

THE EFFECTIVENESS OF BIOCOAGULANT VARIATIONS OF PAPAYA SEED (*CARICA PAPAYA*) AND MORINGA SEED (*MORINGA OLEIFERA L*) EXTRACTS IN REDUCING COD AND TSS LEVELS IN WASTEWATER FROM 'SAT SET LAUNDRY EXPRESS' IN POGUNG KIDUL HAMLET

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ABSTRACT

Background : The growth of the laundry industry in Yogyakarta has led to an increase in untreated wastewater discharge, such as that from Sat Set Laundry Express, Sleman. Laboratory results showed that the COD and TSS levels in the wastewater exceeded the regulatory standards. The coagulation-flocculation method using natural biocoagulants offers an alternative solution for wastewater treatment. Moringa seeds have proven effective but are limited in availability in urban areas. As an alternative, papaya seeds are more accessible and also possess the ability to reduce COD and TSS. Therefore, this study applied a combination of papaya seed and moringa seed extracts with varying compositions of 1:1, 2:1, and 3:1 to reduce pollutants in laundry wastewater.

Objective : To determine the effectiveness of varying compositions of biocoagulant extracts from papaya seeds (*Carica papaya*) and moringa seeds (*Moringa oleifera L*) in reducing COD and TSS levels in laundry wastewater at composition ratios of 1:1, 2:1, and 3:1.

Method : This research is a *quasi-experimental* study using a *pre-test post-test* with control group design.

Research results : Descriptively, the 3:1 composition showed the highest reduction in COD and TSS, at 58.90% and 57.26% respectively. However, statistical tests showed that the COD reduction was not significant ($p > 0.05$), while there were significant differences in TSS for some treatments

Conclusion : The variation in biocoagulant composition of papaya seed and moringa seed extracts affected the reduction of COD, TSS, and pH, with the highest effectiveness observed at the 3:1 composition.

Key words : Biocoagulant, Papaya Seeds, Moringa Seeds, COD, TSS, Laundry Wastewater

EFEKTIVITAS VARIASI BIOKOAGULAN BIJI PEPAYA (*CARICA PAPAYA*) DAN BIJI KELOR (*MORINGA OLEIFERA L*) UNTUK MENURUNKAN KADAR COD, DAN TSS LIMBAH CAIR “SAT SET LAUNDRY EXPRESS” DI DUSUN POGUNG KIDUL

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ABSTRAK

Latar Belakang : Pertumbuhan industri laundry di Yogyakarta berdampak pada meningkatnya limbah cair yang dibuang tanpa pengolahan, seperti di Sat Set Laundry Express, Sleman. Hasil uji menunjukkan kadar COD dan TSS limbah melebihi baku mutu. Metode koagulasi-flokulasi dengan biokoagulan alami menjadi solusi alternatif pengolahan limbah. Biji kelor terbukti efektif, namun sulit dijumpai di daerah perkotaan. Sebagai alternatif, biji pepaya mudah diperoleh dan juga memiliki kemampuan menurunkan COD dan TSS. Oleh karena itu, digunakan kombinasi ekstrak biji pepaya dan biji kelor dengan variasi komposisi 1:1, 2:1, dan 3:1 dalam menurunkan kadar pencemar pada limbah cair laundry.

Tujuan : Mengetahui efektivitas variasi komposisi biokoagulan ekstrak biji pepaya (*Carica papaya*) dan biji kelor (*Moringa oleifera L*) dalam menurunkan kadar COD dan TSS pada limbah cair laundry dengan komposisi perbandingan 1:1, 2:1, dan 3:1.

Metode : Jenis penelitian ini berupa *Quasi Experiment* dengan desain penelitian *pre test-post test with control group design*

Hasil : Secara deskriptif, komposisi 3:1 memberikan penurunan tertinggi terhadap kadar COD dan TSS, masing-masing sebesar 58,90% dan 57,26%. Namun, uji statistik menunjukkan bahwa penurunan kadar COD tidak signifikan ($p>0,05$), sedangkan untuk TSS terdapat perbedaan signifikan pada beberapa perlakuan.

Kesimpulan : Variasi komposisi biokoagulan ekstrak biji pepaya dan biji kelor berpengaruh terhadap penurunan COD, TSS, dan pH, dengan efektivitas tertinggi pada komposisi 3:1.

Kata Kunci : Biokoagulan, Biji Pepaya, Biji Kelor, COD, TSS, Limbah Laundry