

**PENGENDALIAN PENCEMARAN AIR SUNGAI AKIBAT LIMBAH CAIR  
INDUSTRI TAHU MENGGUNAKAN METODE BIOFILTER DI DESA  
KARTASURA, KECAMATAN KARTASURA, KABUPATEN SUKOHARJO,  
PROVINSI JAWA TENGAH**

**Oleh:  
Ghina Fadhilah  
114180008**

**INTISARI**

Seluruh kegiatan manusia akan menghasilkan entropi seperti halnya industri tahu di Desa Kartasura yang mengasihkan limbah padat dan cair yang dapat meningkatkan risiko pencemaran air permukaan akibat dari aktivitas pembuangan limbah cair ke lingkungan. Industri tahu rumahan berskala kecil di Desa Kartasura, Kecamatan Kartasura, Kabupaten Sukoharjo, Jawa Tengah telah beroperasi sejak tahun 1980 dan langsung membuang limbah hasil produksi tahu ke Sungai Purwogondo. Kondisi fisik air sungai di daerah penelitian terlihat memiliki warna kecoklatan dan memiliki bau yang kurang sedap. Tujuan dilakukannya penelitian ini adalah mengidentifikasi kualitas dari limbah cair industri tahu dan air sungai di lokasi penelitian, mengidentifikasi status mutu air sungai di lokasi penelitian, dan memberikan arahan pengolahan terhadap limbah cair industri tahu di lokasi penelitian.

Penelitian ini menggunakan metode kombinasi kualitatif dan kuantitatif dengan metode pengumpulan data berupa studi pustaka, observasi bio-geofisik, lingkungan sosial, uji laboratorium, survei pemetaan yang didapatkan dari pengumpulan data hasil primer dan sekunder, serta uji laboratorium dengan menggunakan parameter BOD, COD, TSS, dan pH. Teknik sampling yang digunakan pada limbah tahu berupa *purposive sampling* dan pengambilan air sungai menggunakan metode *systematic random sampling* berdasarkan jarak segmen sungai sebesar 20 meter untuk S2 hingga S4. Pengambilan sampel limbah cair tahu dilakukan pada outlet limbah, dan sampel air sungai dilakukan pada 1 titik sebelum dan 3 titik setelah pembuangan limbah cair tahu. Arahan pengolahan limbah cair dengan *Experimental Deisgn* yaitu membuat rancangan percobaan pada skala laboratorium. Percobaan unit pengolahan biofilter skala laboratorium dilakukan dengan media ijuk, zeolit, arang aktif, pasir silika, dan kerikil dengan laju aliran 50 mL/menit; 100 mL/menit; dan 150 mL/menit.

Hasil penelitian menunjukkan bahwa limbah cair tahu melebihi dengan baku mutu dengan nilai parameter BOD 4010,03 mg/L; COD 6000,11 mg/L; TSS 335 mg/L; dan pH 3,8. Air sungai daerah penelitian memiliki kualitas air tercemar ringan hingga tercemar berat. Hasil evaluasi *standar stream* menunjukkan pada parameter TSS dan COD masih diatas standar baku mutu air sungai dengan nilai 65,0348 dan 334,1703. Unit biofilter pada unit pertama dapat dijadikan arahan pengolahan dengan laju aliran 50 mL/menit dan efisiensi BOD, COD, TSS, dan pH berturut-turut yaitu 20,9098 %; 49,9990 %; 85,0746 %; dan 80,0000 %, namun nilai efisiensi masih belum dapat menurunkan konsentrasi BOD, TSS, dan COD hingga standar baku mutu sehingga perlu penanganan lebih lanjut.

**Kata Kunci:** Industri tahu; limbah cair tahu; status mutu air; indeks pencemaran; biofilter

**RIVER WATER POLLUTION CONTROL DUE TO LIQUID WASTE OF TOFU  
INDUSTRY USING BIOFILTER METHOD IN KARTASURA VILLAGE,  
KARTASURA DISTRICT, SUKOHARJO REGENCY, CENTRAL JAVA**

**By:**

**Ghina Fadhilah**  
**114180008**

**ABSTRACT**

*All human activities will produce entropy such as the tofu industry in Kartasura Village which produces solid and liquid waste which can increase the risk of surface water pollution as a result of the activity of disposing of liquid waste into the environment. The small-scale home-based tofu industry in Kartasura Village, Kartasura District, Sukoharjo Regency, Central Java has been operating since 1980 and immediately disposes of the waste from tofu production into the Purwogondo River. The physical condition of the river water in the study area appears to have a brownish color and has an unpleasant odor. The purpose of this research is to identify the quality of the tofu industrial wastewater and river water at the research location, identify the status of river water quality at the research location, and provide recommendation for the tofu industrial wastewater treatment at the research location.*

*The research uses a combination of qualitative and quantitative methods with data collection methods in the form of literature studies, bio-geophysical observations, social environment, laboratory tests, mapping surveys obtained from primary and secondary data collection, and laboratory tests with parameters BOD, COD, TSS, and pH. The sampling technique used in tofu waste is purposive sampling and river water collection using systematic random sampling method. Sampling of tofu liquid waste was carried out at the waste outlet, and river water samples were taken at 1 point before and 3 points after the disposal of tofu liquid waste. The direction of wastewater treatment with Experimental Design is to make experimental designs on a laboratory scale. Laboratory-scale biofilter processing unit experiments were carried out with palm fiber media, zeolite, activated charcoal, silica sand, and gravel with a flow rate of 50 mL/minute; 100 mL/min; and 150 mL/min.*

*The results showed that the tofu liquid waste was not in accordance with the quality standard with a parameter value of BOD 4010.03 mg/L; COD 6000.11 mg/L; TSS 335 mg/L; and pH 3.8. The river water in the research area has a water quality of lightly polluted to heavily polluted. The results of the standard stream evaluation show that the TSS and COD parameters are still above the river water quality standards with values of 65.0348 and 334.1703. The biofilter unit in the first unit can be used as a treatment direction with a flow rate of 50 mL/minute and the efficiency of BOD, COD, TSS, and pH, respectively, which is 20.9098%; 49,9990%; 85,0746 %; and 80.0000%, but the efficiency value is still not able to reduce the concentration of BOD, TSS, and COD to quality standards so that further treatment is needed.*

**Keywords:** *Tofu industry; tofu liquid waste; water quality status; pollution index; biofilter*