

**PENGENDALIAN PENCEMARAN AIR SUNGAI AKIBAT LIMBAH CAIR  
INDUSTRI TAHU DI DESA NGEMBAT PADAS, KECAMATAN GEMOLONG,  
KABUPATEN SRAGEN, JAWA TENGAH**

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**INTISARI**

Industri tahu di Desa Ngembat Padas, Kecamatan Gemolong, Kabupaten Sragen, Jawa Tengah merupakan industri tahu rumahan berskala kecil. Industri tahu di Desa Ngembat Padas telah beroperasi sejak tahun 1996 dan langsung membuang limbah hasil produksi ke Sungai Sentulan. Dampak langsung yang dirasakan masyarakat berupa timbulnya bau, adanya perubahan warna, dan munculnya endapan pada sungai. Sungai Sentulan sebagai badan air penerima limbah cair tahu dimanfaatkan oleh masyarakat sebagai sumber air pada lahan pertanian. 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.

Pengumpulan data geofisik kimia pada penelitian menggunakan metode survey dan pemetaan. Pengambilan sampel limbah cair tahu menggunakan metode *purposive sampling* dan air sungai menggunakan metode *systematic random sampling*. Pengambilan sampel limbah cair tahu dilakukan pada *outlet* limbah, sedangkan sampel air sungai dilakukan pada 1 titik sebelum dan 7 titik setelah pembuangan limbah cair tahu. Sampel air sungai diambil setiap perbedaan jarak 100 m, dengan total jarak 700 m. Kualitas limbah cair tahu dan air sungai didapatkan melalui uji laboratorium. Percobaan unit pengolahan biofilter aerob skala laboratorium dilakukan menggunakan media zeolit, arang aktif, dan kerikil dengan waktu tinggal 4 jam dan 8 jam. Metode matematis yang digunakan berupa indeks pencemaran dalam menentukan status mutu air dan efisiensi pengolahan limbah cair tahu pada skala laboratorium. Evaluasi semua data yang telah didapatkan dilakukan menggunakan metode evaluasi deskriptif.

Hasil penelitian menunjukkan limbah cair tahu tidak sesuai dengan baku mutu dengan nilai parameter BOD 1920 mg/L; COD 4675 mg/L; TSS 466 mg/L; dan pH 4,2. Limbah cair tahu mempengaruhi kualitas air sungai ditunjukkan dengan adanya perubahan nilai parameter BOD 9,3-62,9 mg/L, COD 28-127,5 mg/L, dan pH 5,8 pada sampel air sungai setelah *outlet* industri tahu yang tidak sesuai dengan baku mutu. Nilai indeks pencemaran Sungai Sentulan sebesar 0,616-6,0334 yang termasuk klasifikasi tidak tercemar hingga tercemar sedang. Arahan pengolahan yang diterapkan pada lokasi penelitian adalah pembuatan IPAL biofilter aerob. Pengolahan limbah cair tahu metode biofilter aerob menggunakan media zeolit, arang aktif, dan kerikil dengan waktu tinggal 4 jam didapatkan nilai efisiensi pengolahan berkisar antara 14,4142% - 47,7245% sedangkan pengolahan dengan waktu tinggal 8 jam didapatkan nilai efisiensi pengolahan berkisar antara 0,9210% - 45,2055%.

**Kata Kunci:** Industri tahu, limbah cair tahu, status mutu air, biofilter aerob.

**CONTROL OF RIVER WATER POLLUTION DUE TO WASTEWATER OF TOFU  
INDUSTRY IN NGEMBAT PADAS VILLAGE, GEMOLONG DISTRICT, SRAGEN  
REGENCY, CENTRAL JAVA**

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**ABSTRACT**

*The tofu industry in Ngembat Padas Village, Gemolong District, Sragen Regency, Central Java is a small-scale home-based tofu industry. The tofu industry in Ngembat Padas Village has been operating since 1996 and immediately disposes of its wastewater into the Sentulan River. The direct impact felt by the villagers are the emergence of smell, colour changes, and the appearance of sediment in the river. Sentulan River as a water body receiving tofu liquid waste is used by the villagers as a water source on irrigation of agricultural land. 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.*

*Survey and mapping methods are used to collect of geophysical-chemical data in this study. Sampling of tofu liquid waste and river water used purposive sampling method. Sampling of tofu industrial wastewater was carried out at the outlet of the industry, while river water samples were carried out at 1 location before and 7 locations after the disposal of tofu industrial wastewater. River water samples were taken every 100 m distance difference, with a total distance of 700 m. Laboratory tests used to determine the quality of tofu wastewater and river water. An experimental laboratory-scale of aerobic biofilter method processing unit was carried out using zeolite, activated charcoal, and gravel media with retention times of the treatment was 4 hours and 8 hours. The mathematical method used is a pollution index in determining the status of water quality and the efficiency of tofu wastewater treatment on a laboratory scale. Evaluation of all the data that has been obtained is carried out using a descriptive evaluation method.*

*The results showed that tofu wastewater was not in accordance with quality standards with the parameter value of BOD 1920 mg/L; COD 4675 mg/L; TSS 466 mg/L; and pH 4.2. Tofu wastewater affects river water quality as indicated by changes in the parameter values of BOD 9.3-62.9 mg/L, COD 28-127.5 mg/L, and pH 5.8 in river water samples after the outlet of tofu industry were not in accordance with quality standards. The Sentulan River pollution index value is 0.616-6.0334 which is classified as unpolluted to moderately polluted. The processing recommendation applied at the research location were the manufacture of an aerobic biofilter WWTP. Tofu wastewater treatment using aerobic biofilter method using zeolite, activated charcoal, and gravel media with a retention time of 4 hours obtained processing efficiency values ranging from 14.4142% - 47.7245% while processing with a retention time of 8 hours obtained processing efficiency values ranging from 0,9210% - 45,2055%.*

**Keywords:** *Tofu industry, tofu wastewater, water quality status, aerobic biofilter*