ABSTRACT

Effectiveness of Eco-Enzyme Application in Reducing BOD and COD Levels in the Treatment of Laminated Wood Industry Wastewater at PT. X, Samarinda

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Background : Industrial wastewater from laminated wood production contains organic pollutants measured as BOD and COD. At PT. X in Samarinda, wastewater from glue spreader cleaning is treated in a wastewater treatment plant (WWTP) and discharged into the Mahakam River. Eco-enzyme, a fermentation product of fruit peels, sugar, and water, may reduce organic pollutants but has not been applied in this industry.

Objective : To determine the effectiveness of eco-enzyme application in reducing BOD and COD concentrations in the treatment of wastewater from the laminated wood industry at PT. X, Samarinda City.

Methods: This quasi-experimental study used a pre-test–post-test design with a control group (December 2025–March 2026). Grab samples were taken from the WWTP inlet (2 L control, 6 L treatment). Eco-enzyme at 5%, 10%, and 15% was added to 1-L samples in duplicate and incubated for 20 days. BOD (iodometric titration, SNI 6989.72:2009) and COD (closed-reflux spectrophotometry, SNI 6989.2:2019) were measured, with pH and temperature monitored on days 1, 10, and 20. Effectiveness was expressed as percentage reduction.

Results: Initial BOD and COD were 1,443.9 and 8,264.5 mg/L. After treatment, mean BOD increased to 2,646.4, 4,226.4, and 5,286.4 mg/L, and mean COD to 10,741.0, 13,240.4, and 15,510.4 mg/L at 5%, 10%, and 15%, respectively. By day 20, pH had fallen to 5.3, 3.9, and 3.8 as concentration increased.

Eco-enzyme at 5–15% for 20 days did not reduce BOD or COD. Both parameters rose with concentration and remained above the quality standards (50 mg/L for BOD, 100 mg/L for COD), so eco-enzyme was ineffective as supplementary treatment under these conditions.

Keyword : Eco-enzyme; BOD and COD; Laminated Wood Industry