

RINGKASAN

Industri batik merupakan salah satu subsektor industri tekstil yang diketahui berkontribusi besar untuk perekonomian nasional. Namun, masih banyak industri batik di Indonesia yang belum memiliki instalasi pengolahan air limbah. Akibatnya, air limbah langsung dibuang ke sungai. Padahal, limbah cair industri batik tinggi akan kandungan zat warna sintetis yang berbahaya bagi makhluk hidup dan lingkungan. Zat warna sintetis dapat terurai dengan sinar UV, namun membutuhkan waktu yang sangat lama. Akibatnya, laju akumulasi zat tersebut jauh melebihi laju dekolorisasinya, sehingga perlu dilakukan upaya mikoremediasi. Mikoremediasi dipilih karena biayanya yang rendah dan ramah lingkungan. *Aspergillus* sp. 2- coated magnetite digunakan sebagai agen pendekolorisasi zat warna (*naphthol*) pada limbah batik. Penggunaan *magnetite* pada penelitian ini diharapkan dapat meningkatkan efisiensi dekolorisasi dari *Aspergillus* sp. 2. Penelitian ini bertujuan untuk mengetahui kemampuan *Aspergillus* sp. 2-coated magnetite dalam mendekolorisasi zat warna pada limbah batik dan untuk mengetahui pengaruh waktu inkubasi terhadap persentase dekolorisasi.

Penelitian dilakukan menggunakan metode eksperimental dengan Rancangan Acak Lengkap (RAL). Sampel jamur *Aspergillus* sp. 2-coated magnetite dibagi menjadi lima kelompok (kontrol dan perlakuan) yang masing-masing dilakukan pengulangan sebanyak lima kali. Semua kelompok perlakuan diberi limbah *Naphthol* dengan interval waktu inkubasi 12 jam, sementara kelompok kontrol tanpa waktu inkubasi. Kelompok yang dimaksud diantaranya A0 (waktu inkubasi 0 jam), A1 (waktu inkubasi 12 jam), A2 (waktu inkubasi 24 jam), A3 (waktu inkubasi 36 jam), dan A4 (waktu inkubasi 48 jam). Parameter utama yang diukur adalah persentase dekolorisasi, dan parameter pendukungnya adalah nilai pH, TDS, dan suhu. Data persentase dekolorisasi selanjutnya dianalisis menggunakan analisis variansi (ANOVA) dengan tingkat kesalahan 5%.

Hasil penelitian menunjukkan bahwa rata-rata persentase dekolorisasi oleh *Aspergillus* sp. 2-coated magnetite berkisar 26,917-50,49%. Persentase dekolorisasi tertinggi dicapai pada perlakuan waktu inkubasi 12 jam (50,49%), namun hasil uji ANOVA menunjukkan tidak adanya pengaruh nyata antarperlakuan. Oleh karena itu dapat disimpulkan bahwa *Aspergillus* sp. 2-coated magnetite dapat mendekolorisasi zat warna pada limbah batik dan waktu Inkubasi tidak memiliki pengaruh nyata terhadap persentase dekolorisasi.

Kata Kunci: *Aspergillus* sp. 2-coated magnetite, limbah cair batik, *naphthol*.

ABSTRACT

The batik industry is a sub-sector of the textile industry, which has made a great contribution to the national economy. However, there are still many of those that do not have wastewater treatment plant. Thus, they discharged the waste directly into rivers. The concern is that wastewater from the batik industry contains high levels of synthetic dyes, which are toxic for the environment and nearby organisms. Synthetic dyes can be degraded by UV light, but it takes a long time. Because of this, the accumulation rate exceeds the decolorization rate, so it is necessary to implement mycoremediation to decolorize batik wastewater. Mycoremediation was chosen because of its low cost and environmental friendliness. *Aspergillus* sp. 2-coated magnetite is used as an agent to decolorize dye in batik waste. The use of magnetite in this research is intended to increase the decolorization efficiency by *Aspergillus* sp. 2. This research aims to determine the potency of *Aspergillus* sp. 2-coated magnetite for decolorizing batik effluent and to determine the effect of incubation time on the decolorization percentage.

The research was conducted using experimental methods with a Completely Randomized Design (CRD). Samples of the fungus *Aspergillus* sp. 2-coated magnetite were divided into five groups (control and treatment group), with five repetitions. All treatment groups were given Naphthol with an incubation time that varies with a 12-hour interval, whereas the control group had no incubation time. Those groups are A0 (with no incubation), A1 (12 hours of incubation), A2 (24 hours of incubation), A3 (36 hours of incubation), and A4 (48 hours of incubation). The parameters measured are the decolorization percentage as the main parameter, pH value, TDS, and temperature. The data on decolorization percentage were then analyzed using analysis of variance (ANOVA) with a 5% error rate.

The results showed that the decolorization percentage by *Aspergillus* sp. 2-coated magnetite ranged from 26,917-50,49%. The highest decolorization percentage was achieved at the 12 hour incubation time treatment (50,49%), but the ANOVA showed that there was no real influence between each treatment on the decolorization percentage. Therefore, it can be concluded that *Aspergillus* sp. 2-coated magnetite can decolorize dyes in batik wastewater, and incubation time has no real influence on the decolorization percentage.

Key words: *Aspergillus* sp. 2-coated magnetite, batik wastewater, naphthol.