

ABSTRAK

UJI AKTIVITAS ANTIJAMUR ISOLAT *Bacillus thuringiensis* TERHADAP *Fusarium* sp. SECARA *IN VITRO*

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Kerugian ekonomi yang signifikan di sektor pertanian terjadi akibat penyakit layu *Fusarium*, yang menyerang lebih dari 150 jenis tanaman pangan dan hortikultura. Meskipun efektif dan cepat, penggunaan fungisida kimia sebagai agen pengendali konvensional terhadap infeksi *Fusarium* sp. telah menimbulkan banyak dampak negatif, diantaranya pencemaran lingkungan, penurunan keanekaragaman hayati, resistensi patogen, degradasi kesuburan tanah, dan toksisitas pada manusia serta hewan. Oleh karena itu, diperlukan solusi alternatif berupa agen pengendali hayati *Fusarium* sp. untuk meningkatkan efisiensi pengendalian penyakit layu *Fusarium* dengan dampak negatif yang relatif minim. Tujuan penelitian ini adalah menyeleksi 7 isolat *Bacillus thuringiensis* yang memiliki aktivitas antijamur terhadap *Fusarium* sp. (berpotensi sebagai agen pengendali hayati *Fusarium* sp.) dan menentukan konsentrasi hambat minimum (KHM) dari isolat *B. thuringiensis* hasil seleksi. Isolat *B. thuringiensis* diseleksi aktivitas antijamurnya dengan metode *dual culture* pada media agar, sehingga diketahui persentase penghambatan (%). Penentuan KHM (%) isolat *B. thuringiensis* hasil seleksi terhadap *Fusarium* sp. dengan metode *dual culture* pada media *broth*, disertai dilusi bertingkat. Analisis data dilakukan secara deskriptif kuantitatif. Hasil penelitian menunjukkan bahwa 2 dari 7 isolat *B. thuringiensis* (Bt2_{TMA26} dan Bt3_{BP14}) memiliki aktivitas antijamur terhadap *Fusarium* sp., dengan persentase rata-rata penghambatan masing-masing sebesar 12,23% dan 27,41%. Isolat *B. thuringiensis* Bt3_{BP14}, dengan aktivitas antijamur terbaik, diketahui memiliki KHM sebesar 90% (setara dengan kerapatan sel $1,35 \times 10^6$ sel mL⁻¹) terhadap *Fusarium* sp. Berdasarkan hasil penelitian tersebut, diketahui bahwa isolat *B. thuringiensis* Bt3_{BP14} berpotensi sebagai agen pengendali hayati *Fusarium* sp., untuk pengendalian penyakit layu *Fusarium* yang minim dampak negatif.

Kata kunci: aktivitas antijamur, *Bacillus thuringiensis*, *Fusarium* s

ABSTRACT

***IN VITRO* ANTIFUNGAL ACTIVITY OF *Bacillus thuringiensis* AGAINST *Fusarium* sp.**

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Significant economic losses in the agricultural sector occur due to *Fusarium* wilt disease, which attacks more than 150 types of food and horticultural crops. The use of instant-kill chemical fungicides as conventional control agents for *Fusarium* sp. infections has caused many negative impacts, including environmental pollution, decreased biodiversity, pathogen resistance, degradation of soil fertility, and toxicity to humans and animals. Therefore, an alternative solution is needed in the form of *Fusarium* sp. biological control agents to increase the efficiency of *Fusarium* wilt disease control with minimal negative impacts. This research aimed to select 7 *Bacillus thuringiensis* isolates with antifungal activity against *Fusarium* sp. (potential as biological control agents for *Fusarium* sp.) and determine the minimum inhibitory concentration (MIC) of the selected *B. thuringiensis* isolate. *B. thuringiensis* isolates were selected for their antifungal activity using the dual culture method on agar media, allowing for the determination of the percentage of inhibition (%). Determination of MIC (%) of selected *B. thuringiensis* isolate against *Fusarium* sp. with the dual culture method on broth media, with the serial dilution. Quantitative descriptive analysis was used to interpret the data. The results showed that 2 out of 7 *B. thuringiensis* isolates (Bt2_{TMA26} dan Bt3_{BP14}) had antifungal activity against *Fusarium* sp., with an average inhibition percentages of 12,23% and 27.41%, respectively. *B. thuringiensis* isolate Bt3_{BP14}, with the best antifungal activity, had an MIC of 90% (equivalent to $1,35 \times 10^6$ cells mL⁻¹ cell density) against *Fusarium* sp. Based on the results, *B. thuringiensis* isolate Bt3_{BP14} has the potential as a biological control agent for *Fusarium* sp., in the *Fusarium* wilt disease control with minimal negative impacts.

Keywords: antifungal activity, *Bacillus thuringiensis*, *Fusarium* sp.