

ISOLASI DAN KARAKTERISASI BAKTERI PENGHASIL PROTEASE DARI LIMBAH PENYAMAKAN KULIT DI PT. ADI SATRIA ABADI

Ayu Rachmi Saraswati
11/317500/PT/06050

INTISARI

Penelitian ini bertujuan untuk mengisolasi dan mengetahui karakteristik bakteri penghasil enzim protease dari limbah penyamakan kulit di PT Adi Satria Abadi. Sampel yang digunakan dalam penelitian ini adalah sampel limbah padat penyamakan. Isolat bakteri ditumbuhkan pada medium dengan konsentrasi susu skim 0%, 0,5%, 1%, 1,5%, dan 2%. Pertumbuhan bakteri berdasarkan pengukuran *optical density*, diameter koloni, diameter zona bening, dan indeks proteolitik. Nilai diameter koloni optimum pada skim 2%, sedangkan diameter zona bening dan indeks proteolitik 0,5%. Data pertumbuhan *optical density*, identifikasi bakteri, dan kinetika enzim dianalisis secara deskriptif. Pertumbuhan diameter koloni, diameter zona bening, indeks proteolitik, dan uji aktivitas enzim dianalisis menggunakan rancangan acak lengkap pola searah (*Completely Randomized Design*), apabila diperoleh perbedaan hasil akan dilanjutkan dengan uji *Duncan New Multiple Range Test* (DMRT). Hasil isolasi bakteri menunjukkan adanya aktivitas proteolitik. Identifikasi isolat bakteri L4 memiliki morfologi koloni berbentuk bulat, berwarna putih, tepian rata, dan elevasi cembung, morfologi sel berbentuk kokus, berwarna biru-ungu, dan uji katalase positif. Diameter koloni isolat bakteri tertinggi pada konsentrasi susu skim 1,5%, sedangkan diameter zona bening dan indeks proteolitik tertinggi pada susu skim 0,5%. Enzim protease yang dihasilkan oleh isolat bakteri L4 memiliki kadar protein 1,092 mg/ml. Aktivitas enzim protease tertinggi berada pada pH 7,5 dengan aktivitas unit enzim $92,50 \pm 40,01$ U/ml dan aktivitas spesifik enzim $84,71 \pm 36,64$ U/mg. Suhu optimum enzim protease dari isolat bakteri L4 adalah 60°C dengan aktivitas unit enzim $168,55 \pm 28,83$ U/ml dan aktivitas spesifik enzim $154,43 \pm 33,85$ U/mg. Enzim protease isolat bakteri L4 memiliki nilai V_{maks} 0,132 mg/ml/menit dan K_m 16,75 mg/ml/menit. Pemurnian enzim protease menggunakan pengendapan ammonium sulfat $(\text{NH}_4)_2\text{SO}_4$ konsentrasi 70% dan 80%. Berdasarkan hasil penelitian menunjukkan limbah penyamakan kulit mampu menghasilkan bakteri protease

(Kata Kunci: Limbah Penyamakan Kulit, Isolasi Bakteri, Karakterisasi Enzim Protease)

ISOLATION AND CHARACTERIZATION OF PROTEASE BACTERIA FROM WASTE OF TANNING AT ADI SATRIA ABADI

Ayu Rachmi Saraswati
11/317500/PT/06050

ABSTRACT

This research aimed to isolate and determine the characteric of proteolitic bacterial of waste tannery at Adi Satria Abadi Ltd. The sample used in this reasearch was solid waste from tannery industry. Bacteria isolate was grown on a medium with concentration of skim milk 0%, 0,5%, 1%, 1,5%, and 2%. The highest of colony diameter showed on then skim 2%, and the highest of clear zone diameter and proteolytic index showed on the skim 0,5%. The data of optical density, bacteria identification, and enzyme kinetic were analyzed descriptively. The activity of enzyme were analyzed with a completely randomized design in one way pattern. The mean differences were analyzed by us New Multiple Range Test (DMRT). The isolated bacteria showed proteolinytic activity. The identification of bacteria has spherical morphology colony form, white colour, flat margin, and bioconcave elevation, coccus celluler morphology, blue-violet coloured, and positive catalase. The highest colony diameter were on medium with concentration of skim 1,5%, meanwhile the highest clear zone diameter and proteolytic index were on medium with concentration skim 0,5%. The highest enzyme activity showed on the pH 7,5 with enzyme unit activity $92,50 \pm 40,01$ U/ml and the spesific activity of enzyme $84,71 \pm 36,64$ U/mg. The optimum temperature of the protease enzyme is 60°C with the unit activity enzyme $168,55 \pm 28,83$ U/ml and the spesific activity of enzyme $154,43 \pm 33,85$ U/mg. The protease enzyme of bacteria isolated L4 has V_{\max} value of 0,132 mg/ml and K_m value of 16,75 mg/ml. The purification of protease enzyme used ammonium sulfate precipitation concentraion of 70% and 80%. The conclusion of the study was tannery industry waste capable to producing proteolytic bacteria.

(Keywords: Waste of tannery, Isolation of Bacteria, Chacaracterization of Protease Enzyme)