

EFEKTIVITAS BIOREAKTOR DALAM MENGURAIKAN BAHAN ORGANIK LIMBAH CAIR RUMAH POTONG AYAM DENGAN MEMANFAATKAN *Rothia* sp. SO3K

Anisa Yuni Azizah
21/482730/PT/09105

INTISARI

Penelitian ini bertujuan untuk mengetahui efektivitas bioreaktor dalam menurunkan dan menguraikan bahan organik limbah cair rumah potong ayam (RPA) dengan memanfaatkan *Rothia* sp. SO3K sebagai agen bioremediasi. Penelitian dilakukan dengan karakterisasi pertumbuhan *Rothia* sp. SO3K dalam medium cair dan padat dengan konsentrasi limbah cair RPA sebesar 0%, 25%, 50%, 75%, dan 100%. Viabilitas bakteri diamati dengan inokulasi bakteri yang telah diinkubasi dalam medium cair selama 24 dan 48 jam pada medium padat. Efektivitas bioreaktor dalam menguraikan bahan organik limbah cair RPA yang memanfaatkan *Rothia* sp. SO3K diuji sebelum dan setelah proses aerasi selama 4 hari. Perlakuan yang digunakan untuk proses aerasi yaitu dengan 100% limbah cair RPA. Data yang diperoleh yaitu pertumbuhan bakteri medium cair dan padat, viabilitas bakteri, nilai *total solid* (TS), nilai *total volatile solid* (TVS), nilai *total suspended solid* (TSS), nilai *total dissolved solid* (TDS), nilai *biological oxygen demand* (BOD), nilai *chemical oxygen demand* (COD), nilai kadar amonia, dan nilai kadar nitrat. Data pertumbuhan bakteri medium cair dan viabilitas bakteri dianalisis secara deskriptif. Data pertumbuhan bakteri medium padat dianalisis secara statistik menggunakan analisis variansi (ANOVA) Rancangan Acak Lengkap (RAL) pola searah yang dilanjutkan dengan uji *Duncan's Multiple Range Test* (DMRT). Data TS, TVS, TSS, TDS, BOD, COD, kadar amonia, dan kadar nitrat dianalisis secara statistik menggunakan *Paired T-Test*. Hasil penelitian diperoleh bahwa *Rothia* sp. SO3K dapat tumbuh optimal di medium cair dan padat dengan konsentrasi 0% dan 100% limbah cair RPA. Proses aerasi berpengaruh nyata ($P < 0,05$) terhadap nilai TS, TVS, TSS, BOD, COD, dan kadar amonia. Proses aerasi tidak memberikan pengaruh nyata ($P > 0,05$) terhadap nilai TDS dan kadar nitrat. Penggunaan bioreaktor efektif dalam menguraikan bahan organik dengan memanfaatkan *Rothia* sp. SO3K sebagai agen bioremediasi.

Kata kunci: bioreaktor, limbah cair, rumah potong ayam, *Rothia* sp. SO3K, bioremediasi.

EFFECTIVENESS OF BIOREACTORS IN DEGRADING ORGANIC MATTERS IN THE CHICKEN SLAUGHTERHOUSE WASTEWATER UTILIZING *Rothia* sp. SO3K

Anisa Yuni Azizah
21/482730/PT/09105

ABSTRACT

The aim of this research was to determine the effectiveness of a bioreactor in reducing and degrading organic matters in chicken slaughterhouse wastewater by utilizing *Rothia* sp. SO3K as a bioremediation agent. The research was conducted by characterizing the growth of *Rothia* sp. SO3K in liquid and solid medium that contain chicken slaughterhouse wastewater concentrations of 5%, 25%, 50%, 75%, and 100%. Bacterial viability was observed by inoculating bacteria that had been incubated in liquid waste medium for 24 and 48 hours in solid nutrient medium. The effectiveness of the bioreactors in reducing organic matters in chicken slaughterhouse wastewater using *Rothia* sp. SO3K was tested before and after by aeration process for 4 days. The treatment was selected on the best bacterial growth characterization results in both liquid and solid medium, identified as P4 with 100% chicken slaughterhouse wastewater. The data obtained included bacterial growth in liquid and solid media, bacterial cell viability, the value of total solid (TS), total volatile solid (TVS), total suspended solid (TSS), total dissolved solid (TDS), biological oxygen demand (BOD), chemical oxygen demand (COD), ammonia and nitrate levels. The research data on bacterial growth in liquid medium and bacterial viability were analyzed descriptively. Bacterial growth in solid media was statistically analyzed using one-way Analysis of Variance (ANOVA) with unidirectional patterns of Complete Randomized Design (CRD) and continued with Duncan's Multiple Range Test (DMRT). The research data on TS, TVS, TSS, TDS, BOD, COD, ammonia and nitrate levels were statistically analyzed using Paired T-Test. The results showed that *Rothia* sp. SO3K grew optimally in both liquid and solid medium at 0% and 100% wastewater. The aeration process had a significant effect ($P < 0,05$) on TS, TVS, TSS, BOD, COD, and ammonia levels. However, it had no significant effect ($P > 0,05$) on TDS and nitrate levels. The organic matter was degraded by *Rothia* sp. SO3K as a bioremediation agent, indicated by the reduction in TS, TVS, TSS, TDS, BOD, COD, ammonia and nitrate levels through an aeration process in a bioreactor, resulting in improved chicken slaughterhouse wastewater quality.

Keywords: bioreactor, wastewater, chicken slaughterhouse, *Rothia* sp. SO3K, bioremediation.