

## ABSTRAK

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**AKTIVITAS ANTIFUNGAL *Bacillus amyloliquefaciens* N1 DAN *Lactobacillus fermentum* E5 TERHADAP *Aspergillus welwitschiae* DAN *Penicillium* sp.**

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(xiv + 67 halaman; 4 tabel, 4 gambar, 23 lampiran)

Kontaminasi jamur memiliki dampak negatif dalam bidang industri dan kesehatan, khususnya jamur yang menghasilkan zat toksin. Pada umumnya, dalam mengatasi masalah kontaminasi jamur digunakan zat kimia yang berpotensi membahayakan kesehatan dan tidak ramah lingkungan. Oleh sebab itu, penggunaan agen biologis berupa bakteri yang memiliki sifat antifungal dapat menjadi solusi karena mudah ditemukan, lebih aman dan ramah lingkungan. Penelitian ini melakukan uji aktivitas antifungal dari *Bacillus amyloliquefaciens* N1 dan *Lactobacillus fermentum* E5 terhadap *Aspergillus welwitschiae* dan *Penicillium* sp melalui metode zona inhibisi dengan model *whole cell*. Selain itu, dilakukan juga analisis bioinformatika untuk mengetahui keberadaan gen yang terkait dengan komponen antifungal yang dihasilkan. Berdasarkan penelitian yang dilakukan pada uji aktivitas antifungal, *B. amyloliquefaciens* N1 dapat menghambat *A. welwitschiae* dan *Penicillium* sp. dengan persen inhibisi masing-masing adalah 73% dan 100%, sedangkan *L. fermentum* E5 tidak menunjukkan aktivitas antifungal terhadap kedua jamur. Pada analisis bioinformatika, komponen antifungal yang dimiliki *B. amyloliquefaciens* N1 diduga adalah bacillomycin D, surfactin dan fengycin. Dengan demikian, *B. amyloliquefaciens* N1 berpotensi untuk dikembangkan lebih lanjut dan dimanfaatkan terkait dengan sifat antifungal yang dimiliki.

Kata Kunci : antifungal, *Bacillus amyloliquefaciens*, *Lactobacillus fermentum*, zona inhibisi, *whole cell*, *Aspergillus welwitschiae*, *Penicillium* sp., anotasi gen.

Referensi : 77 (1990-2021)

## ABSTRACT

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### **ANTIFUNGAL ACTIVITY OF *Bacillus amyloliquefaciens* N1 AND *Lactobacillus fermentum* E5 AGAINST *Aspergillus welwitschiae* AND *Penicillium* sp.**

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Fungal contamination, especially by the toxin-producing fungi, has negative impacts on health and industry sectors. Chemicals are commonly used to eliminate the fungal contamination. However, those substances could be harmful for health and the environment. Therefore, the biological agent, such as bacteria able to inhibit fungal growth, would be a safer option. Hereby, a study on antifungal activity of *Bacillus amyloliquefaciens* N1 and *Lactobacillus fermentum* E5 against *Aspergillus welwitschiae* and *Penicillium* sp. was reported. The whole-cell method was used in this study. In addition, bioinformatic analysis was performed on whole genome of *Bacillus amyloliquefaciens* N1 to determine putative genes encoding antifungal compounds. Our result showed that *Bacillus amyloliquefaciens* N1 could inhibit *Aspergillus welwitschiae* and *Penicillium* sp. with the percent of inhibition were 73% and 100%. In contrast, *Lactobacillus fermentum* E5 was observed to exhibit no antifungal activity. Subsequently, the bioinformatic analyses indicated that the antifungal components of *Bacillus amyloliquefaciens* N1 were bacillomycin D, surfactin and fengycin. In conclusion, *Bacillus amyloliquefaciens* N1 has the potential to be further developed and utilized due to its antifungal properties.

Keywords : antifungal, *Bacillus amyloliquefaciens*, *Lactobacillus fermentum*, inhibition zone, whole cell, *Aspergillus welwitschiae*, *Penicillium* sp., gene annotation.

Reference : 77 (1990-2021)