

ABSTRAK

Salah satu kelompok enzim yang berperan penting dalam bidang industri adalah hidrolitik. Enzim hidrolitik berperan dalam mengkatalisis reaksi hidrolisis, yaitu reaksi yang melibatkan air pada ikatan spesifik substrat. Aktinobakteri merupakan bakteri gram positif yang telah diketahui memproduksi enzim hidrolitik ekstraselular. Penelitian ini bertujuan untuk mengidentifikasi spesies aktinobakteri dari Segara Anakan Cilacap yang berpotensi menghasilkan enzim hidrolitik, khususnya enzim amilase, protease, lipase, dan urease. Tahapan penelitian meliputi peremajaan aktinobakteri, uji potensi enzim hidrolitik, kultivasi aktinobakteri, isolasi DNA, amplifikasi gen 16S rRNA, sekuensing dan identifikasi spesies, serta konstruksi pohon filogenetik. Hasil uji potensi enzim hidrolitik menunjukkan lima dari sepuluh isolat terindikasi berpotensi menghasilkan enzim hidrolitik terbesar. Isolat P-7C berpotensi menghasilkan enzim amilase dengan indeks amilolitik sebesar 2,000, isolat P-6B berpotensi menghasilkan enzim protease dengan indeks proteolitik sebesar 2,996, isolat W-5B berpotensi menghasilkan enzim lipase dengan indeks lipolitik sebesar 0,819, serta isolat P-6F, P-7E, dan W-5B berpotensi menghasilkan enzim urease dengan intensitas sampel warna merah muda (+++). Hasil identifikasi spesies kelima isolat menunjukkan isolat P-7C teridentifikasi sebagai *Streptomyces longisporoflavus* strain Moghannam M1 dengan similaritas 99,81%. Isolat P-6B teridentifikasi sebagai *Ochrobactrum intermedium* strain NBRC 15820 dengan similaritas 99,78%. Isolat W-5B teridentifikasi sebagai *Streptomyces cellulosae* strain NBRC 13027 dengan similaritas 99,92%. Isolat P-6F teridentifikasi sebagai *Paenibacillus agaridevorans* strain DSM 1355 dengan similaritas 98,43%. Isolat P-7E teridentifikasi sebagai *Streptomyces* sp. F2(2011) strain F2 dengan similaritas 80,94%.

Kata Kunci: Aktinobakteri, DNA, enzim, 16S rRNA

ABSTRACT

*One group of enzymes that have an important uses in the industrial sector is hydrolytic. Hydrolytic enzymes is important in catalyzing hydrolysis reactions. It is reactions that involve water in specific substrate bonds. Actinobacteria are gram-positive bacteria that have been known to produce extracellular hydrolytic enzymes. The aim of this research is to identify actinobacteria species from Segara Anakan Cilacap which have the potential to produce hydrolytic enzymes, especially amylase, protease, lipase, and urease enzymes. The stages of this research include actinobacteria rejuvenation, hydrolytic enzyme potency test, actinobacteria cultivation, DNA isolation, 16S rRNA gene amplification, sequencing and species identification, and phylogenetic tree construction. The results of potential hydrolytic enzymes test showed that five of ten isolates were indicated to produce the largest hydrolytic enzymes. P-7C had the potential to produce amylase enzymes with an amylolytic index 2.000, P-6B had the potential to produce protease enzymes with proteolytic index 2.996, W-5B had the potential to produce lipase enzymes with a lipolytic index 0.819, P-6F, P-7E, and W-5B had the potential to produce urease enzyme with pink color sample intensity (+++). The results of the identification of the five isolates showed that P-7C was identified as *Streptomyces longisporoflavus* strain Moghannam M1 with 99.81% similarity. P-6B was identified as *Ochrobactrum intermedium* strain NBRC 15820 with 99.78% similarity. W-5B was identified as *Streptomyces cellulosa* strain NBRC 13027 with 99.92% similarity. P-6F was identified as *Paenibacillus agaridevorans* strain DSM 1355 with 98.43% similarity. P-7E was identified as *Streptomyces* sp. F2(2011) strain F2 with 80.94% similarity.*

Keywords: Actinobacteria, DNA, enzymes, 16S rRNA