

RINGKASAN

Limbah cair industri tahu mengandung zat organik tinggi yang dapat mencemari lingkungan perairan apabila tidak diolah dengan baik. Penelitian ini bertujuan untuk mengkaji efektivitas mikroalga *Spirulina platensis* sebagai agen fikoremediasi dalam menurunkan kadar polutan pada limbah cair tahu, dengan parameter utama meliputi *Chemical Oxygen Demand* (COD), *Dissolved Oxygen* (DO), *Total Suspended Solid* (TSS), pH, suhu, dan pertumbuhan alga. Penelitian dilakukan secara eksperimental kuantitatif dengan Rancangan Acak Lengkap (RAL) menggunakan tiga perlakuan *Spirulina platensis* (10%, 30%, 50%) dan kontrol dengan 6 ulangan. Kondisi awal limbah berbusa, berwarna kuning dan memiliki nilai COD 894,28, TSS 820, DO 0,63 dan pH 3,5. Setelah proses fikoremediasi selama 7 hari, menunjukkan bahwa perlakuan 50% *Spirulina platensis* mampu menurunkan kadar COD hingga 58%, TSS sebesar 72%, serta meningkatkan kadar DO sebesar 24%. Selain itu, terjadi peningkatan nilai pH kisaran 3,5 -8,10 dan suhu berfluktuasi 26,6 °C- 32,6 °C. Hasil uji ANOVA dan DMRT mengonfirmasi adanya perbedaan signifikan antar perlakuan dengan perlakuan terbaik pada perlakuan P3. Dengan demikian, *Spirulina platensis* terbukti mampu digunakan untuk mendegradasi dan memperbaiki kualitas limbah cair tahu sebelum dibuang ke lingkungan.

Kata kunci: fikoremediasi, kualitas air, limbah tahu, *Spirulina platensis*.

SUMMARY

Tofu industrial wastewater contains high organic matter that can pollute the aquatic environment if not treated properly. This study aims to assess the effectiveness of *Spirulina platensis* microalgae as a phycoremediation agent in reducing pollutant levels in tofu wastewater, with the main parameters including *Chemical Oxygen Demand* (COD), *Dissolved Oxygen* (DO), *Total Suspended Solid* (TSS), pH, temperature, and algae growth. The study was conducted quantitatively with a Completely Randomized Design (CRD) using three *Spirulina platensis* treatments (10%, 30%, 50%) and one control with 6 replications. The initial condition of the wastewater was foamy, yellow, and had a COD value of 894.28, TSS 820, DO 0.63, and pH 3.5. After a phycoremediation process for 7 days, it was proven that the 50% *Spirulina platensis* treatment was able to reduce COD levels by 58%, TSS by 72%, and increase DO levels by 24%. Furthermore, there was an increase in pH values ranging from 3.5 to 8.10 and temperature fluctuated from 26.6°C to 32.6°C. The results of the ANOVA and DMRT tests showed significant differences between treatments, with the best treatment being treatment P3. Thus, *Spirulina platensis* has been proven to be able to be used to degrade and improve the quality of tofu liquid waste before it is discharged into the environment.

Keywords: *Spirulina platensis*, tofu waste, phycoremediation, water quality.