosis 5 mL/L yaitu sebesar  $913,33 \pm 45,21$  gram dibandingkan dengan kontrol pelarut sebesar  $767,67 \pm 29,95$ .

**Kata kunci:** Ekstrak daun kelor, Bionutrien S-367B, Tanaman brokoli, Laju pertumbuhan, Hasil panen.

## ABSTRACT

*Pest control that is environmentally friendly and safe for health is very necessary. One such effort is the use of natural pesticides derived from plants or biopesticides. Moringa leaves have great potential to be used as a biopesticide because they contain active compounds that have the potential as antibacterial substances. This study aims to determine the effect of moringa leaf extract (*Moringa oleifera*. L) with Bionutrien S-367B applied to broccoli plants (*Brassica oleracea* var. *Italica*) on growth, growth rate, and yield on broccoli. The stages of this study include the extraction stage of moringa leaves, the analysis stage of moringa leaf extracts including phytochemical tests, total phenolic tests, and characterization of functional groups with FTIR spectrophotometry, the application stage of a mixture of moringa leaf extracts and S-367B bionutrients, the observation stage of the growth of broccoli plants. In the application stage, for the treatment group plants were applied a mixture of moringa leaf extract and bionutrient S-367B in doses of 5 mL; 7.5 mL; and 10 mL in 1000 mL. The results showed that the phytochemical test showed positive results in the alkaloid, flavonoid, saponin, and tannin tests. Total phenol in moringa leaf extract contains  $20,079 \pm 0,701$  mg GAE/g. Characterization of the functional groups of moringa leaf extract shows that the active compounds contained in it are phenol and non-phenolic derivative compounds. The greatest leaf length and growth rate of broccoli were obtained by a mixture of moringa leaf extract and bionutrient S-367B in the 75% at a dose of 5 mL/L sequentially, with a leaf length 37 cm and a growth rate constant of  $0,5495 \text{ week}^{-1}$  compared to solvent control of 29,33 cm for leaf length and  $0,5495 \text{ week}^{-1}$  for growth rate constant. The widest leaf was obtained from the 50% treatment group at a dose of 5 mL/L, reaching 22,33 cm compared to 19,33 cm in the solvent control. The tallest plant height group was obtained in the 75% treatment group at a dose of 10 mL/L, measuring 35,67 cm compared to 24 cm in the solvent control. The highest mass of broccoli plant yield was obtained by the treatment group 75% at a dose of 5 mL/L which amounted to  $913.33 \pm 45.21$  grams compared to the solvent control of  $767,67 \pm 29.95$  grams.*

**Keywords:** *Moringa leaf extract, Bionutrien S-367B, Broccoli plants, Growth rate, Yield.*

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