

**PENGENDALIAN PENCEMARAN AIR SUNGAI KATANG AKIBAT
LIMBAH CAIR INDUSTRI TAHU MENGGUNAKAN KOMBINASI
BIOFILTER DAN *CONSTRUCTED WETLAND* DI DESA MEJING,
KABUPATEN MAGELANG**

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INTISARI

Sentra Industri tahu di Desa Mejing, Kecamatan Candimulyo, Kabupaten Magelang, Provinsi Jawa Tengah merupakan sentra industri tahu skala rumahan yang telah berdiri sejak tahun 1970-an. Proses produksi tahu menghasilkan limbah cair yang dibuang langsung ke sungai Katang. Dampak yang ditimbulkan dari pembuangan limbah cair ke Sungai Katang adalah warna air sungai yang keruh serta timbulnya bau yang tidak sedap di sekitar sungai. Tujuan dilakukannya penelitian ini adalah menganalisis kualitas air limbah cair dan air sungai, serta status mutu air sungai di daerah penelitian; menganalisis efektifitas pengolahan limbah cair industri tahu menggunakan kombinasi metode biofilter aerob dan *constructed wetland* dengan media *bioball* dan tanaman melati air; serta merancang arahan pengolahan untuk kawasan sentra industri tahu di daerah penelitian.

Metode yang digunakan dalam penelitian ini berupa metode kuantitatif yang berfokus pada angka dan statistik. Pengumpulan data geofisik kimia pada penelitian menggunakan metode survei dan pengamatan. Kualitas air sungai dan air limbah diperoleh dari uji laboratorium, sampel air diambil menggunakan metode *purposive sampling* dengan teknik pengambilan sampel secara *grab sampling*. Percobaan pengolahan menggunakan kombinasi biofilter aerob dengan media *bioball* dan *constructed wetland* dengan media tanah, kerikil, serta tanaman melati air skala laboratorium dengan waktu tinggal 3, 6, dan 9 hari. Metode evaluasi berupa indeks pencemaran, evaluasi standar stream dan efisiensi pengolahan pada skala laboratorium dan metode analisis deskriptif.

Hasil penelitian menunjukkan semua parameter yang diuji pada limbah cair melebihi baku mutu. Kualitas air sungai sebelum outlet semua parameter memenuhi baku mutu, pada outlet hanya TSS yang memenuhi baku mutu, dan setelah outlet hanya BOD yang melebihi baku mutu. Air sungai memiliki nilai indeks pencemar sebesar 0,588 - 7,967 termasuk klasifikasi tidak tercemar hingga tercemar sedang. Pengolahan limbah cair tahu menggunakan kombinasi biofilter aerob dan *constructed wetland* memiliki nilai efisiensi tertinggi pada percobaan dengan variasi waktu tinggal 9 hari dengan penurunan BOD sebesar 98,919%, COD 98,484%, TSS 89,549%, dan pH 48,529% efisiensi tersebut mampu menurunkan kadar pencemar hingga memenuhi baku mutu. Arahan pengolahan yang disarankan berupa IPAL kombinasi biofilter dan *constructed wetland* dengan ukuran bak ekualisasi 5,5 x 6 x 4 m, bak biofilter aerob dengan ukuran 18 x 6 x 4 m, serta bak *constructed wetland* dengan ukuran 80 x 40 x 1,2 m.

Kata kunci: Industri Tahu, Limbah Cair Tahu, Pencemaran, Biofilter Aerob, *Constructed Wetland*

**CONTROL OF KATANG RIVER WATER POLLUTION DUE TO TOFU
INDUSTRY LIQUID WASTE USING A COMBINATION OF BIOFILTER
AND CONSTRUCTED WETLAND IN MEJING VILLAGE, MAGELANG
REGENCY**

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ABSTRACT

The Tofu Industry Center in Mejing Village, Candimulyo District, Magelang Regency, Central Java Province is a home-scale tofu industry center that has been established since the 1970s. The tofu production process produces liquid waste which is discharged directly into the Kutang river. The impact caused by the discharge of liquid waste into the Katang River is the turbid color of the river water and the emergence of unpleasant odors around the river. The purpose of this study is to analyze the quality of liquid wastewater and river water, as well as the status of river water quality in the research area; analyze the effectiveness of tofu industry liquid waste treatment using a combination of aerobic biofilter methods and constructed wetland with bioball media and water jasmine plants; As well as designing processing directions for the tofu industrial center area in the research area.

The method used in this study is in the form of quantitative methods that focus on numbers and statistics. Collection of chemical geophysical data in research using survey and observation methods. The quality of river water and wastewater is obtained from laboratory tests, water samples are taken using the purposive sampling method with grab sampling techniques. The processing experiment used a combination of aerobic biofilters with bioball media and constructed wetland with soil, gravel, and laboratory-scale water jasmine plants with residence times of 3, 6, and 9 days. Evaluation methods in the form of pollution indexes, evaluation of stream standards and processing efficiency on a laboratory scale and descriptive analysis methods.

The results showed that all parameters tested on liquid waste did not meet quality standards. River water quality before the outlet all parameters meet quality standards, at outlets only TSS meets quality standards, and after outlets only BOD does not meet quality standards. River water has a pollutant index value of 0.588 - 7.967 is classified as unpolluted to moderately polluted. Tofu liquid waste treatment using a combination of aerobic biofilters and constructed wetland has the highest efficiency value in experiments with a variation in residence time of 9 days with a decrease in BOD of 98.919%, COD 98.484%, TSS 89.549%, and pH 48.529% of the efficiency is able to reduce pollutant levels to meet quality standards. The recommended processing directions are a combination WWTP biofilter and constructed wetland with an equalization body size of 5.5 x 6 x 4 m, an aerobic biofilter body with a size of 18 x 6 x 4 m, and a constructed wetland body with a size of 80 x 40 x 1.2 m.

Keywords: *Tofu Industry, Tofu Liquid Waste, Pollution, Biofilter Aerob, Constructed wetland*