

Karakterisasi Dan Seleksi Fungi Pendegradasi Limbah Pewarna Remazol *Black B* Dan Naftol *Yellow S* Pada Limbah Industri Batik di Bantul, Daerah Istimewa Yogyakarta

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INTISARI

Industri tekstil seperti batik memberikan kontribusi terhadap sejumlah besar limbah yang dibuang selama proses pencelupan. Zat warna azo merupakan zat warna yang paling banyak digunakan oleh industri tekstil dan tergolong zat warna reaktif seperti pewarna remazol dan naftol. Salah satu pendekatan secara biologis adalah dengan menggunakan teknik bioremediasi menggunakan fungi sebagai agen bioremediasi. Penelitian ini bertujuan untuk mengidentifikasi kemampuan isolat jamur potensial dalam mendekolorisasi variasi konsentrasi pewarna Remazol *Black B* (RBB) dan Naftol *Yellow S* (250ppm, 500ppm, 1000ppm, 1500ppm) dan limbah batik. Isolat potensial yang diperoleh kemudian diidentifikasi dan juga untuk mengidentifikasi kemampuan isolat jamur potensial dalam menghasilkan enzim lakase sebagai enzim yang berperan dalam proses bioremediasi. Hasil penelitian menunjukkan dari 98 isolat jamur, enam isolat menunjukkan positif uji lakase menggunakan asam tanat. Dua dari enam isolat jamur diidentifikasi sebagai *Aspergillus* sp.1 (74BRT) dan *Aspergillus* sp.2 (105PDL) dipilih untuk penelitian lebih lanjut berdasarkan efisiensi dekolorisasinya terhadap pewarna RBB (97,87% dan 93,62%) dan Naftol *Yellow S* (87,62% dan 89,99%). Efisiensi dekolorisasi *Aspergillus* sp.1 dan *Aspergillus* sp.2 terhadap limbah batik jauh lebih rendah (37,47% dan 42,09%) dibandingkan efisiensinya terhadap pewarna RBB dan Naftol *Yellow S*. Uji lakase kedua isolat ini menunjukkan bahwa *Aspergillus* sp.1 memiliki aktivitas enzim tertinggi pada 120 jam mencapai 12,23 IU/ml sedangkan *Aspergillus* sp.2 mencapai 9,34 IU/ml. Berdasarkan gen ITS, *Aspergillus* sp.1 memiliki kemiripan 100% dengan *Aspergillus tamarii* 54 sedangkan *Aspergillus* sp. 2 memiliki kemiripan 100% dengan *Aspergillus sclerotiorum* WSM12. Penelitian ini berhasil mendapatkan potensi jamur untuk pengolahan limbah cair pewarna.

Kata kunci : dekolorisasi, fungi pendegradasi, limbah batik, isolasi, seleksi.

**Characterization and Selection of Remazol *Black B* and Naftol *Yellow S* Dye-Degrading
Fungi in Batik Industry Waste in Bantul, Special Region of Yogyakarta**

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ABSTRACT

The textile industry such as batik contributed for a large amount of waste that is disposed during the dyeing process. Azo dyes were the most commonly used dyes by the textile industry and classified as reactive dyes including remazol and naphthol dyes. One of the biological treatments is using bioremediation techniques using fungi as a bioremediation agent. This study aims to identification on the ability of potential fungal isolates to decolorize variations in concentrations of Remazol Black B (RBB) and Naphthol Yellow S dye (250ppm, 500ppm, 1000ppm, 1500ppm) and batik effluent in liquid medium. The potential isolats obtained were then identified and also to identify the ability of the potential fungal isolats to produce laccase enzymes as enzymes that play a role in the bioremediation process. The results showed among ninety-eight fungalisolat, six isolates were positive for laccase assay using Tannic acid. Two of the six fungal isolates were identified as *Aspergillus* sp.1 (74BRT) and *Aspergillus* sp.2 (105PDL), was selected for the further study based on their high efficiency to decolorize RBB (97.87% and 93,62%) and Naphthol *Yellow S* (87.62% and 89,99%). Meanwhile, the efficiency of *Aspergillus* sp.1 and *Aspergillus* sp.2 to decolorize the batik effluent was lower than their efficiency to decolorize dye (37.47% and 42.09%). The laccase assay of these two isolates showed that *Aspergillus* sp.1 had the highest enzyme activity at 120h reached 12.23 IU/ml while *Aspergillus* sp.2 reached 9.34 IU/ml. Based on ITS gene, *Aspergillus* sp.1 had a 100% similarity with *Aspergillus tamarii* 54 and *Aspergillus* sp.2 had a 100% similarity with *Aspergillus sclerotiorum* WSMT12. This research succeeded in obtaining fungal potential for the treatment of dye wastewater.

Keywords: decolorization, degradation, fungi, batik waste, isolation, selection.