

BIOKONTROL ULAT BAWANG MERAH (*Spodoptera exigua* Hübner, 1808) MENGGUNAKAN SENYAWA BIOAKTIF DAUN PANDAN WANGI (*Pandanus amaryllifolius* Roxb.)

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Intisari

Spodoptera exigua Hübner termasuk serangga hama yang dikenal sangat merugikan oleh para petani di dunia. Namun, pengaplikasian insektisida sintetik dapat menimbulkan dampak negatif terutama terkait resistensi, resurgensi dan residu. Bioinsektisida mulai banyak dikaji sebagai alternatif pengganti insektisida sintetik karena lebih aman dan ramah lingkungan. Penelitian ini bertujuan untuk meneliti efektivitas ekstrak kasar dan fraksi *Pandanus amaryllifolius* sebagai bioinsektisida *Spodoptera exigua* serta mengungkap senyawa aktif utamanya. Proses ekstraksi dilakukan dengan cara maserasi menggunakan metanol 80%. Ekstrak kasar kemudian difraksinasi dengan kromatografi kolom vakum. Melalui fraksinasi diperoleh enam jenis fraksi yang selanjutnya digunakan dalam uji fraksi. Ekstrak kasar dan fraksi potensial yang diperoleh kemudian dilakukan analisis kandungan senyawa utamanya menggunakan teknik *gas chromatography–mass spectrometry* (GC-MS). Uji histokimia dilakukan untuk mendeteksi kandungan golongan senyawa pada jaringan daun pandan wangi. Hasil uji insektisida terhadap ekstrak kasar diperoleh simpulan, yaitu: metode racun kontak ($LC_{90} = 18,51\%$) lebih toksik daripada racun perut ($LC_{90} = 31,99\%$); ekstrak kasar berpengaruh signifikan terhadap daya hambat makan larva; serta terdapat penurunan rerata berat larva yang signifikan dengan metode racun perut sedangkan pada racun kontak terdapat penurunan berat larva meskipun tidak signifikan. Hasil uji fraksi potensial diperoleh simpulan, yaitu: Fraksi 2 adalah fraksi terbaik dalam uji mortalitas dengan $LC_{90} = 3,56\%$ (racun kontak) dan $LC_{90} = 11,46\%$ (racun perut); fraksi 3 adalah fraksi terbaik dalam uji daya hambat makan; serta racun kontak menyebabkan penurunan berat larva yang signifikan, sementara racun perut menyebabkan penurunan berat larva meskipun tidak signifikan. Hasil uji histokimia menunjukkan reaksi positif terhadap kandungan alkaloid, flavonoid, fenol, tannin dan terpenoid. Senyawa bioaktif potensial pada daun pandan wangi sebagai kandidat insektisida adalah 9,12,15-Octadecatrien-1-ol; phytol, 9,12-Octadecadienoic acid (Z,Z)-; dan 9,12- Hexadecadienoic acid, methyl ester.

Kata kunci: Bioinsektisida, *Pandanus amaryllifolius*, *Spodoptera exigua*, racun perut, racun kontak

BIOCONTROL OF SHALLOT PEST (*Spodoptera exigua* Hübner, 1808) USING BIOACTIVE COMPOUNDS OF PANDAN WANGI LEAVES (*Pandanus amaryllifolius* Roxb.)

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Abstract

Spodoptera exigua Hübner is an insect pest that is known to be very detrimental to farmers in the world. However, the application of synthetic insecticides causes negative impacts, especially regarding resistance, resurgence, and residue. Bioinsecticides are starting to be widely studied as an alternative to synthetic insecticides because they are safer and environmentally friendly. This research aims to examine the effectiveness of crude extracts and fractions of *Pandanus amaryllifolius* as bioinsecticides for *Spodoptera exigua* and to reveal the main active compounds. The extraction process was carried out by maceration using 80% methanol. The crude extract was then fractionated by vacuum column chromatography. Through fractionation, six types of fractions are obtained which are then used in fraction tests. The crude extract and potential fraction obtained were then analyzed for the main compound content using the gas chromatography–mass spectrometry (GC-MS) technique. Histochemical tests were carried out to detect the content of compound groups in pandan wangi leaf tissue. The results of insecticide tests on crude extracts concluded that; the contact poison method ($LC_{90} = 18.51\%$) was more toxic than stomach poison ($LC_{90} = 31.99\%$); the crude extract had a significant effect on larval feeding inhibition; and there was a significant decrease in the average weight of larvae with the stomach poison method, while with contact poison the reduction in larval weight was not significant. The results of the potential fraction test concluded that; fraction 2 is the best fraction in mortality test with $LC_{90} = 3.56\%$ (contact poison) and $LC_{90} = 11.46\%$ (stomach poison); fraction 3 is the best fraction in food inhibition test; as well as contact poison causes a significant decrease in larval weight, while stomach poison causes an insignificant decrease in larval weight. Histochemical test results showed a positive reaction to the content of alkaloids, flavonoids, phenols, tannins and terpenoids. The potential bioactive compound as an insecticide candidate found in the two most potential fractions was 9,12,15-Octadecatrien-1-ol; phytol; 9,12-Octadecadienoic acid (Z,Z)-; and 9,12- Hexadecadienoic acid, methyl ester.

Keywords: Bioinsecticide, *Pandanus amaryllifolius*, *Spodoptera exigua*, Contact poison, Stomach poison