Uji Kemampuan Azolla sp. sebagai Agen Bioremediasi Air Limbah Laundry = Ability Test of Azolla sp. as Bioremediation Agent for Laundry Wastewater

Alya Jannata Shafira, author

Abstrak

Bioremediasi merupakan upaya untuk menghilangkan zat kontaminan dari lingkungan menggunakan bantuan makhluk hidup. Azolla sp. merupakan tumbuhan paku air yang memiliki kemampuan bioremediasi karena memiliki kemampuan produksi biomassa yang cepat dan ketahanan terhadap zat kontaminan. Air limbah laundry adalah air yang dibuang setelah digunakan untuk mencuci pakaian. Penelitian uji kemampuan Azolla sp. sebagai agen bioremediasi air limbah laundry bertujuan untuk menganalisis pengurangan konsentrasi fosfat, nitrat, TSS, dan COD pada air limbah laundry. Penelitian dilakukan selama 21 hari dengan perlakuan air limbah laundry, yaitu 20% (P1), 40% (P2), 60% (P3), 80% (P4) dan 100% (P5) air limbah laundry. Masing-masing perlakuan dilakukan dalam empat kali ulangan. Analisis statistik menggunakan uji non-parametrik korelasi Spearman untuk mengetahui korrlasi antara biomassa basah Azolla sp. dengan perubahan konsentrasi fosfat, nitrat dan TSS pada air limbah laundry. Hasil yang diperoleh dari penelitian adalah biomassa tertinggi terdapat pada perlakuan P1 pada waktu tanam T14. Persen efisiensi pengurangan konsentrasi fosfat, nitrat dan TSS tertinggi pada waktu tanam T7—T14 terjadi pada perlakuan P3, P4 dan P1 sebanyak 72%, 77% dan 33% berturut-turut. Persen efisiensi pengurangan konsentrasi COD tertinggi pada perlakuan P5 waktu tanam T21 sebanyak 45%. Persen efisiensi pengurangan kadar fosfat, nitrat, dan TSS tertinggi terdapat pada minggu kedua (T7—T14) percobaan. Penelitian ini menunjukkan titik jenuh Azolla sp. dalam menolerir kontaminan fosfat dan TSS adalah 14 hari, sedangkan nitrat dan COD adalah 21 hari. Nilai korelasi antara biomassa basah Azolla sp. dengan perubahan konsentrasi kontaminan air limbah laundry beragam.

.....Bioremediation is an effort to remove contaminants from the environment using the help of living things. Azolla sp. is a water fern that has bioremediation ability because it has the ability to produce fast biomass and is resistant to contaminants. Laundry wastewater is water that is discharged after being used to wash clothes. Research on the ability test of Azolla sp. as a laundry wastewater bioremediation agent aims to analyze the reduction in the concentration of phosphate, nitrate, TSS, and COD in laundry wastewater. The study was conducted for 21 days with laundry wastewater treatment, namely 20% (P1), 40% (P2), 60% (P3), 80% (P4) and 100% (P5) laundry wastewater. Each treatment was carried out in four replications. Statistical analysis using non-parametric Spearman correlation test to determine the correlation between wet biomass of Azolla sp. with changes in the concentration of phosphate, nitrate and TSS in laundry wastewater. The results obtained from the study were that the highest biomass was found in the P1 treatment at T14 planting time. The highest percentage reduction efficiency of phosphate, nitrate and TSS concentrations at planting time T7-T14 occurred in treatments P3, P4 and P1 as much as 72%, 77% and 33%, respectively. The highest percentage of COD concentration reduction efficiency in P5 treatment at T21 planting time was 45%. The highest percentage of phosphate, nitrate, and TSS reduction efficiency was found in the second week (T7-T14) of the experiment. This study shows the saturation point of Azolla sp. in tolerating phosphate and TSS contaminants is 14 days, while nitrate and COD are 21 days. The correlation value between the wet biomass

of Azolla sp. with changes in the concentration of laundry wastewater contaminants varies.