JURNAL ECOSOLUM
Volume 13 Issue 2, Desember 2024. P-ISSN: 2252-7923, E-ISSN: 2654-430X

Impact of Tofu X Factory Liquid Waste Discharge on Gentung River Water Quality, Pangkep Regency

Dampak Buangan Limbah Cair Pabrik Tahu X Terhadap Kualitas Air Sungai Gentung, Kabupaten Pangkep

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ABSTRACT

This research aims to determine the impact of tofu factory liquid waste on the water quality of the Gentung River, Pangkep Regency. Quantitative descriptive analysis is used to analyze and process data presented narratively. The data was obtained from laboratory test results taken from five sampling points (one wastewater sample point as a pollutant, three river water sample points in the tofu factory area, and one river water sample as comparative data) which was then compared with the water quality standard requirements of the secondclass river. Survey data, observations, and documentation were also used to strengthen the laboratory analysis results of this research. The research results show that tofu factory liquid waste hurts river water quality in terms of the parameters Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Dissolved Solids (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Organic Matter. The temperature, color, and pH parameters meet the established river water quality standards. So, it can be seen that the water from the Gentung River, Pangkep Regency, which is in the Tofu Factory Area, cannot be used as a source of clean water for the community and agricultural land and similar uses because the water is polluted. This research can be used as a source of information for local stakeholders who are taking steps to address environmental problems.

Keywords: Impact; tofu factory liquid waste; river water quality, Gentung River

ABSTRAK

Penelitian ini bertujuan untuk mengetahui dampak limbah cair pabrik tahu terhadap kualitas air Sungai Gentung Kabupaten Pangkep. Analisis deskriptif kuantitatif digunakan untuk menganalisis dan mengolah data yang disajikan secara naratif. Data diperoleh dari hasil uji laboratorium yang diambil dari lima titik pengambilan sampel (satu titik sampel air limbah sebagai pencemar, tiga titik sampel air sungai di area pabrik tahu, dan satu titik sampel air sungai sebagai data pembanding) yang kemudian dibandingkan dengan baku mutu air sungai kelas dua. Data survei, observasi, dan dokumentasi juga digunakan untuk memperkuat hasil analisis laboratorium dalam penelitian ini. Hasil penelitian menunjukkan bahwa limbah cair pabrik tahu berdampak buruk terhadap kualitas air sungai ditinjau dari parameter *Total Suspended Solids* (TSS), *Total Dissolved Solids* (TDS), *Dissolved Solids* (DO), *Biochemical Oxygen Demand* (BOD), *Chemical Oxygen Demand* (COD), dan Total Bahan Organik. Parameter suhu, warna, dan pH memenuhi baku mutu air sungai yang telah ditetapkan. Sehingga, dapat diketahui bahwa air Sungai Gentung Kabupaten Pangkep yang berada di Kawasan Pabrik Tahu tidak dapat dijadikan sumber air bersih bagi masyarakat dan lahan pertanian dan penggunaan sejenisnya karena memiliki kondisi air yang tidak sesuai dengan standa baku mutu kualitas air sungais. Penelitian ini dapat digunakan sebagai sumber informasi bagi pemangku kepentingan lokal yang mengambil langkah-langkah untuk mengatasi permasalahan lingkungan.

Kata Kunci: Dampak; Limbah Cair Pabrik Tahu X, Kualitas Air Sungai, Sungai Gentung

1. INTRODUCTION

River water quality problems are one of the main problems of environmental management today (Anidah H Triwulandari & Okik Hendriyanto Cahyonugroho, 2023; Hannan *et al*., 2024; Nasrul *et al*., 2024; Sylviani, 2010). Based on BPS data for 2022, it was recorded that only 8.2 percent of rivers met the quality standard requirements of the 110 rivers that had been identified as being in a mild to heavily polluted condition. This shows that the state of river water in Indonesia is mostly polluted (Adi, 2012; Dwiyanti Suryono, 2019; Nasrul *et al*, 2024; Sappa *et al*., 2015). So, it is necessary to make more massive efforts to overcome environmental problems (Altamis *et al*., 2023; Leparc *et al*., 2007; Nuryadin *et al*., 2024; Qaiyimah *et al*., 2024; Saraswati *et al*., 2017; Umasugi *et al*., 2021).

Various factors influence the decline in river water quality, including (1) People throwing rubbish into the river; (2) Disposal of domestic waste; (3) The influence of agricultural and pond activities; and (4) uncontrolled industrial waste discharge (Agustiningsih & Sasongko, 2012; Ahmad Iqbal Addzikri & Firra Rosariawari, 2023; Pohan *et al*., 2017; Prayogo, 2015; PS & Oktavianti, 2021). Based on this, it can be seen that human activity is the main indicator causing the decline in river water quality, such that physically and chemically it does not meet river water quality standards, both for clean water use and also for recreational needs, thus having an impact on humans and the environment (Eko Wiriani, 2020; Sasongko *et al*., 2014). Based on this, it can be seen that human activity is the main indicator causing the decline in river water quality, such that physically and chemically it does not meet river water quality standards, both for clean water use and also for recreational needs, thus having an impact on humans and the environment.If efforts are not taken to overcome this problem, it can damage the environmental ecosystem (Agustiningsih & Sasongko, 2012; Arni & Susilawati, 2022; Darmawan *et al*., 2021; Minggawati & Saptono, 2016; Qaiyimah *et al*., 2016; Rahmah *et al*., 2024).

The 2021 Badan Pusat Statistik (BPS) noted that 46 percent of rivers in Indonesia are polluted by industrial waste that flows directly into the river (Aliviyanti *et al*., 2022; Amru & Makkau, 2023; Haekal & Wibowo, 2023; Nuryadin *et al*., 2024). River water pollution that occurs due to the discharge of industrial waste can occur when the wastewater management installation (IPAL) in the industry does not meet the established standards (Karami & Titah, 2023; Pambdui *et al*., 2022; Sutapa & Tri, 2014). So quite a few rivers experience increasing industrial waste pollution. The occurrence of pollution in river water makes it difficult for

people to obtain clean water sources for agricultural land and plantations and even for household use (Niswati *et al*., 2024; Sulistia & Septisya, 2020).

Rivers with their water quality can be identified based on their physical, chemical, and biological aspects. Physically, the quality of river water can be seen directly from its color, taste, and smell. So quite a few people can conclude that the water is polluted if they see the physical condition of the river water directly. This can be seen from the condition of the people of Gentung Village who complain about the condition of the water quality due to the construction of a tofu industry which dumps liquid waste into the river. Remember, this river water was previously used as the main source of clean water by the community and after the construction of the tofu factory, many people now complain about the condition and condition of the water which feels itchy and unhealthy when used for bathing. This is what underlies the discrepancy in the community's response to river water before and after the factory was built.

The Gentung River is one of the rivers in Gentung Village, Labakkang District, Pangkep Regency. As a result of the construction of the tofu factory industry, the Gentung River water is rarely used by the community as a source of clean water. So it is necessary to conduct a study to see the impact of tofu factory liquid waste disposal on river water quality, which is considered the main source of river pollution. This is important to study because people have to look for sources of clean water from wells which are very far from their homes and of course, apart from requiring a lot of energy, it also involves a lot of money because there is no road access to the community's residential areas. The types of pollutants found in tofu liquid waste and their comparison with the standard requirements for river water quality can be seen in Table 1 below.

Table 1. Comparison of tofu liquid waste pollutant levels and river water quality standard requirements.

Parameter	Unit	Tofu liquid waste pollutant levels	Syarat baku mutu kualitas air sungai
Temperature	^{o}C	40-46	Dev 3
***Total Suspended Solids* (TSS)**	mg/l	>560	50
***Total Dissolved Solids* (TDS)**	mg/l	975	1.000
Color	TCU	>50	50
pH	-	4-5	6-9
***Dissolved Oxygen* (DO)**	mg/l	<4	4
***Biochemical Oxygen Demand* (BOD)**	mg/l	5000-10.000	3
***Chemical Oxygen Demand* (COD)**	mg/l	7000-12.000	25
Total Organic Ingredients	mg/l	>50	10

Source: Data on the pollutant content of tofu factory liquid waste based on Marian's 2019 research and river water quality standard requirements based on Republic of Indonesia Government Regulation number 22 of 2021

Water quality measurements need to be carried out to see the impact of tofu waste disposal on the water quality of the Gentung River. This is important as study material to serve as a source of information for people who complain about the water situation and as a source of information for the government in taking steps and policies related to handling environmental problems.

2. METHOD

The research was carried out by taking water samples at five sampling points using purposive sampling. Purposive sampling is intended as a non-random sampling technique where the researcher determines the sampling point by considering the special characteristics and characteristics of that location. This is adjusted to the objectives of the research conducted (Ningsih *et al*., 2020). The five sampling points consist of:

a. One point of the liquid waste sample is known to be a pollutant;
b. Three river water sample points located in the tofu factory area; and
c. One sample point at the upstream of the river as comparative data.

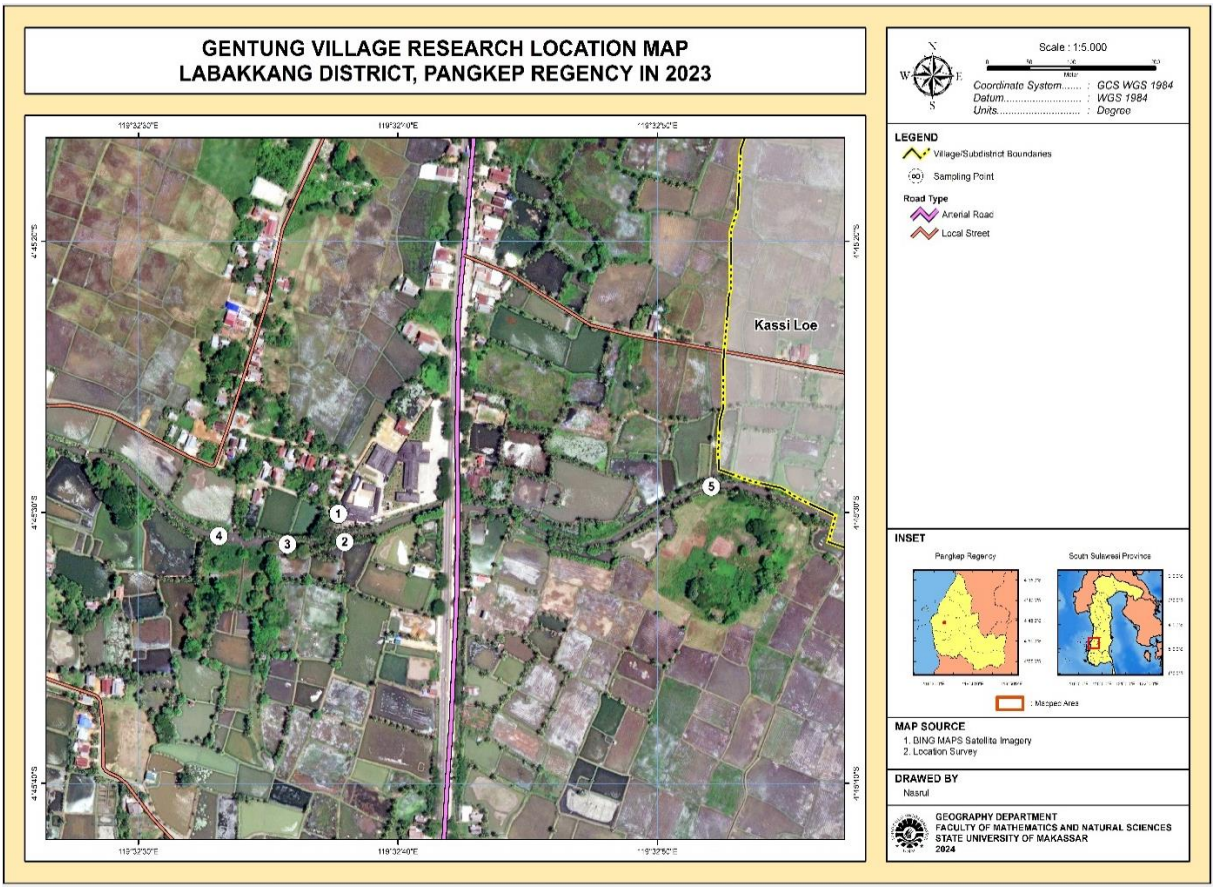

Figure 1. Research Location Map of Gentung Village, Labakkang District, Pangkep Regency

Research data collection was obtained from the results of sampling which was then analyzed in the laboratory for nine test parameters. These parameters include physical and chemical parameters. Physical parameters consist of temperature, color, total suspended solids (TSS), and Total Dissolved Solids (TDS) while chemical parameters include pH, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), and materials. total organic (BOT). Data from laboratory analysis will be compared with the standard requirements for river water quality based on Republic of Indonesia government regulation number 22 of 2021 to see the quality of river water quality. The following picture shows the process of comparing laboratory analysis results with quality standard requirements to see the impact of tofu factory liquid waste on river water quality.

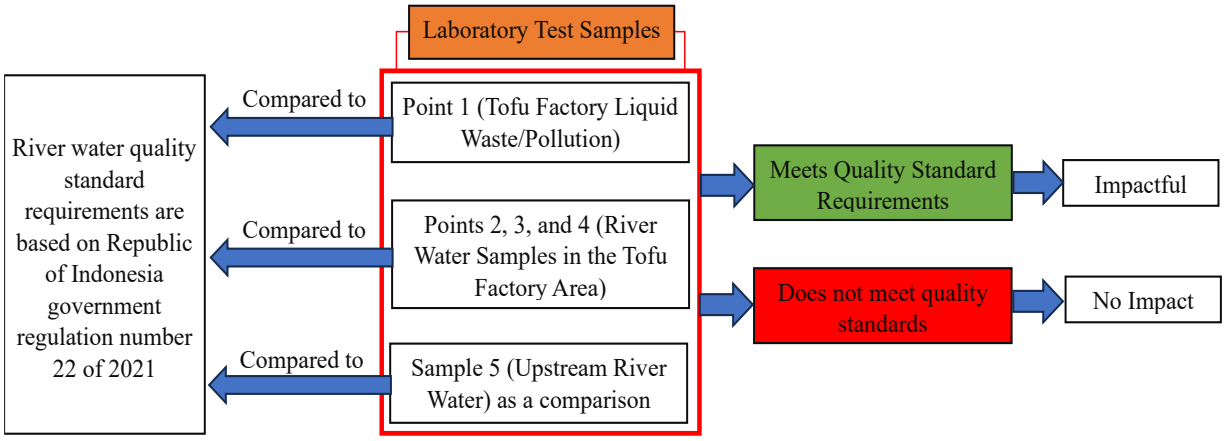

Figure 2. Process of analyzing the impact of tofu factory liquid waste on river water quality

The results of laboratory analysis which have been compared with the standard requirements for river water quality, can be concluded whether tofu liquid waste discharge impacts river water quality or not. To strengthen the research results, water quality data was also taken in the upstream areas of the river which were not contaminated by liquid waste discharge. So it can be used as a data source to compare river water quality standards at the three sampling points in the tofu factory area. Observations and documentation are also carried out to see the conditions of the research location as information material to strengthen laboratory test results as proven by observation notes and documentation results.

3. RESULTS AND DISCUSSION

To determine the impact of liquid tofu factory waste on river water quality, air quality measurements and testing were carried out. There were five samples tested for nine parameters,

namely, one sample of contaminants/pollutants taken from the Tofu Factory WWTP, three samples of river water in the tofu factory area where liquid tofu waste was disposed of, and one point sample of river water taken in the area. upstream as a comparison of data with the results of measurements of river water quality in the tofu factory area. Based on the results of laboratory tests on four river water intakes and one sampling point, nine physical and chemical measurement parameters can be seen in Table 3.1. following.

Table 2**.** Sample test results on physical and chemical parameters.

Parameter	**unit**	**1 (Pollutant)**	**2**	**3**	**4**	**5 (Comparator)**
Temperature	^{o}C	28,5	28,5	28,5	28,5	28,5
Color	TCU	7,5	15,0	12,5	10,0	10,0
Total Suspended Solids (TSS)	mg/l	**202,76***	**323,63***	**303,65***	**324,62***	**29.96**
Total Dissolved Solids (TDS)	mg/l	**3795,66***	**4974,31***	**5363,87***	**5543,66***	**1927,79***
pH	-	6,42	6,73	6,90	6,95	7,31
Dissolved Oxygen (DO)	mg/l	**5,70***	**5,44***	**5,12***	**4,80***	1,92
Biochemical Oxygen Demand (BOD)	mg/l	**147,21***	**139,20***	**148,80***	**176,00***	**16,43***
Chemical Oxygen Demand (COD)	mg/l	**368,00***	**348,00***	**372,00***	**440,00***	**41,07***
Total organic matter	mg/l	**92,16***	**88,37***	**73,22***	**75,12***	**49,87***

*Source**:** 2023 laboratory test results*
Description: $^{(*)}$ Does not meet quality standard requirements

Based on the laboratory test results data contained in Table 2 above, it shows that several test parameters indicate that the river water quality does not meet the required quality standards. To find out the impact of tofu factory liquid waste on river water quality, it can be seen as follows.

a. Temperature

Based on data from sample testing in the laboratory, it can be seen that the pollutant material has a good water temperature according to the established water quality standards. So this does not have an impact on the temperature of the river water in the Tofu Factory area. Apart from that, the water temperature between pollutants and river water in the Tofu Factory area is the same as the water temperature of the river water samples used as comparative data. So it can be seen that the liquid waste from the Tofu Factory does not have a negative impact

on Gentung River water, as proven by laboratory test data whose results meet class two (2) river water quality standards. It is important to carry out temperature testing because poor water temperatures will affect the decrease in dissolved oxygen concentration which will of course have an impact on the river water ecosystem (Gao *et al*, 2022; Hosseini *et al*, 2023)

b. Color

Based on the results of measurements of the color of river water that have been carried out, it can be seen that the liquid waste from the X tofu factory does not have an impact on the color of the river water. This can be known based on test results that meet the established river water quality standards. It is important to measure the color of river water because the color of river water significantly affects the ability of sunlight to enter the water, which is a source of riverwater biota for photosynthesis (Nurfitri & Handoko, 2023). Apart from that, the river's color also impacts increasing the amount of organic matter dissolved in the water. The more cloudy or brownish the river water is, the worse the water is (Hadi *et al*, 2022).

c. Total Suspended Solids (TSS)

Based on laboratory testing results, it is evident that liquid waste samples from the Tofu Factory, referred to as pollutants, adversely affect river water quality in the factory area based on the physical parameter of Total Suspended Solids (TSS). Laboratory tests show that the Tofu Factory's liquid waste has TSS values exceeding water quality standards, thus impacting the river water quality in the surrounding area, which also fails to meet established standards. The TSS parameter is critical in evaluating the physical quality of water, as it measures the concentration of solid particles suspended in the water column, such as silt, organic matter, and industrial residues. These particles are primarily introduced by untreated or poorly managed industrial waste, erosion, or runoff containing fine sediments (Suryani *et al*., 2021; Wahyudi *et al*., 2023).

High levels of TSS in river water can have several detrimental effects. First, elevated TSS reduces water clarity, impeding sunlight penetration and limiting photosynthesis for aquatic plants. This disruption can negatively affect the entire aquatic food chain. Second, the accumulation of suspended solids in water bodies can smother benthic habitats, threatening the survival of organisms that depend on these ecosystems. Lastly, excessive TSS increases the risk of sediment deposition, which can alter the riverbed structure, reduce water flow capacity, and increase the likelihood of flooding (Handayani & Putri, 2023; Susanti & Prasetyo, 2021). Moreover, suspended solids can act as carriers for pollutants, such as heavy metals and

pathogens, further exacerbating water quality degradation and posing risks to both ecosystems and human health.

d. Total Dissolved Solids (TDS)

Laboratory test results indicate that liquid waste samples from the Tofu Factory, referred to as pollutants, have Total Dissolved Solids (TDS) values exceeding river water quality standards. The TDS value of the pollutant sample is 3795.66 mg/L, far above the established standard of 1000 mg/L. This indicates that the tofu factory's liquid waste adversely impacts the river water quality in the tofu factory area. Laboratory tests confirm that river water in this area also fails to meet established water quality standards, with TDS values higher than the pollutant sample. This suggests that the river water cannot neutralize the pollutants effectively, and continuous waste discharge exacerbates the problem. Comparative data further supports these findings, showing TDS levels significantly above the standard in both pollutant samples and river water samples near the tofu factory (Wahyudi *et al*., 2023; Suryani *et al*., 2021).

Total Dissolved Solids (TDS) represent the combined content of all inorganic and organic substances dissolved in water, including minerals, salts, and other particulates. High TDS levels indicate excessive solutes in the water, which can affect water clarity, taste, and suitability for aquatic life. Elevated TDS levels can disrupt the river's ecosystem by increasing water turbidity and reducing light penetration, which inhibits photosynthesis in aquatic plants. Additionally, high TDS concentrations can increase water conductivity, leading to stress on aquatic organisms and affecting their survival and reproduction (Handayani & Putri, 2023). Prolonged exposure to water with excessive TDS can also result in bioaccumulation of harmful substances in aquatic organisms, posing risks to human health and ecosystems (Susanti & Prasetyo, 2021).

Failure to manage TDS levels in the tofu factory's liquid waste can lead to long-term ecological and environmental degradation of the Gentung River. Continuous pollution contributes to salinization and makes the water unsuitable for agricultural, domestic, and industrial purposes. Effective waste treatment systems, such as filtration or advanced sedimentation methods, are urgently needed to reduce TDS levels in the discharged liquid waste. These interventions are critical to restoring the river's water quality and maintaining its ecological balance (Ariska *et al*., 2020; Wahyudi & Nugroho, 2022).

e. pH

Based on laboratory sample testing data, the pH of the water in the Tofu Factory area is recorded at six (6), which aligns with the established water quality standards. This indicates

that the liquid waste from the tofu factory does not significantly impact the pH of the river water in the area. pH is a critical parameter in determining river water quality as it affects the aquatic ecosystem balance. Extremely low pH (acidic) or high pH (alkaline) levels can disrupt biochemical processes in the water, such as hindering the activity of decomposer microorganisms and causing the death of sensitive aquatic organisms like fish and plankton (Suryani *et al*., 2021).

Additionally, the water temperature and color in the Tofu Factory area are consistent with the river water samples used as a reference, suggesting no significant physical changes due to the factory's liquid waste. However, the slight increase in pH levels at some sampling points is influenced by the presence of rubbish in the area, rather than the factory's activities. Laboratory results further confirm that the tofu factory's liquid waste complies with Class II river water quality standards as regulated by Government Regulation No. 22 of 2021, indicating no adverse effects on the chemical quality of Gentung River water (Wahyudi & Nugroho, 2022).

The pH of river water plays a crucial role in maintaining the health of aquatic ecosystems. Extreme pH changes can increase the solubility of heavy metals like iron and aluminum, which are toxic to aquatic organisms, and reduce the solubility of oxygen in water, thereby disrupting the balance of the food chain (Handayani & Putri, 2023). Therefore, maintaining stable pH levels within a safe range serves as an indicator that the liquid waste from the tofu factory does not harm the ecological function of the river. Thus, the industrial activities in this area can be considered within the tolerance limits of the river's aquatic ecosystem (Ariska *et al*., 2020).

f. Dissolved Oxygen

Based on the results obtained through laboratory testing, it can be seen that samples of liquid waste from the Tofu Factory, also known as pollutants, have Dissolved Oxygen (DO) values that meet river water quality standards. The Dissolved Oxygen (DO) value in the pollutant sample is 5.70 mg/l, which results are in accordance with the established quality standard, namely 4 mg/l specifically for the Dissolved Oxygen (DO) quality standard requirements. So it can be seen that the Tofu Factory liquid waste does not have a bad impact on the quality of river water in the Tofu Factory area. This is known based on the results of laboratory tests which show that the quality of the river water in the Tofu Factory area is of a quality that also meets the established water quality standards. In fact, river water samples in the Tofu Factory area show a Dissolved Oxygen (DO) value that is greater (point 4) than the Dissolved Oxygen (DO) value because several aquatic plants cause an increase in the Dissolved

Oxygen (DO) value in the river water. Meanwhile, the comparative data water samples have water quality that does not meet river water quality standards because it has a Dissolved Oxygen (DO) value that is smaller than the standard requirements that have been set.

g. Biochemical Oxygen Demand

Based on the results obtained through laboratory testing, it can be seen that samples of liquid waste from the Tofu Factory, also known as pollutants, have Biochemical Oxygen Demand (BOD) values that do not meet river water quality standards. The Biochemical Oxygen Demand (BOD) value in the pollutant sample was 147.20 mg/l, which results did not comply with the established quality standard, namely 3 mg/l specifically for the Biochemical Oxygen Demand (BOD) quality standard requirements. So it can be seen that the Tofu Factory liquid waste has an impact on the quality of river water in the Tofu Factory area. This impact was discovered based on laboratory test results which showed that the quality of the river water in the Tofu Factory area was of a quality that did not meet the established water quality standards. The test results show that the Biochemical Oxygen Demand (BOD) value at point 2 is 139.20 mg/l, point 3 is 148.80 mg/l, and point 5 is 176.0 mg/l so it is said to not meet the quality standards. designated river water. The impact of liquid waste from the Tofu Factory on the water quality of the Gentung River can also be determined based on comparative data which has a Biochemical Oxygen Demand (BOD) value that is very far from the Biochemical Oxygen Demand (BOD) of pollutants and samples from the Tofu Factory area. However the comparative data also has Biochemical Oxygen Demand (BOD) values that do not meet the established river water quality standards.

Based on the test results, the Biochemical Oxygen Demand (BOD) value at the third and fourth points of river water sampling in the Tofu Factory area has a Biochemical Oxygen Demand (BOD) value that is higher than the polluter's Biochemical Oxygen Demand (BOD) value. This is influenced by the large amount of organic and inorganic waste in the sampling point area, which has an impact on increasing the Biochemical Oxygen Demand (BOD) value in river water in the Tofu Factory area. Piles of undecomposed waste can have an impact on the concentration of Biochemical Oxygen Demand (BOD).

h. Chemical Oxygen Demand

Based on the results of laboratory sample testing, it was found that the liquid waste from the tofu factory has water quality that does not meet river water quality standards. The tofu factory liquid waste, referred to as pollutants, has a Chemical Oxygen Demand (COD) value of

368.00 mg/L. This value is significantly higher than the established standard of 25 mg/L for COD parameters. The high COD value indicates that the liquid waste from the tofu factory negatively impacts the water quality of the Gentung River, Pangkep Regency. Measurement data from river water samples in the tofu factory area further confirm this, with COD values recorded at 348.00 mg/L at the second point, 372.00 mg/L at the third point, and 440.00 mg/L at the fourth point. These values, far exceeding the permissible limit, indicate severe organic pollution in the river.

An increased COD value in water indicates a higher amount of organic matter that requires oxygen for decomposition. This can lead to oxygen depletion in the water, making it difficult for aquatic organisms to survive. Decreased dissolved oxygen levels can disrupt the river's ecosystem balance, leading to the death of sensitive species and the proliferation of anaerobic microorganisms that may produce harmful substances like hydrogen sulfide (Handayani *et al*., 2022; Yulianti & Wicaksono, 2020). The high COD levels in the Gentung River highlight the urgent need for proper waste treatment systems in the tofu factory to reduce the organic load in its effluent.

In this context, the significant discrepancy in COD values between the tofu factory waste and the river's water quality standards underscores the need for immediate action. If left unaddressed, the continuous discharge of untreated or partially treated liquid waste could lead to long-term ecological degradation, affecting biodiversity and the river's usability for domestic, agricultural, or industrial purposes (Wahyudi *et al*., 2023; Susanti & Prasetyo, 2021). Effective intervention strategies, such as implementing biological or chemical treatment methods, are critical to reduce the COD load in the tofu factory's effluent.

Based on the test results, the Chemical Oxygen Demand (COD) value at the third and fourth sampling points of river water in the tofu factory area has a Chemical Oxygen Demand (COD) value that is higher than the pollutant's Chemical Oxygen Demand (COD) value. This is influenced by the large amount of organic and inorganic waste in the sampling point area, which has an impact on increasing the Chemical Oxygen Demand (COD) value in river water in the tofu factory area (Arni & Susilawati, 2022; Hannan *et al*., 2024; Niswati *et al*., 2024). Piles of undecomposed waste can have an impact on the concentration of Chemical Oxygen Demand (COD) in river water.

i. Total Organic Matter

Based on laboratory testing results, it was found that liquid waste samples from tofu factories, referred to as pollutants, have Total Organic Matter (TOM) values that exceed river water quality standards. The TOM value in the pollutant samples is 92.16 mg/L, significantly higher than the established quality standard of 10 mg/L for this parameter. This indicates that the liquid waste from the tofu factory negatively impacts the water quality in the area surrounding the tofu factory. Laboratory test results also revealed that river water quality in the tofu factory area does not meet the established water quality standards. The deviation of TOM values between the liquid waste and the comparative river water samples highlights the substantial influence of the factory's waste on the Gentung River. Moreover, even the comparative data showed TOM values that fail to meet the required quality standards.

The presence of high Total Organic Matter in river water indicates an excessive amount of organic pollutants, which can lead to oxygen depletion as these materials undergo decomposition. This process can disrupt the aquatic ecosystem by creating hypoxic conditions that harm aquatic organisms, reduce biodiversity, and foster the growth of anaerobic bacteria, which may produce harmful byproducts such as ammonia or methane (Suryani *et al*., 2021). Additionally, high TOM concentrations can lead to the eutrophication of water bodies, resulting in algal blooms that further degrade water quality and harm aquatic life (Putri & Wahyudi, 2023).

The failure to meet TOM standards not only signifies potential ecological disturbances but also poses risks to human health if the water is used for consumption or agriculture without adequate treatment. Addressing this issue requires implementing effective waste management strategies at the tofu factory, such as installing advanced treatment systems that can reduce TOM levels before discharge into the river. Immediate actions are essential to prevent long-term environmental and health consequences (Handayani & Nugroho, 2022; Susanti *et al*., 2020).

4. CONCLUSION

Tofu factory liquid waste discharge has an impact on the water quality of the Gentung River, Pangkep Regency in terms of several parameters that can be determined from laboratory test results. This impact can be seen through the results of testing river water samples in the tofu factory area, tofu liquid waste as a pollutant, and river water samples which are used as

comparative data. The test results show that liquid waste discharge has an impact on the water quality of the Gentung River in terms of the parameters Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD) and Total Organic Matter. The temperature, color, and pH parameters show that the test results meet the established water quality standards. So based on these results, it can be concluded that Gentung River water cannot be used as a source of clean water and similar uses because it does not meet the established second class river water quality standards.

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