

EFEK PENAMBAHAN LIMBAH CAIR INDUSTRI RUMAH POTONG AYAM TERHADAP PERTUMBUHAN DAN KEMAMPUAN *Rothia* sp. SO3K DALAM MENGURAI LIMBAH ORGANIK

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INTISARI

Penelitian ini bertujuan untuk mengetahui perilaku pertumbuhan isolate bakteri *Rothia* sp. SO3K dalam limbah cair RPA dan kemampuannya dalam mengurai bahan organik melalui proses nitrifikasi-denitrifikasi secara aerobik dengan menjadi agen bioremediasi. Penelitian dimulai dengan menumbuhkan *Rothia* sp. SO3K pada medium padat dan cair dengan penambahan limbah cair RPA dengan konsentrasi 0%, 25%, 50%, 75%, dan 100%. Viabilitas bakteri juga dilihat dengan menginokulasikan bakteri yang telah diinkubasi dalam medium limbah cair selama 24 dan 48 jam pada medium nutrisi padat. Kemampuan *Rothia* sp. SO3K untuk mereduksi amonia, nitrat dan bahan organik limbah cair RPA diuji sebelum dan sesudah proses aerasi selama empat hari. Data yang didapatkan yaitu pertumbuhan bakteri, viabilitas bakteri, nilai *total solid* (TS), nilai *total volatile solid* (TVS), nilai *total suspended solid* (TSS), nilai *total dissolved solid* (TDS), *biological oxygen demand* (BOD₅), *chemical oxygen demand* (COD), kadar amonia dan kadar nitrat. Data hasil penelitian dianalisis secara statistik menggunakan variasi rancangan acak lengkap (RAL) pola searah yang dilanjutkan dengan uji beda Duncan's Multiple Range Test (DMRT). Hasil yang didapatkan menunjukkan bahwa *Rothia* sp. SO3K dapat tumbuh di medium cair maupun padat pada setiap perlakuan. Presentase penurunan terbesar untuk nilai TS yaitu $43,98 \pm 2,182\%$ pada B2, nilai TVS sebesar $35,10 \pm 5,157\%$ pada P3, nilai TDS sebesar $42,54 \pm 2,580\%$ pada B4, nilai TSS sebesar $-46,41 \pm 8,988\%$ pada B3, nilai BOD₅ $66,63 \pm 17,519\%$ pada B4, untuk nilai COD yaitu $87,46 \pm 5,377\%$ pada B4, untuk nilai kadar amonia yaitu $11,913 \pm 4,495\%$ pada P3, dan kadar nitrat yaitu $25,62 \pm 1,66\%$ pada B3. Berdasarkan ini dapat disimpulkan bahwa bakteri *Rothia* sp. SO3K dapat menurunkan kadar bahan organik, kadar amonia dan kadar nitrat pada limbah cair RPA.

Kata Kunci: limbah cair, rumah potong ayam, *Rothia* sp., bioremediasi.

**EFFECT ADDING WASTEWATER FROM SLAUGHTERHOUSE
INDUSTRIES ON THE GROWTH AND ABILITY OF
Rothia sp. SO3K IN DEGRADING
ORGANIC WASTE**

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ABSTRACT

This research aims to understand the growth behavior of the *Rothia* sp. SO3K bacteria isolate in chicken slaughterhouse wastewater and its ability to degrade organic matter through the nitrification – denitrification process aerobically, acting as bioremediation agent. The research began by cultivating *Rothia* sp. SO3K on solid and liquid medium with the addition of chicken slaughterhouse wastewater concentrations of 0%, 25%, 50%, 75%, and 100%. Bacterial viability was also observed by inoculating bacteria that had been incubated in liquid waste medium for 24 and 48 hours on solid nutrient medium. The ability of *Rothia* sp. SO3K to reduce ammonia, nitrate, and organic matter in chicken slaughterhouse wastewater was tested before and after the aeration process for four days. The data collected included bacterial growth, bacterial viability, *total solid* (TS) value, total volatile solid (TVS) value, total suspended solid (TSS) value, total dissolved solid (TDS) value, biological oxygen demand (BOD₅), chemical oxygen demand (COD), ammonia content, and nitrate content. The research data were statistically analyzed using a complete randomized design (CRD) with a one-way pattern followed by Duncan's Multiple Range Test (DMRT). The results indicated that *Rothia* sp. SO3K could grow in both liquid and solid mediums under each treatment. The largest reduction percentage for TS value was $43.98 \pm 2.182\%$ in B2, TVS value was $35.10 \pm 5.157\%$ in B3, TDS value was $42.54 \pm 2.580\%$ in B4, TSS value was $-46.41 \pm 8.988\%$ in B3, BOD₅ value was $66.63 \pm 17.519\%$ in B4, COD value was $87.46 \pm 5.377\%$ in B4, ammonia value was $11.913 \pm 4.495\%$ in B3, and nitrate value was $25.62 \pm 1.66\%$ in B3. It can be concluded *Rothia* sp. SO3K could reduce the levels of organic matter, ammonia, and nitrate in chicken slaughterhouse wastewater.

Keywords: wastewater, chicken slaughterhouse, *Rothia* sp., bioremediation.