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Analysis of BOD, COD and TSS Levels in Domestic Liquid Waste (Greywater) in Households in Bada Village, Dompu Regency

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Abstract: Water is a very important part of life because it is used in various daily activities such as drinking, bathing, and washing. In addition, water is also used in other activities such as agriculture, animal husbandry and industry. The cause of water pollution can be caused by waste from domestic (household), industry, agriculture and others. The purpose of this study was to determine the levels of BOD, COD and TSS in Domestic Liquid Waste (Greywater) in Households in Bada Village, Dompu Regency. This study is a Qualitative Descriptive Research with sampling using the Purposive Sampling method. Sampling was carried out at the household waste outlet, with a total of 3 samples. The results of the study showed that domestic liquid waste (Greywater) has a BOD content ranging from 120.9 mg/L to 180.30 mg/L, COD content of 310.50 mg/L to 356.89 mg/L and TSS content of 98 mg/L to 115 mg/L. Based on the results of the study, the levels of BOD, COD and TSS in Domestic Waste (Greywater) in Bada Dompu Village exceed the threshold value permitted based on the Regulation of the Minister of Forestry Number 68 of 2016 concerning domestic wastewater quality standards. It is hoped that the community can process domestic liquid waste (Greywater) first before it enters the environment.

Keywords: BOD; COD; Greywater; TSS.

Introduction

Water is one of the basic daily needs of living things in the world, both humans, animals and plants. Water is used for various purposes, including drinking, bathing, washing household appliances, washing clothes, cooking, all of which are basic needs, in addition to other needs such as watering plants, washing vehicles, cleaning floors, engine coolants or solvents. However, there are problems that cause water pollution, so it cannot be used properly [1].

Water pollution can be caused by domestic waste (household), industry, agriculture and others. For the Jakarta area, the largest contribution of liquid waste comes from domestic waste, which is 75%, and in terms of pollutant load, 70% comes from domestic waste [2].

Domestic wastewater can be divided into two types, namely Greywater and black water. Greywater is domestic liquid waste that comes from washing activities such as washing dishes, used dishwashing water, bathing and washing clothes. While black water is liquid waste from toilets and septic tanks [3]. Greywater waste that is directly disposed of into the gutter without being treated first has the potential to pollute the water. So, it can pollute the river where the gutter flows. The impact is that the river changes color to brown and emits an unpleasant odor. In addition, it can cause the fish in the river to die. Pollutants contained in waste can also be a source of disease, such as cholera, dysentery, and various other diseases [4].

According to the Government Regulation of the Republic of Indonesia Number 82 of 2001 concerning water quality management and water pollution control, domestic wastewater is the residue from a business and/or residential activity in liquid form. Domestic wastewater is wastewater originating from residential businesses and/or activities, restaurants, offices, businesses, apartments and dormitories [5]. This water contains quite high levels of organic, inorganic and pathogenic micro-organisms originating from residential businesses such as restaurants, offices, businesses and residential residences that can pollute the environment and cause disease and unpleasant odours. The composition of domestic liquid waste consists of 99% water and 0.1% solids, where these solids consist of organic materials such as carbohydrates (25%), protein (10%) and fat (85%) and inorganic materials such as salt, metal and granules [6].

The parameters used to determine the levels of pollutant elements in domestic wastewater are COD, BOD, and TSS tests. Chemical Oxygen Demand (COD) is the amount of oxygen (MgO2) needed to chemically oxidize organic substances, both those that can be biologically degraded (biodegradable) and those that are difficult to degrade (non-biodegradable) into CO2 and H2O in one liter of water sample. Chemical decomposition of organic materials is carried out using a strong oxidizer (K2Cr2O7) in an acidic and hot atmosphere using silver sulfate oxidizer as a catalyst, and then heated for a certain time [7].

Biological Oxygen Demand (BOD) is the amount of oxygen needed by microorganisms to break down organic materials in water. The breakdown of organic materials means that organic materials are needed by organisms as food and energy from the oxidation process. COD in liquid waste is Chemical Oxygen Demand, which is the amount of oxygen needed to break down organic materials in water through chemical processes [8]. COD is an important

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indicator for assessing the level of organic pollution in liquid waste. High COD values indicate a large amount of organic material in water, which can deplete dissolved oxygen and have a negative impact on aquatic ecosystems. TSS (Total Suspended Solids) in domestic waste is a measurement of the total amount of solid particles suspended or dissolved in wastewater. TSS levels in domestic waste can vary [9].

Bada Village is one of the areas in Dompu Regency which has quite a large population. Apart from the large population, Bada Village is the location of the centre of the Dompu Regency Government. In an effort to maintain environmental sustainability so that it remains beneficial for human life and other living things and to minimize environmental pollution in Bada Village, testing of these parameters needs to be carried out to determine the levels contained in domestic wastewater before being discharged directly into the environment.

Research Methods

This study is a descriptive study to determine the quality of domestic wastewater (Greywater) in Bada Village, Dompu Regency, based on BOD, COD, and TSS parameters. The sampling method in this study used the Purposive Sampling method. Sampling was carried out at the household waste outlet for as many as three samples. The measurement results will be compared with the applicable standards based on the Regulation of the Minister of Environment and Forestry Number 68 of 2016 concerning Domestic Wastewater Quality Standards [10].

Tools and Materials

The tools used in this study were chemical glassware, COD Reactor HAC DRB 200, magnetic stirrer, test tube rack, COD bottle, Seal gasket, Incubator, Lovibond Oxidirect and TSS Meter. The materials used in this study were K2Cr2O7, H2SO4.Pro COD, HgSO4, FAS standard solution, Feroin indicator, Aquades, Samples, Sample paper, Nitrification inhibitor, KOH 45% and tissue [11].

Sampling Technique

The sampling method in this study used the purposive sampling method with certain criteria. The criteria for this sampling are that samples were taken from densely populated areas and the Dompu District Government center. Samples were taken when household activity was quite high, namely from 09.00 WITA - 11.00 WITA, and samples were taken directly from the Greywater waste disposal site.

BOD Level Examination on Samples

On each sample, 4 drops of 45% KOH were dropped into the seal gasket, then the BOD Head/sensor was installed on each COD bottle. The samples were then incubated for 5 days at a temperature of 20 °C, and the BOD levels were recorded every 24 hours [12].

COD Level Examination on Samples

A total of 2 mL of sample and blank were put into a test tube, then 1 mL of 0.25 N K2Cr2O7, 3 mL of H2SO4.Pro COD and 100 mg of HgSO4 were added. Then closed and shook. Each test tube was put into the COD reactor at a temperature of 150 °C for 2 hours. Then cooled. Then the sample and blank were poured into a beaker, and distilled water was added to 100 mL. Next, 2 drops of ferroin indicator were added, and the sample and blank were titrated using 0.1 N ferroammonium sulfate [13].

TSS Level Examination in Samples

Filtration is carried out using filtering equipment, and the filter media is moistened with a little distilled water. The test sample is stirred until homogeneous and measured in a 100mL measuring cup, then inserted into the filter media and the vacuum system is turned on. The filter media is rinsed with 10 mL distilled water 3 times, and then filtered until drained. The filter media (filter paper) is carefully transferred from the filter equipment into a petri dish using tweezers, with the filter paper positioned leaning on the dish. The petri dish containing the filter paper is dried in an oven at a temperature of 103 oC - 105 oC for 1 hour. Furthermore, it is cooled in a desiccator for 30 minutes and weighed using a 50 mL beaker, glass support media on an analytical balance with a readability of 0.1 mg. This step is repeated several times until obtained fixed weight is obtained

Results and Discussion

Research on the analysis of domestic wastewater quality (Greywater) in households in Bada Dompu Village compares the levels of BOD, COD, and TSS measured with the applicable standards based on the Regulation of the Minister of Environment and Forestry Number 68 of 2016 concerning Domestic Wastewater Quality Standards. Sampling was carried out three times at the wastewater outlet.

Results of BOD Level Examination in Samples

The results of BOD level measurements in domestic wastewater samples (Greywater) in Bada Village, Dompu Regency, can be seen in Table 1.

Table 1. BOD Level examination results on samples

Sample	Results (mg/L)	Standard (mg/L)	Information
1	180.30	30	Not Eligible
2	157.12	30	Not Eligible
3	120.9	30	Not Eligible

BOD (Biological Oxygen Demand) is the oxygen required for a number of bacteria to decompose (oxidise) all organic substances dissolved or suspended in water into sample organic materials.

Based on the table above, the measurement results obtained the highest BOD value of 180.30 mg/L and the lowest was 120.9 mg/L; the results of the BOD level measurement in the sample did not meet the requirements based on the Regulation of the Minister of Environment in 2016.

The determination of the BOD value of the sample is done by the Winkler titration method. The principle of determining BOD value by the Winkler titration method is iodometric titration (azide modification). In this method, the volume to be determined is the volume of sodium thiosulfate solution ($Na_2S_2O_3$) used for the titration of released iodine (I_2). Previously, phosphate buffer solution that has been aerated with oxygen is added with $MnSO_4$ solution and alkali iodide azide solution so that $Mn(OH)_3$ precipitate is formed. With the addition of H_2SO_4, the precipitate that is formed will dissolve again and release iodine molecules (I_2) equivalent to dissolved oxygen. This released iodine is then titrated with sodium thiosulfate solution ($Na_2S_2O_3$) until the color changes to straw yellow. Next, the starch indicator is added to the iodine solution, and titration is continued with sodium thiosulfate (Na2S2O3) solution until the colour changes from blue to colorless. The addition of the starch indicator near the end point of the titration is done so that no iodine-starch bond is formed, which can cause the volume of $Na_2S_2O_3$ to come out more than it should [13].

BOD examination in waste is based on the reaction of organic substances with oxygen in water, where the process can take place because there are a number of bacteria. BOD is the main measure of the strength of liquid waste and is also an indication of the expected effect on the receiving water body related to the reduction in its oxygen content [14].

The BOD value can be a reference for describing the levels of organic matter that can be decomposed. Based on the BOD value in domestic wastewater in this study, it can be said that indirectly, it produces high organic matter, so that it will contribute quite high organic matter to the receiving water ecosystem [15].

The high BOD value in the sample indicates that further action is needed to reduce the concentration of these parameters before being discharged into the waters. Actions that can be taken using chemical or biological methods. Reducing the levels of organic substances in the form of particles and colloids, followed by reducing organic substances in the form of solutions. Reducing the levels of organic substances in the form of colloids and particles with the help of microbes can be done with fungi or bacteria [16].

Results of COD Level Examination in Samples

The results of COD level measurements in domestic wastewater samples (Greywater) in Bada Village, Dompu Regency, can be seen in Table 2.

Table 2.COD Level examination results on samples

Sample	Results (mg/L)	Standard (mg/L)	Information
1	310.50	100	Not Eligible
2	320.65	100	Not Eligible
3	356.89	100	Not Eligible

From the COD measurement results, it can be seen that the COD value in all samples exceeds the maximum allowable limit of 100 mg/L. The highest COD value was found in the measurement results of the third sample, namely 356.89 mg/L and the lowest in the measurement results of the first sample, namely 310.50 mg/L.

In Principle, COD measurement is the addition of a certain amount of potassium bichromate (K2Cr207), which functions as an oxidiser, to a sample (with a known volume) that has been added with concentrated acid and silver sulfite catalyst, then heated for some time. Furthermore, the excess potassium bichromate is measured by titration. Thus, the potassium bichromate used for the oxidation of organic matter in the sample can be calculated, and the COD value can be determined [17].

The addition of sulfuric acid (H_2SO_4) functions as a catalyst to accelerate the reaction. The addition of mercury sulfate ($HgSO_4$) functions to eliminate chloride interference, which is generally found in wastewater. Here, chlorine can interfere with the analysis because it will be oxidized by potassium dichromate. To ensure that almost all organic matter is completely oxidized, the oxidizing agent K_2Cr_207 must still remain after reflux [18].

COD is related to the presence of elements in domestic wastewater that cannot be biochemically degraded. The high levels of COD in wastewater are also caused by the high use of materials that cannot be biochemically degraded, such as detergents, phenols, and pesticides. High COD concentrations can cause the dissolved oxygen content in the water to be low, causing aquatic creatures (animals and plants) to die because their oxygen needs cannot be met. This study is in line with other studies that found COD concentrations in wastewater were found to range from 79-700 mg/L in housing in South Tangerang [19].

COD is the amount of oxygen needed to oxidize inorganic and organic substances, as in BOD. The COD number is a measure of water pollution by inorganic substances. Measuring the strength of waste with COD is another form of measuring the need for oxygen in wastewater. The measurement emphasizes the need for oxygen for chemistry, where the compounds measured are materials that are not broken down biochemically [20].

COD describes the total amount of oxygen needed to oxidize organic materials chemically, both those that can be decomposed biologically (biodegradable) and those that cannot be decomposed biologically (non-biodegradable). The amount of oxygen consumed is equivalent to the amount of dichromate needed to oxidize the water sample [21].

COD is also a parameter of the strength of liquid waste. COD is a measure of the requirements for the oxidation needs of samples that are in certain conditions, which are determined using chemical oxidants. This indicator is generally useful for industrial waste. The COD test usually produces higher oxygen demand values than the BOD test because materials that are stable to biological reactions and microorganisms can be oxidized in the COD test [22].

Polluted water, for example, by domestic waste or industrial waste, generally has a high COD value, while unpolluted water has a low COD; because of this, greater degradation of organic matter is needed. In addition, ammonia factory liquid waste also contains high organic compounds, including carbon, nitrogen, and phosphate compounds that can pollute the environment [23]. If there is an excess COD level in a liquid, then the method that can be used to reduce the COD level is the trickling filter method. In the trickling filter, the organic matter contained in the waste is decomposed. This decomposition is carried out by microorganisms attached to the filter media in the form of a biofilm layer. In this layer, organic matter is decomposed by aerobic microorganisms, so that the COD value decreases [24]. The aeration process in KPPL is the process of adding oxygen. By adding oxygen, the COD levels will change, so that the aeration process can reduce COD levels. If the COD levels are too high, the wastewater will be pumped into the aeration tower, and the ammonia and COD levels will be reduced by about 20% [25].

Results of the TSS level Examination on the sample

The results of TSS level measurements in domestic wastewater samples (Greywater) in Bada Village, Dompu Regency, can be seen in the following table.

Table 3. TSS Level examination results on samples

Sample	Results (mg/L)	Standard (mg/L)	Information
1	100	30	Not Eligible
2	98	30	Not Eligible
3	115	30	Not Eligible

The table above shows that the highest COD value was 100 mg/L and the lowest was 98 mg/L. The COD measurement results did not meet the requirements.

Total Suspended Solids (TSS) are suspended materials that have a diameter of > 1μm and are retained on a Millipore filter with a pore diameter of 0.45 μm. TSS in the environment generally comes from mud and fine sand as well as microorganisms, which are carried into water bodies by soil erosion [26].

Analysis of Total Suspended Solid (TSS) levels aims to determine the amount of solids suspended in Greywater waste in units of mg/L. The method used is gravimetry with the principle that the test sample that has been homogenized is filtered with microglass-fibre filter paper with a porosity size of 0.7 μm - 1.5 μm. The stages of the TSS test in the sample are wetted with filter paper with a little distilled water, the aim is to remove fine contaminants in the filter paper so that it does not affect the weight when weighed. The test sample of Domestic Greywater waste is then homogenized and rinsed 3 times to obtain perfect filtration. Next, the filter paper is dried in an oven to remove the water content in the filter paper. During the oven, the position of the filter paper is occasionally moved so that the filter paper does not stick to the petri dish. The final stage is to cool the filter paper in a desiccator so that the weight of the filter paper is accurate and constant [27].

TSS triggers the emergence of mud deposits and anaerobic conditions in receiving water bodies or wastewater drainage channels. High TSS values can inhibit light penetration into water, which can trigger a decrease in dissolved oxygen levels so that it is no longer able to supply the oxygen needs of aquatic biota. TSS Parameters are used to evaluate the ability of bacteria to carry out their duties, namely decomposing organic substances in liquid waste in activated sludge. When the TSS value in waste is at a high level, the liquid waste will still look cloudy, and the mud is difficult to separate; this indicates that the bacteria are not working optimally [28].

High TSS in household waste can come from various activities such as bathing, washing, or other activities that use water. TSS in water can increase turbidity values so that it will inhibit the penetration of sunlight into the water and ultimately affect the photosynthesis process in the water [29].

The high measurement results of BOD, COD and TSS parameters in domestic wastewater in Bada Dompu Village require prior processing before being discharged into the environment. Wastewater treatment can be carried out using various methods, including physical-chemical, anaerobic and aerobic biological methods and the use of aquatic plants [30].

Conclusion

The results of the analysis of domestic liquid waste (Greywater) showed a range of values for the BOD parameters of 120.9 mg/L – 180.30 mg/L; COD 310.50 mg/L – 356.899 mg/L; and TSS 98 mg/L – 115 mg/L. The results of the analysis of domestic liquid waste (Greywater) when compared with the regulations of the Minister of Environment and Forestry Regulation Number 68 of 2016 do not meet the requirements because they exced the permitted quality standards. It hoped that community will process waste before disposing of it into the environment, Wastewater treatment can be carried out using various methods including physical-chemical, anaerobic and aerobic biological methods and the use of aquatic plants. Disposing of Greywaterwaste directly into the environment without prior processing can cause enviromental pollution, damage the ecosystem and can have negative impacts on health.

Author's Contribution

Tina Melinda: Manage Permits and Collect Data and Searching for supporting literature for compiling research results and compiling research results. Muhamad Majdi: Compiling research results and publications in scientific journals

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References

[1] W. Sahani and A. M. Alfian, "Kombinasi Constructed Wetland dan Koagulasi dalam Menurunkan Kadar BOD dan TSS Air Limbah Domestik," *Media Kesehatan Politeknik Kesehatan Makassar*, vol. 19, no. 1, pp. 48–52, Jun. 2024, doi: 10.32382/medkes.v19i1.555.

[2] W. P. Pangestu, H. Sadida, and D. Vitasari, "Pengaruh Kadar BOD, COD, pH dan TSS pada Limbah Cair Industri Tahu dengan Metode Media Filter Adsorben Alam dan Elektrokoagulasi," *Media Ilmiah Teknik Lingkungan (MITL)*, vol. 6, no. 2, pp. 74–80, Sep. 2021, doi: 10.33084/mitl.v6i2.2376.

[3] D. Mardhia and V. Abdullah, “Studi analisis kualitas air Sungai Barangbiji Sumbawa Besar,” *Jurnal Biologi Tropis*, vol. 18, no. 2, pp. 182–189, Nov. 2018, doi: 10.29303/jbt.v18i2.860.

[4] R. Faradila, H. S. Huboyo, and A. Syakur, “Rekayasa Pengolahan Air Limbah Domestik dengan Metode Kombinasi Filtrasi untuk Menurunkan Tingkat Polutan Air,” *Jurnal Kesehatan Lingkungan Indonesia*, vol. 22, no. 3, pp. 342–350, Oct. 2023, doi: 10.14710/jkli.22.3.342-350.

[5] F. D. Rosy, N. Roestijawati, and J. Mulyanto, “Association between Air Pollutants and Levels of Macrophage Inflammatory Protein-2 in Purwokerto Informal Workers,” *Jurnal Kesehatan Lingkungan Indonesia*, vol. 24, no. 1, pp. 1–8, Feb. 2025, doi: 10.14710/jkli.24.1.1-8.

[6] M. I. Silalahi et al., “Kombinasi Adsorben Alam dalam Pengolahan Air Limbah Cucian pada Bengkel,” *Jurnal Kesehatan Lingkungan Indonesia*, vol. 22, no. 2, pp. 122–127, Jun. 2022, doi: 10.14710/jkli.22.2.122-127.

[7] A. Daramusseng and S. Syamsir, “Studi Kualitas Air Sungai Karang Mumus Ditinjau dari Parameter *Escherichia coli* untuk Keperluan Higiene Sanitasi,” *Jurnal Kesehatan Lingkungan Indonesia*, vol. 20, no. 1, pp. 1–6, Apr. 2021, doi: 10.14710/jkli.20.1.1-6.

[8] U. A`yunina, A. D. Moelyaningrum, and E. Ellyke, “Pemanfaatan Arang Aktif Tempurung Kelapa (*Cocos nucifera*) untuk Mengikat Kromium (Cr) (Studi pada Limbah Cair Batik),” *Jurnal Kesehatan Lingkungan Indonesia*, vol. 21, no. 1, pp. 93–98, Feb. 2022, doi: 10.14710/jkli.21.1.93-98.

[9] T. A. Karini, D. R. Wijaya, and Z. F. Arranury, “Karakteristik dan Kualitas BOD, COD, Limbah Cair Rumah Sakit,” *Higiene: Jurnal Kesehatan Lingkungan*, vol. 6, no. 2, pp. 100–107, Dec. 2020, doi: 10.24252/higiene.v6i2.18234.

[10] M. F. Natsir, A. A. Liani, and A. D. Fahsa, “Analisis Kualitas BOD, COD, dan TSS Limbah Cair Domestik (Greywater) pada Rumah Tangga di Kabupaten Maros,” *Jurnal Nasional Ilmu Kesehatan*, vol. 4, no. 1, pp. 20–25, Jun. 2021.

[11] B. I. Yuniarti and T. Widayatno, “Analisa Perubahan BOD, COD, dan TSS Limbah Cair Industri Tekstil Menggunakan Metode Elektrooksidasi-elektrokoagulasi,” *Rekayasa Hijau: Jurnal Teknologi Ramah Lingkungan*, vol. 5, no. 3, pp. 238–247, Mei 2021, doi: 10.26760/jrh.v5i3.238-247.

[12] L. Yuliyani and T. Widayatno, “Pengaruh Variasi Waktu Tinggal dan Kuat Arus terhadap Penurunan Kadar COD, TSS, dan BOD Limbah Cair Industri Tahu Menggunakan Elektrokoagulasi Secara Kontinyu,” *Proceeding*, pp. 48–55, May 2020.

[13] S. A. Savira and W. Zamrudy, “Analisis TSS, BOD, COD, dan Minyak Lemak Limbah Cair pada Industri Susu,” *Distilat: J. Tekn.*, vol. 9, no. 3, pp. 266–278, Sep. 2023, doi: 10.33795/distilat.v9i3.3722.

[14] A. D. W. Alfaini and K. Sa’diyah, “Pengaruh Jenis Biosorben terhadap Kualitas Limbah Cair Domestik Pusat Perbelanjaan di Dinoyo Malang,” *Distilat: J. Tekn.*, vol. 9, no. 3, pp. 225–239, Sep. 2023, doi: 10.33795/distilat.v9i3.3722.

[15] N. Z. Ulya, H. Dewajani, and S. Ambarwati, “Efektivitas Pengolahan Instalasi Air Limbah (IPAL) di Seameo Biotrop,” *Distilat: J. Tekn.*, vol. 10, no. 4, pp. 838–848, Dec. 2024, doi: 10.33795/distilat.v10i4.6647.

[16] A. Ladini, H. P. Buwono, and I. K. B. Arta, “Efektivitas Bentuk Padatan Kaporit dalam Pengolahan Limbah Cair Industri Konstruksi terhadap Turbidity dan Total Suspended Solid,” *Distilat: J. Tekn.*, vol. 10, no. 4, pp. 923–931, Dec. 2024, doi: 10.33795/distilat.v10i4.6647.

[17] A. Ilmanafia and H. P. Sudarminto, “Pemanfaatan Adsorben Arang Aktif Bonggol Jagung untuk Penurunan BOD dan COD pada Limbah Cair Pengolahan Rumput Laut,” *Distilat: J. Tekn.*, vol. 8, no. 4, pp. 909–913, Dec. 2022, doi: 10.33795/distilat.v8i4.450.

[18] H. Pagoray, S. Sulistyawati, and F. Fitriyani, “Limbah Cair Industri Tahu dan Dampaknya terhadap Kualitas Air dan Biota Perairan,” *Jurnal Pertanian Terpadu*, vol. 9, no. 1, pp. 53–65, Jun. 2021, doi: 10.36084/jpt.v9i1.312.

[19] D. Sari and A. Rahmawati, “Analisa Kandungan Limbah Cair Air Rebusan Tempe dan Air Endapan Kedelai,” *JIKMH*, vol. 9, no. 1, pp. 36–41, Apr. 2020, doi: 10.33475/jikmh.v9i1.210.

[20] S. A. Savira and W. Zamrudy, “Analisis TSS, BOD, COD, dan Minyak Lemak pada Industri Susu,” *Distilat: J. Tekn.*, vol. 9, no. 3, pp. 266–278, Sep. 2023, doi: 10.33795/distilat.v9i3.3722.

[21] A. Daramusseng and S. Syamsir, “Studi Kualitas Air Sungai Karang Mumus Ditinjau dari Parameter *Escherichia coli* untuk Keperluan Higiene Sanitasi,” *Jurnal Kesehatan Lingkungan Indonesia*, vol. 20, no. 1, pp. 1–6, Apr. 2021, doi: 10.14710/jkli.20.1.1-6.

[22] A. Azwaruddin, T. Abdullah, and S. Wahyuningsih, “Study of Chlorine Use in Water Treatment at the Giri Menang Regional Drinking Water,” *J. Pijar MIPA*, vol. 20, no. 3, pp. 462–467, May 2025, doi: 10.29303/jpm.v20i3.8885.

[23] T. D. Pradana, S. Suharno, and A. Apriansyah, “Pengolahan Limbah Cair Tahu untuk Menurunkan Kadar TSS dan BOD,” *Jurnal Vokasi Kesehatan*, vol. 4, no. 2, pp. 56–62, Jul. 2018, doi: 10.30602/jvk.v4i2.9.

[24] S. V. Sari, “Pengaplikasian Kayu Apu (*Pistia stratiotes* L.) dalam Menurunkan Kadar BOD, COD dan TSS pada Limbah Cair Laboratorium di RSUD Besuki Kabupaten Situbondo,” *Jurnal Keperawatan Profesional*, vol. 8, no. 1, pp. 26–39, Jun. 2020, doi: 10.33650/jkp.v8i1.1019.

[25] S. A. Savira and W. Zamrudy, “Analisis TSS, BOD, COD, dan Minyak Lemak pada Industri Susu,” *Distilat: J. Tekn.*, vol. 9, no. 3, pp. 266–278, Sep. 2023, doi: 10.33795/distilat.v9i3.3722.

[26] A. Yani, “Analisis Kadar BOD dan COD Limbah Air Rumah Sakit TK.VI Akademi Militer di Magelang,” *PM Sdirjianbang Akmil*, vol. 11, no. 2, pp. 147–154, Jul. 2024, doi: 10.63824/jptsp.v11i2.208.

[27] A. I. C. Isuluqi, K. Sa’diyah, and E. Nabil, “Pengolahan Limbah Cair pada Coal Stockpile dengan Metode Koagulasi,” *Distilat: J. Tekn.*, vol. 11, no. 1,

pp. 131–140, Mar. 2025, doi: 10.33795/distilat.v11i1.6924.
[28] S. Sulistia and A. C. Septisya, “Analisis Kualitas Air Limbah Domestik Perkantoran,” *Jurnal Rekayasa Lingkungan*, vol. 12, no. 1, pp. 41–57, Jun. 2020, doi: 10.29122/jrl.v12i1.3658.
[29] G. A. Pradelia, H. P. Buwono, and I. K. B. Artha, “Penurunan Nilai Turbidity dan Total Suspended Solid pada Limbah Cair Industri Additive Chemical Construction dengan Menggunakan Tawas,” *Distilat: J. Tekn.*, vol. 11, no. 1, pp. 121–130, Mar. 2025, doi: 10.33795/distilat.v11i1.6926.
[30] B. I. Yuniarti and T. Widayatno, “Analisa Perubahan BOD, COD, dan TSS Limbah Cair Industri Tekstil Menggunakan Metode Elektrooksidasi-elektrokoagulasi Elektroda Fe-C dengan Sistem Semi Kontinyu,” *Rekayasa Hijau: Jurnal Teknologi Ramah Lingkungan*, vol. 5, no. 3, pp. 238–247, Mei 2021, doi: 10.26760/jrh.v5i3.238-247.