

ABSTRAK

Dini Rahmawati, 24020120120016. Bioprospeksi dan Identifikasi Molekuler Bakteri Haloalkalifilik Penghasil Amilase dari Bledug Kesongo, Kabupaten Blora, di bawah bimbingan Nurhayati dan Anto Budiharjo.

Bakteri haloalkalifilik merupakan mikroorganisme yang hidup di habitat bersalinitas tinggi dan pH basa, salah satu strategi adaptasinya yaitu dengan memproduksi enzim seperti amilase yang berfungsi menguraikan polisakarida menjadi gula sederhana sebagai sumber energi dan penyeimbang kondisi sel agar tidak stres akibat kondisi ekstrem. Bledug Kesongo dengan pH 9 dan salinitas 4% menjadi habitat ideal bagi bakteri haloalkalifilik. Amilase yang dihasilkan dari lingkungan ekstrem bersifat stabil pada pH tinggi dan salinitas tinggi serta ramah lingkungan sehingga berpotensi diaplikasikan dalam industri roti, deterjen, kertas, dan bioenergi. Penelitian ini bertujuan mengeksplorasi keragaman bakteri haloalkalifilik, menganalisis kemampuan produksi amilase serta mengidentifikasi spesies isolat terbaik secara molekuler. Bakteri diisolasi dari sampel lumpur Bledug Kesongo menggunakan metode pengenceran berseri. Aktivitas amilase diuji melalui metode skrining pada media agar pati dengan larutan Lugol pada variasi suhu (30°C, 34°C, 40°C) dan pH (5, 7, 9, 11). Identifikasi molekuler dilakukan menggunakan gen 16S rRNA. Hasil isolasi diperoleh sebanyak 35 isolat bakteri haloalkalifilik dengan karakteristik dominan: berbentuk bulat, tepi halus, tekstur *moist*, elevasi *raised*, warna bervariasi dan sel bakteri Gram positif berbentuk kokus. Uji aktivitas amilase menunjukkan 16 isolat positif penghasil amilase. Isolat BK7 merupakan penghasil amilase terbaik dengan nilai indeks amilolitik 2,75 pada suhu 34°C dan pH 11. Identifikasi molekuler menunjukkan bahwa isolat BK7 memiliki kemiripan tinggi dengan *Billgrantia desiderata* (basonim dari *Halomonas desiderata*) dan telah terdaftar NCBI dengan nomor akses PV076947.1.

Kata kunci: Amilase, bakteri haloalkalifilik, Bledug Kesongo, BK7

ABSTRACT

Dini Rahmawati, 24020120120016. Bioprospecting and Molecular Identification of Amylase-Producing Haloalkaliphilic Bacteria from Bledug Kesongo, Blora Regency, under the supervision of Nurhayati dan Anto Budiharjo.

Haloalkaliphilic bacteria are microorganisms that thrive in environments with high salinity and alkaline pH. One of their adaptive strategies is the production of enzymes such as amylase, which breaks down polysaccharides into simple sugars as an energy source and helps maintain cell stability under extreme conditions. Bledug Kesongo, with a pH of 9 and salinity of 4%, serves as an ideal habitat for these bacteria. Amylases derived from extreme environments exhibit stability at high pH and salinity levels and are environmentally friendly, making them suitable for applications in industries such as baking, detergents, paper, and bioenergy. This study aimed to explore the diversity of haloalkaliphilic bacteria, analyze their amylase-producing capabilities, and identify the best isolate species using molecular methods. Bacteria were isolated from mud samples collected from Bledug Kesongo using the serial dilution method. Amylase activity was assessed through a screening test on starch agar medium with Lugol's iodine at various temperatures (30°C, 34°C, 40°C) and pH levels (5, 7, 9, 11). Molecular identification was performed using the 16S rRNA gene. A total of 35 haloalkaliphilic bacterial isolates were obtained, showing dominant characteristics such as round shape, smooth edges, moist texture, raised elevation, varied colony colors, and Gram-positive cocci cell morphology. Amylase activity tests revealed that 16 isolates were amylase producers. Among them, isolate BK7 showed the highest amylolytic index of 2.75 at 34°C and pH 11. Molecular identification indicated that BK7 had high homology with *Billgrantia desiderata* (basonym of *Halomonas desiderata*) and has been registered in the NCBI database under accession number PV076947.1.

Keywords: *Amylase, haloalkaliphilic bacteria, Bledug Kesongo, BK7*