

## **Toksisitas Metabolit Sekunder *Streptomyces* sp. GMY01 Terhadap Larva Penggerek Batang Jagung *Ostrinia furnacalis***

### **INTISARI**

Mikrobia, khususnya Aktinobakteria, dikenal sebagai organisme yang mampu menghasilkan beragam metabolit sekunder. *Streptomyces* sp. GMY01, isolat Aktinobakteria laut, mampu menghasilkan beragam metabolit sekunder berdasarkan analisa genom. Namun kenyataan di laboratorium menunjukkan bakteri tersebut hanya mampu memproduksi empat macam metabolit berbeda, sehingga masih banyak kemungkinan metabolit lain yang belum diketahui potensinya. *Co-culture* adalah salah satu metode yang paling sering digunakan untuk meningkatkan produksi dan potensi metabolit sekunder mikrobia. Penelitian ini dilakukan untuk menguji toksisitas metabolit sekunder yang dihasilkan oleh *co-culture* antara *Streptomyces* sp. GMY01 dan *Pseudomonas putida* KT2440, terhadap larva *Ostrinia furnacalis*. *Co-culture* dibuat dengan menggunakan media TSB. Kemudian setelah 10 hari inkubasi dilakukan ekstraksi untuk mendapatkan fraksi heksan, fraksi metanol, fraksi etil asetat dan fraksi air. Setiap fraksi diuji toksisitasnya terhadap larva *Ostrinia furnacalis*, dan fraksi air menunjukkan nilai mortalitas larva paling tinggi diantara fraksi lainnya. Kemudian fraksi ini dianalisa menggunakan TLC, HPLC, dan GC-MS. Berdasarkan hasil analisa TLC, metabolit sekunder hasil *co-culture* merupakan gabungan dari metabolit sekunder yang dihasilkan masing-masing mikrobia penyusunnya. Sedangkan berdasarkan analisa HPLC dan GC-MS, metabolit sekunder yang dihasilkan oleh *co-culture* memiliki tingkat keragaman lebih tinggi dibandingkan metabolit hasil kultur tunggal mikrobia penyusunnya. Dengan demikian dapat disimpulkan bahwa peningkatan keragaman metabolit sekunder hasil *co-culture* diduga bertanggungjawab pada peningkatan toksisitas metabolit terhadap larva *O. furnacalis*.

**Kata Kunci:** *Streptomyces* sp. GMY01, toksisitas, *co-culture*, *Pseudomonas putida* KT2440, larva *Ostrinia furnacalis*

## Toxicity of Secondary Metabolite from *Streptomyces* sp. GMY01 against Larvae of Asian Corn Borer *Ostrinia furnacalis*

### ABSTRACT

Microbes, in particular Actinobacteria, have been known as an organism that produce many secondary metabolites. *Streptomyces* sp. GMY01 isolated from sea-based analysis of the genome has the potential to produce a variety of secondary metabolites. A single culture of this bacterium produced only four active metabolites, suggesting that there are still many unexploited potential metabolites. Co-culture is one of the most commonly used methods to increase production and the potency of microbial secondary metabolites. The study aimed to evaluate the toxicity of metabolites produced by co-culture between *Streptomyces* sp. GMY01 and *Pseudomonas putida* KT2440 against larvae of *Ostrinia furnacalis*. The media used for the culture was TSB. Extraction was performed 10 days of incubation to take hexane, methanol, ethyl acetate, and water fractions. Every fraction was tested its toxicity against the larvae of *O. furnacalis*, and the water fraction resulted the highest larval mortality. This fraction was then was analyzed using TLC, HPLC and GC-MS. Based on TLC analysis, the metabolites produced by the co-culture was a combination of metabolites produced by each microbe. In contrast, HPLC and GC-MS analysis demonstrated that the diversity of metabolites produced by co-culture was significantly higher than that produced by single culture. Increasing the number of metabolites may be responsible for increasing their toxicity on larvae of *O. furnacalis*.

**Keywords:** *Streptomyces* sp. GMY01, toxicity, co-culture, *Pseudomonas putida* KT2440, larvae of *Ostrinia furnacalis*