

Zuhrotun Nisa. (180311100073). Uji Toksisitas Formula Cair Berbahan *Serratia* sp. Sebagai Pengendali *Spodoptera frugiperda* J. E. Smith. Dibimbing Oleh: Dr. Ir. Gita Pawana, M. Si dan Dr. Ir. H. Ahmad Arsyadmunir, M.Si

ABSTRAK

Kebutuhan komoditas jagung yang meningkat di pasar tidak diimbangi dengan produktivitasnya dilapang. Salah satu pembatas peningkatan produksi tersebut adalah keberadaan hama utama yang menyerang jagung yaitu ulat penggerek pucuk jagung *Spodoptera frugiperda* J. E. Smith. Penggunaan beberapa pestisida sintetik dalam pengendalian hama tersebut menunjukkan gejala resistensi. Bakteri *Serratia* dilaporkan mampu mensekresikan beberapa senyawa sekunder dan enzim hidrolitik. Selain itu bakteri juga memproduksi prodigiosin yang bersifat antifungi, antibakteri, algicidal, antiprotozoal, aktivitas antimalaria, immunosuppressif dan aktivitas antikanker. Pemanfaatan protein insektisidal dari bakteri entomopatogen *Serratia* berpotensi dalam menekan pertumbuhan serangga hama sehingga memungkinkan bakteri ini dijadikan bioinsektisida. Bioinsektisida diformulasikan dalam bentuk cair dengan tujuan untuk menjaga viabilitas bahan aktifnya dengan menghindari dari proses pengeringan dengan suhu tinggi. Penelitian dilaksanakan pada bulan Januari 2022 sampai Mei 2022 di Laboratorium Lingkungan Agroekoteknologi Universitas Trunojoyo Madura. Formula cair bioinsektisida berbahan aktif *S. marcescens* dan *S. nematodiphila* dinyatakan efektif mematikan larva *S. frugiperda* dengan nilai mortalitas pada konsentrasi tertinggi sebesar 97,5% dan 92,5%. Nilai $LC_{50,90}$ formula cair bioinsektisida berbahan aktif *S. marcescens* sebesar 1,29% dan 7,56%. $LC_{50,90}$ formula cair bioinsektisida berbahan aktif *S. nematodiphila* sebesar 1,55% dan 12,15%. Nilai $LT_{50,90}$ semakin rendah pada konsentrasi yang tinggi. Tingkat kesintasan larva pada konsentrasi *sublethal* semakin menurun, dilihat dari hasil pengamatan yakni periode waktu larva menjadi pupa, periode waktu pupa menjadi imago, persentase larva menjadi pupa dan imago, serta rata-rata bobot pupa yang semakin rendah pada konsentrasi yang tinggi. Hal ini diduga karena aktivitas bakteri yang mampu mensekresikan senyawa sekunder maupun enzim hidrolitik, seperti prodigiosin, serralyisin, enzim kitinase, enzim protease, karbohidrase serta enzim nuklease.

Kata kunci : *Serratia*, *Spodoptera frugiperda*, Toksisitas.

Zuhrotun Nisa. (180311100073). Toxicity Test of Liquid Formula Made From *Serratia* sp. As Controller of *Spodoptera frugiperda* J. E. Smith. Supervised By: Dr. Ir. Gita Pawana, M. Si and Dr. Ir. H. Ahmad Arsyadmunir, M.Si

ABSTRACT

The increasing demand for corn in the market is not matched by its productivity in the field. One of the limiting factors for the increase in production is the presence of the main pest that attacks corn, namely the corn shoot borer *Spodoptera frugiperda* J. E. Smith. The use of several synthetic pesticides in controlling these pests shows signs of resistance. *Serratia* bacteria are reported to be able to secrete several secondary compounds and hydrolytic enzymes. In addition, bacteria also produce prodigiosin which has antifungal, antibacterial, algicidal, antiprotozoal, antimalarial, immunosuppressive and anticancer activities. The use of insecticidal protein from the entomopathogenic bacteria *Serratia* has the potential to suppress the growth of insect pests, thus enabling these bacteria to be used as bioinsecticides. Bioinsecticides are formulated in liquid form with the aim of maintaining the viability of the active ingredients by avoiding the drying process at high temperatures. The research was conducted from January 2022 to May 2022 at the Environmental Laboratory of Agroecotechnology, Trunojoyo University, Madura. The bioinsecticide liquid formula with active ingredients *S. marcescens* and *S. nematodiphila* was declared effective in killing *S. frugiperda* larvae with mortality values at the highest concentrations of 97.5% and 92.5%, respectively. The $LC_{50.90}$ values for the liquid bioinsecticide formula with the active ingredient *S. marcescens* were 1.29% and 7.56%, respectively. $LC_{50.90}$ liquid formula of bioinsecticide with active ingredients of *S. nematodiphila* at 1.55% and 12.15%, respectively. The value of $LT_{50.90}$ gets lower at high concentrations. The survival rate of larvae at sublethal concentrations decreased, as seen from the observations, namely the time period for larvae to pupa, the time period for pupae to become imago, the percentage of larvae to pupae and imago, and the lower average pupal weight at high concentrations. This is presumably due to the activity of bacteria capable of secreting secondary compounds and hydrolytic enzymes, such as prodigiosin, serralyisin, chitinase enzymes, protease enzymes, carbohydrases and nuclease enzymes.

Key words : *Serratia*, *Spodoptera frugiperda*, Toxicity.