

PENGARUH PENAMBAHAN LIMBAH CAIR PENYAMAKAN KULIT TERHADAP KARAKTER PERTUMBUHAN *Bacillus cereus* LS2B DALAM MENURUNKAN KADAR KROMIUM SECARA AEROB

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INTISARI

Penelitian ini bertujuan mengevaluasi karakteristik pertumbuhan secara aerobik dari *Bacillus cereus* LS2B serta potensi aplikasinya sebagai agen pereduksi krom pada limbah penyamakan kulit sapi. Penelitian dilakukan dengan menumbuhkan *Bacillus cereus* LS2B pada medium agar dan cair limbah penyamakan kulit, serta medium agar dan cair $K_2Cr_2O_7$ pH 7 dengan level limbah penyamakan dan krom yang berbeda. Variabel yang diamati yaitu pertumbuhan bakteri, kadar amonium, dan krom. Setiap perlakuan dilakukan replikasi sebanyak tiga kali. Data hasil penelitian dianalisis secara deskriptif dan statistik menggunakan analisis variansi RAL pola searah dan dilanjutkan dengan uji beda *Duncan's Multiple Range Test* (DMRT). Hasil penelitian menunjukkan bahwa *Bacillus cereus* LS2B terbukti tumbuh pada medium agar 0%, 25%, dan 50% (v/v) limbah penyamakan kulit, dan tidak tumbuh pada level 75% dan 100%. Perbedaan level penambahan limbah penyamakan kulit berpengaruh nyata terhadap karakteristik pertumbuhan dan sintesis amonium oleh bakteri ($P < 0,05$). Akumulasi amonium terendah oleh *Bacillus cereus* LS2B terjadi pada perlakuan limbah 50% selama 36 jam yaitu sebesar $1018,28 \pm 21,50$ ppm. *Bacillus cereus* LS2B terbukti tumbuh pada medium $K_2Cr_2O_7$ dengan kadar 500, 1000, dan 1500 ppm. Kandungan krom berpengaruh nyata terhadap kemampuan *Bacillus cereus* LS2B dalam menurunkan kadar krom ($P < 0,05$). Nilai reduksi krom heksavalen (Cr-VI) tertinggi terjadi pada kadar $K_2Cr_2O_7$ 1500 ppm sebesar $327,3 \pm 63,72$ ppm dan efisiensi penurunan tertinggi terjadi pada kadar $K_2Cr_2O_7$ 1000 ppm sebesar 29,77%. Kesimpulan dari penelitian ini adalah *Bacillus cereus* LS2B memiliki kemampuan untuk tumbuh dan beradaptasi pada medium dengan penambahan limbah penyamakan kulit dan krom, serta mampu mereduksi krom heksavalen.

Kata kunci: limbah penyamakan, aerobik, amonium, krom heksavalen.

THE INFLUENCE OF ADDITIONAL TANNERY WASTEWATER TO GROWTH CHARACTERS OF *Bacillus cereus* LS2B IN REDUCING CHROMIUM LEVELS AEROBICALLY

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ABSTRACT

This research aims evaluate the characteristic growth of *Bacillus cereus* LS2B aerobically and its potential as a chromium removal agent in tannery wastewater. The study was conducted by growing *Bacillus cereus* LS2B on agar and liquid medium of tannery wastewater, as well as $K_2Cr_2O_7$ with adjustment of pH 7 with the different levels. The variable of bacterial growth, ammonium and chromium concentrations was observed in triplicates. The data were analyzed descriptively and statistically using the experimental method by simple Completely Randomized Design (CRD) with ANOVA one way and continued with Duncan's Multiple Range Test (DMRT). The results showed that the bacteria proved to grow on the agar medium 0%, 25%, and 50% of the tannery waste, and did not grow at the level of 75% and 100%. The different level of tannery waste had a significant effect on the characteristic growth and ammonium metabolism of bacterial ($P < 0.05$). The lowest accumulated ammonium by *Bacillus cereus* LS2B occurred in 50% waste treatment with ammonium accumulation formed for 36 hours at 1018.28 ± 21.50 ppm. The bacteria were proven to grow on the $K_2Cr_2O_7$ medium with concentration of 500, 1000, and 1500 ppm. The chromium concentration had a significant effect on the bacteria's ability to decrease chromium content ($P < 0.05$). The highest reduction value of hexavalent chromium (Cr-VI) occurred in the $K_2Cr_2O_7$ level of 1500 ppm at 327.3 ± 63.72 ppm and the highest efficiency of chromium reduction occurred in the $K_2Cr_2O_7$ level of 1000 ppm at 29,77%. The conclusion of this research is *Bacillus cereus* LS2B has the ability to growth and adapt well in medium with tannery wastewater and chromium, and can reduce chromium hexavalent.

Keywords: tannery waste, aerobic, ammonium, hexavalent chromium.