EFEKTIVITAS *Bacillus cereus* TD5B DALAM MENURUNKAN BAHAN ORGANIK PADA LIMBAH CAIR RUMAH POTONG AYAM

INTISARI

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Limbah cair rumah potong ayam (PSW) merupakan limbah cair dengan tingkat pencemaran tinggi dan kandungan bahan organik yang tinggi, sehingga menimbulkan tantangan lingkungan dalam pengolahannya. Penelitian ini mengkaji potensi *Bacillus cereus* TD5B untuk tumbuh dan mengurangi bahan organik pada PSW melalui percobaan skala laboratorium yang mengevaluasi pertumbuhan bakteri dalam medium cair dan padat yang mengandung PSW, serta efektivitasnya dalam menurunkan kebutuhan oksigen biologis (BOD_5), kebutuhan oksigen kimia (COD), total padatan (TS), total padatan volatil (TVS), total padatan tersuspensi (TSS), total padatan terlarut (TDS), dan konsentrasi amonium. Hasil penelitian menunjukkan bahwa *Bacillus cereus* TD5B mampu tumbuh pada semua konsentrasi PSW, dengan pertumbuhan tertinggi di medium cair pada T1 (25% PSW) dan di medium padat pada T4 (100% PSW) sebesar $5,1\pm0,8\times10^7$ CFU/mL. Uji viabilitas menunjukkan kemampuan bertahan hidup bakteri yang ditandai dengan peningkatan diameter koloni, dengan ukuran terbesar ditemukan pada T2 (50% PSW). Kinerja tertinggi degradasi bahan organik diperoleh pada T4 (100% PSW) dengan efektivitas penurunan sebesar 92,54±5,53% untuk BOD_5, 51,28±14,84% untuk COD, 27,40±6,66% untuk TS, 70,53±14,84% untuk TVS, 88,49±4,51% untuk TSS, 22,45±7,30% untuk TDS, dan 63,38±21,48% untuk amonium. Hasil ini menunjukkan bahwa *Bacillus cereus* TD5B memiliki potensi sebagai agen bioremediasi untuk pengolahan limbah cair yang mengandung bahan organik tinggi seperti PSW.

Kata kunci : *Bacillus cereus,* bahan organik, bioremediasi, limbah cair, penanganan biologis

THE EFFECTIVITY OF ORGANIC MATTER REMOVAL IN POULTRY SLAUGHTERHOUSE WASTEWATER BY *Bacillus cereus* TD5B

ABSTRACT

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Poultry slaughterhouse wastewater (PSW) is a highly polluted effluent with a significant organic load, posing environmental challenges for treatment. This study investigates the potential of *Bacillus cereus* TD5B to grow and reduce organic matter in PSW. Laboratory-scale experiments were performed to assess the growth of *Bacillus cereus* TD5B in a PSW-containing medium and to evaluate the effectiveness of this bacterial strain in reducing key parameters, including biological oxygen demand (BOD5), chemical oxygen demand (COD), total solids (TS), total volatile solids (TVS), total suspended solids (TSS), total dissolved solids (TDS), and ammonium concentration. *Bacillus cereus* TD5B exhibited growth in both liquid and solid mediums containing PSW. The highest bacterial growth in liquid medium occurred in T1 (25% PSW), while in solid medium, T4 (100% PSW) showed the highest growth ($5.1\pm0.8\times10^7$ CFU/mL). The survival ability of *Bacillus cereus* TD5B following incubation in a medium supplemented with nutrients and PSW at varying concentrations was confirmed through viability assays and was evidenced by the expansion of colony diameter, with the largest colony diameter observed in T2 (50% PSW). *Bacillus cereus* TD5B effectively decomposed organic matter, significantly reducing several parameters assessed. The highest performance was observed in T4 (100% PSW), which achieved removal effectivity of 92.54±5.53% for BOD5, 51.28±14.84% for COD, 27.40±6.66% for TS, 70.53±14.84% for TVS, 88.49±4.51% for TSS, 22.45±7.30% for TDS, and 63.38±21.48% for ammonium. These findings suggest that *Bacillus cereus* TD5B holds promise as a bioremediation agent for treating high-content organic wastewater, such as PSW. Further research is recommended to optimize the conditions for bacterial growth and enhance performance in large-scale applications.

Keywords : *Bacillus cereus*, biological treatment, bioremediation, organic matter, wastewater