

RINGKASAN

Saat ini perkembangan dunia industri di Indonesia mengalami kemajuan yang cukup pesat. Semakin maju perkembangan suatu industri, maka semakin banyak limbah yang dihasilkan. Limbah *degreasing* merupakan salah satu penyebab dari permasalahan lingkungan. Degradasi limbah dilakukan dengan memanfaatkan mikroorganisme, salah satunya jamur *Trichoderma* sp. Jamur digunakan dalam mendegradasi limbah serta ditingkatkan dengan menggunakan metode imobilisasi Abu boiler berpotensi sebagai bahan pendukung imobilisasi karena memiliki luas permukaan yang besar dan stabilitas yang tinggi. Penelitian ini bertujuan untuk mengetahui kemampuan jamur *Trichoderma* sp. yang terimobilisasi abu boiler pada lama waktu inkubasi berbeda dalam degradasi limbah *degreasing*, dan mengetahui lama waktu inkubasi yang optimal pada penggunaan jamur *Trichoderma* sp. yang terimobilisasi abu boiler dalam degradasi limbah *degreasing*.

Penelitian ini menggunakan metode eksperimental dengan Rancangan Acak Lengkap (RAL) yang terdiri atas 7 perlakuan dan 4 kali pengulangan yaitu kontrol jamur *Trichoderma* sp., kontrol abu boiler, inkubasi Jamur *Trichoderma* sp. terimobilisasi abu boiler selama 0, 24, 72, 120, dan 168 jam. Variabel bebas yang diamati yaitu waktu inkubasi, sedangkan variabel terikat dalam yaitu kemampuan jamur *Trichoderma* sp. terimobilisasi abu boiler dalam degradasi limbah *degreasing*. Parameter utama yang diukur adalah persentase dekolonisasi limbah *degreasing* sedangkan parameter pendukung yang diukur adalah DO, pH, suhu, pengamatan mikroskopis pelet miselium, dan pemakaian berulang pelet miselium terimobilisasi abu boiler. Data hasil uji kemampuan degradasi dianalisis menggunakan *Analysis of Variance* (ANOVA) dengan tingkat kesalahan sebesar 5% kemudian dilanjutkan dengan uji Beda Nyata Jujur dengan tingkat kesalahan 5%.

Hasil penelitian menunjukkan bahwa perlakuan jamur *Trichoderma* sp. terimobilisasi abu boiler dapat mendegradasi limbah *degreasing*. Penggunaan jamur *Trichoderma* sp. terimobilisasi abu boiler dengan waktu inkubasi 168 jam mampu memberikan hasil yang paling tinggi dengan rata-rata persentase dekolonisasi sebesar 90,29%. Hasil tersebut didukung oleh pengukuran kadar DO sebesar 7 mg/L, nilai pH sebesar 3,8, nilai suhu, pelet miselium menjadi berwarna hitam, dan pelet miselium terimobilisasi abu boiler dapat diulang hingga 3 kali.

Kata kunci: Abu boiler, degradasi, imobilisasi, limbah *degreasing*, *Trichoderma* sp.

SUMMARY

Currently the development of the industrial in Indonesia is progressing quite rapidly. The more advanced the development of an industry, the more waste it will produce. Degreasing waste is one of the causes of environmental problems. Waste degradation is carried out by utilizing microorganisms, one of which is fungi *Trichoderma* sp. Fungi are used to degrade waste and are improved using the immobilization method. Boiler ash has potential as a supporting material for immobilization because it has a large surface area and high stability. This research aims to determine the ability of *Trichoderma* sp. immobilized on boiler ash at different incubation times in degreasing waste degradation, and knowing the effective incubation time for *Trichoderma* sp. immobilized on boiler ash in degreasing waste degradation.

This research used an experimental method with a Completely Randomized Design (CRD) consisted of 7 treatments and 4 repetitions, namely fungal control *Trichoderma* sp., boiler ash control, incubation time of *Trichoderma* sp. immobilized on boiler ash for 0, 24, 72, 120, and 168 hours. The independent variable observed was incubation time, while the dependent variable was the ability of *Trichoderma* sp. immobilized on boiler ash in degreasing waste degradation. The main parameter measured was the decolorization presentation of degreasing waste and the supporting parameters were DO, pH, temperature, the character of mycelium pellets, and repeated use of mycelium pellets. Data decolorization percentage were analyzed using Analysis of Variance (ANOVA) with an error rate of 5% then continued with the Honest Significant Difference test with an error rate of 5%.

The research results showed that the fungal treatment *Trichoderma* sp. immobilized on boiler ash can degrade degreasing waste. The use of *Trichoderma* sp. immobilized on boiler ash with an incubation time of 168 hours was able to provide the highest results with an average decolorization percentage of 90.29%. These results were supported by DO levels 7 mg/L, pH value 3.8, temperature values, mycelium pellets were getting black color, and the mycelium pellets can be repeated up to 3 times.

Keywords: *Boiler ash, degradation, degreasing waste, immobilization, Trichoderma* sp.