

ABSTRAK

ISOLASI DAN KARAKTERISASI BAKTERI TERMOFILIK PADA KOMPOS PERMUKAAN DI FASE PROSES COMPOST PLANT PT GREAT GIANT PINEAPPLE

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Pengomposan merupakan proses dekomposisi limbah organik yang dapat berlangsung secara aerobik karena adanya bantuan dari agen dekomposer dalam kondisi yang terkontrol. Bakteri termofilik adalah salah satu kelompok mikroorganisme dekomposer yang berperan dalam pengomposan saat fase termofilik dengan menghasilkan enzim ekstraseluler yang bersifat termostabil. Penambahan inokulum bakteri termofilik dapat menjadi pilihan agar proses pengomposan berlangsung lebih efisien. Penelitian ini bertujuan untuk mengisolasi dan mengkarakterisasi bakteri termofilik pada kompos permukaan di fase proses Compost Plant PT Great Giant Pineapple yang diharapkan dapat mempercepat waktu pengomposan. Penelitian ini dilakukan dengan menggunakan metode deskriptif eksploratif dengan tahapan penelitian meliputi pengambilan sampel kompos permukaan, isolasi bakteri termofilik, pemurnian isolat bakteri termofilik, karakterisasi morfologi secara makroskopis dan mikroskopis, serta uji aktivitas enzimatik. Data hasil penelitian disajikan dalam bentuk gambar dan tabel, kemudian dilakukan analisis secara deskriptif kualitatif dan kuantitatif. Hasil penelitian diperoleh tujuh isolat yaitu ALV1, ALV2, ALV3, ALV4, ALV5, ALV6, dan ALV7. Morfologi koloni bakteri didominasi oleh bentuk *irregular and spreading*, dengan tepi tersebar diantara *irregular*, *wooly*, *undulate*, dan *entire*. Elevasi koloni mayoritas *raised* dan ketujuh koloni berwarna krem. Ketujuh isolat memiliki bentuk sel basil, bersifat Gram positif, dan menghasilkan spora. Isolat ALV1, ALV2, ALV3, ALV4, ALV5, ALV6, dan ALV7 mampu menghasilkan enzim amilase dan protease, sedangkan hanya isolat ALV1, ALV2, ALV3, ALV5, dan ALV6 yang mampu menghasilkan enzim selulase. Indeks Enzimatik (IE) amilase dan selulase tertinggi diperoleh dari isolat ALV6 yaitu sebesar 8,38 dan 14,66, sedangkan nilai IE protease tertinggi diperoleh dari isolat ALV4 yaitu sebesar 4,39.

Kata kunci: kompos, pengomposan, bakteri termofilik, isolasi, karakterisasi

ABSTRACT

ISOLATION AND CHARACTERIZATION OF THERMOPHILIC BACTERIA ON SURFACE COMPOST IN THE PROCESSING PHASE OF PT GREAT GIANT PINEAPPLE'S COMPOST PLANT

By

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Composting is a process of decomposing organic waste that can occur aerobically with the assistance of decomposer agents under controlled conditions. Thermophilic bacteria are one group of decomposer microorganisms that play role in composting during the thermophilic phase by producing thermostable extracellular enzymes. The addition of thermophilic bacterial inoculum can be an option to make the composting process more efficient. This study aims to isolate and characterize thermophilic bacteria in surface compost during the composting process at PT Great Giant Pineapple's Compost Plant, which is expected to accelerate the composting time. This study was conducted using an exploratory descriptive method, with research stages including sampling of surface compost, isolation of thermophilic bacteria, purification of thermophilic bacterial isolates, macroscopic and microscopic morphological characterization, and enzymatic activity testing. Research results were presented in the form of images and tables, followed by descriptive qualitative and quantitative analysis. The results showed that seven isolates were obtained: ALV1, ALV2, ALV3, ALV4, ALV5, ALV6, and ALV7. The bacterial colony morphology was dominated by irregular and spreading shapes, with margins ranging from irregular, wooly, undulate, to entire. Most colonies were raised and shared a uniform cream coloration. All seven isolates were Gram-positive, with bacil cell shape, and produced spores. Isolates ALV1, ALV2, ALV3, ALV4, ALV5, ALV6, and ALV7 were capable of producing amylase and protease enzymes, while only isolates ALV1, ALV2, ALV3, ALV5, and ALV6 were capable of producing cellulase enzymes. The highest amylase and cellulase Enzymatic Index (EI) values were obtained from isolate ALV6, at 8.38 and 14.66 respectively, while the highest protease EI value was obtained from isolate ALV4, at 4.39.

Keywords: compost, composting, thermophilic bacteria, isolation, characterization