

## KARAKTERISASI PERTUMBUHAN *Pseudomonas* sp. LS3K DENGAN PENAMBAHAN LIMBAH CAIR PENYAMAKAN KULIT SERTA KEMAMPUANNYA MENURUNKAN KADAR KROM HEKSAVALEN

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### INTISARI

Pemanfaatan mikroorganisme dalam rangkaian pengolahan limbah cair penyamakan kulit memiliki potensi yang besar karena sifatnya yang lebih ramah lingkungan dan hemat biaya dibandingkan pengolahan kimiawi. Bakteri *Pseudomonas* sp. LS3K yang mampu hidup di medium dengan kadar amonium yang tinggi memiliki potensi menjadi agen nitrifikasi dan denitrifikasi dalam pengolahan limbah cair penyamakan kulit. Penelitian ini bertujuan untuk mengetahui karakter pertumbuhan isolat *Pseudomonas* sp. LS3K dalam limbah cair industri penyamakan kulit dan kemampuannya dalam menurunkan kadar Cr(VI) dalam medium. Penelitian dilakukan di Fakultas Peternakan Universitas Gadjah Mada Yogyakarta. Perlakuan yang dilakukan adalah penambahan limbah cair industri penyamakan kulit dalam medium dengan konsentrasi berbeda yaitu 0%, 25%, dan 50%. Pertumbuhan bakteri dan perhitungan kadar Cr(VI) juga diuji pada medium resistensi krom dengan penambahan  $K_2Cr_2O_7$  sebanyak 500 ppm, 1000 ppm, dan 1500 ppm. Hasil penelitian menunjukkan bahwa bakteri *Pseudomonas* sp. LS3K tumbuh optimal di medium limbah 0%, dan mampu tumbuh di medium dengan limbah 25% dan 50% meskipun laju pertumbuhan bakteri tersebut lebih rendah karena adanya *stressor* limbah. Bakteri juga mampu tumbuh di medium resistensi krom meskipun pertumbuhannya lebih lambat ketika konsentrasi krom dalam medium lebih tinggi. Bakteri *Pseudomonas* sp. LS3K dapat beradaptasi dan bertahan hidup di medium dengan *stressor* dan toksisitas tinggi, dilihat terdapatnya  $NH_4$  sebagai hasil metabolisme dan reduksi jumlah senyawa Cr(VI) dalam medium.

(Kata kunci: limbah cair penyamakan kulit, *Pseudomonas* sp. LS3K, pertumbuhan bakteri, amonium, krom heksavalen)

## GROWTH CHARACTERIZATION OF *Pseudomonas* sp. LS3K WITH TANNERY WASTEWATER ADDITION AND ITS POTENTIAL TO REDUCE HEXAVALENT CHROMIUM LEVELS

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### ABSTRACT

The use of microorganisms in tannery wastewater treatment has great potential because it is more eco-friendly and cost-effectively than chemical treatments. *Pseudomonas* sp. LS3K which can live in a medium with high ammonium content has the potential to be a nitrifying and denitrifying agent in the processing of tannery wastewater. This study aims to determine the growth characteristic of *Pseudomonas* sp. LS3K with tannery wastewater addition and its ability to reduce hexavalent chromium levels in the medium. The research was conducted at the Faculty of Animal Science, Universitas Gadjah Mada, Yogyakarta. The treatment carried out was the addition of tannery wastewater in medium with different concentrations, namely 0%, 25%, and 50% addition. Bacterial growth in chromium resistance medium and its Cr(VI) reducing ability was also tested on medium with K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> addition as much as 500 ppm, 1000 ppm, and 1500 ppm. The results showed that the *Pseudomonas* sp. LS3K grows optimally in medium with 0% wastewater and can grow in medium with 25% and 50% wastewater although the growth rate of the bacteria on these mediums is lower due to the presence of growth stressor. Bacteria are also able to grow in chromium resistance medium although the growth is slower when there is a higher chromium concentration in the medium. *Pseudomonas* sp. LS3K can adapt and survive in a medium with high stressors and toxicity, seen from the presence of NH<sub>4</sub> as a result of bacterial metabolism and a reduction in the number of Cr(VI) compounds in the medium.

(Keywords: tannery wastewater, *Pseudomonas* sp. LS3K, bacterial growth, ammonium, hexavalent chromium)