Waluya The International Science Of Health Journal
Vol.3 No.2

ISSN: 2829-2278

WALUYA THE INTERNATIONAL SCIENCE OF HEALTH JOURNAL

The Evaluation of the Quality of Local Water Company Tirta Anoa Processed Water in the Community of West Kendari District, Kendari City

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ARTICLE INFO

Article history
Received : June 04th, 2024
Revised : June 20th, 2024
Accepted : June 28th, 2024

Keywords
Water Quality,
TSS,
TDS.

ABSTRACT

Introduction: The government has the task of collecting, purifying and distributing clean water from water terminals via water channels, pipes or tank cars (in administrative management units with economic activities) to homes, industrial companies or other commercial uses. For this reason, Local water company has the responsibility to provide clean water for all groups of people in an area.

Method: This type of research is observational research with a descriptive approach to get an overview of the quality of Local water company Tirta Anoa's processed water. Water quality sampling was carried out in 9 sub-districts in West Kendari District, which is the sub-district with the largest population of 44,290 people.

Result: The results of the pollution index analysis for TDS parameters show that river waters in the study study area at 7 monitoring points are still classified as meeting water quality standards, namely still below 1,000 mg/L. The highest TDS content was found at station 5 (AB.03 = 611 mg/L) and station 6 (AB.04 = 614 mg/L), while the lowest TDS value was at station 2 (AB.02 = 193 mg/L). And the concentration of TSS parameters is still below the quality standard, namely monitoring point 1 (AP.01 to 5 (AB.05) respectively 4.7 mg/L; 3.4 mg/L; 2.6 mg/L ; 3.7 mg/L; 3.9 mg/L.

Conclusion: There is water quality (physics, chemistry, biology) from Local water company Tirta Anoa processed water which has been consumed by the community in West Kendari.

Introduction

Water is one of the basic human needs which has an important role in human life. The role of water in daily life is very important, whether it is used as a material to help with activities such as cooking, washing, bathing and also for consumption as drinking water.[1] Water used for consumption is water that has clean quality. Water can be said to be clean if it is

colorless, odorless and tasteless. Clean water can be obtained from natural sources such as river springs, lakes, mountain water, well water, and from clean water management companies, namely Regional Drinking Water Companies.[2]

The use of water to meet community needs, especially water consumption, is always increasing, this is due to the increase in population. Due to the high need for clean water for human survival, clean water has become a problem that needs careful attention.[3] Clean water that meets health requirements must be free from pollution, and must also meet standards because water consumed if it does not meet quality standards can cause health problems. Water quality generally indicates the quality or condition of water associated with a particular activity or need. Thus, water quality will differ from one activity to another, the quality of water for irrigation purposes is different from the quality of water for drinking water purposes. Water quality must meet health requirements which include microbiological, physicochemical and radioactive requirements.[4]

The main problems related to water resources include the quantity of water which is no longer able to meet human needs and the quality of drinking water which continues to decline.[5]Water quantity is the amount of clean water needed to meet daily needs. This water quantity is influenced by several factors, including technical factors, namely the use of water meters, socio-economic factors, namely population and the level of economic capacity of the community.

As a source of drinking water for the community, it needs to fulfill several aspects including quantity, quality and continuity which are required for use and management for sustainability. Water treatment is carried out as a technical effort to provide clean water. Treatment is carried out at water sources by improving the quality of original water or raw water that is not yet suitable for consumption until the water has a quality that meets the criteria for clean water and is of good quality so that it is safe for use by the public.[6]

The government's efforts to fulfill the needs related to clean drinking water for the community in order to minimize the occurrence of a clean water crisis and to ensure that all people can consume clean water are carried out by establishing Regional Drinking Water Companies which are placed in every region in Indonesia, one of which is Local water company Tirta Anoa Kendari.[7]

PT. Tirta Anoa is a Local water company that processes water on a large scale for the Kendari City area. Local water company organization is regulated in Regional Regulation no. 3 of 2010 and Regional Regulation no. 7 of 2010 concerning Drinking Water Services. PT. Tirta Anoa processes raw water originating from five areas, namely Anggoeya intake (9%), Matabondu intake (5%), Andonohu intake (1%), Pohara intake (75%) and Wanggu intake (10%). The Pohara River (Intake Pohara) which borders Kendari City from the east and the Wanggu River (Intake Wanggu) which is the largest river in Kendari City and is located in the river area unit (Lasolo-Sampara Village) in the South Konawe Regency and Kendari City.[8]The number of Local water company Tirta Anoa Kendari City customers at the end of 2019 is known to have reached 18,450 SR with a Local water company reservoir capacity of 2,500 m3.[7]

Complaints from the people of Kendari City regarding the quality of Local water company water where the produced water received by the community is sometimes cloudy and smelly. This has even led to a decrease in the number of customers, because the quality of Local water company service is not directly proportional to the level of satisfaction or fulfillment of clean water needs for customers.[9]This shows that the water produced by Local water company Tirta Anoa is of poor quality so it is necessary to evaluate the quality of the processed water produced by Local water company Tirta Anoa so that it conforms to the quality standards or standards that have been set. Research on the quality of processed water produced by Local water company Tirta ANOA

for the people of West Kendari District has never been carried out before. Based on the description above, it is important to carry out research entitled Evaluation of the Quality of Local water company Tirta Anoa Processed Water in the Community of West Kendari District, Kendari City.

Method

This type of research is observational research with a descriptive approach to get an overview of the quality of Local water company Tirta Anoa's processed water.[10] Water quality sampling was carried out in 9 sub-districts in West Kendari District, which is the sub-district with the largest population of 44.290 people.The above parameters were taken in situ and ex situ. The samples were taken to the Microbiology Laboratory, Faculty of Mathematics and Natural Sciences, Halu Oleo University for testing.

Result

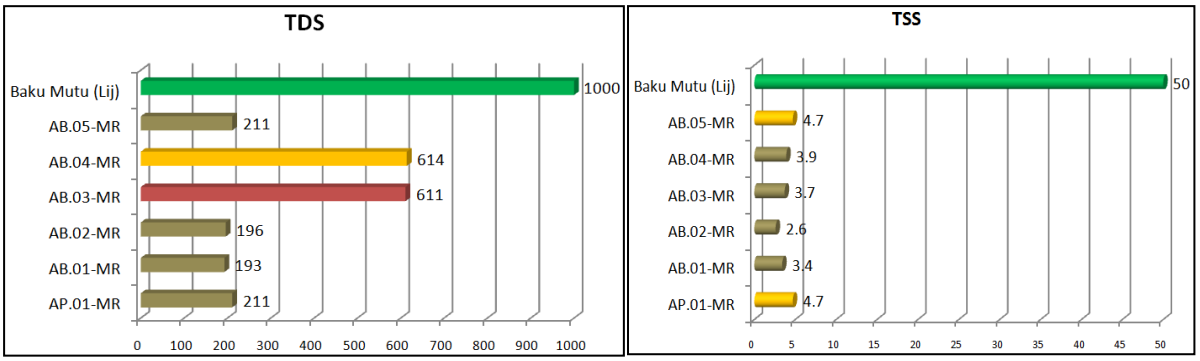
Figure 1 shows the results of pollution index analysis for TDS parameters show that the total dissolved solids (TDS) value in the river waters of the study study area at 7 monitoring points is still classified as meeting water quality standards, namely still below 1,000 mg/L. The highest TDS content was found at station 5 (AB.03 = 611 mg/L) and station 6 (AB.04 = 614 mg/L), while the lowest TDS value was at station 2 (AB.02 = 193 mg/L). The high TDS values at stations 5 and 6 are caused by factory waste pollutant sources that have been surveyed, including detergent waste, chemicals, toilets and other factory activities. AndTSS parameter concentrations are still below the quality standards, namely monitoring points 1 (AP.01 to 5 (AB.05), respectively, 4.7 mg/L; 3.4 mg/L; 2.6 mg/L; 3.7 mg/L; 3.9 mg/L; 4.7 mg/L. The average TSS parameter value at the station is below the quality standards permitted in Indonesian Government Regulation Number 22 of 2021 concerning environmental protection and management. that the TSS value that meets the requirements for aquatic biota life is <50 mg/L, because if it exceeds the quality standard threshold for this condition it will cause poor life for aquatic biota.

Figure 2 shows in the middle part of the river, there are several causes for the increase in nitrate content in the river, including the existence of C excavation mining in the upstream area and the entry of pollution from settlements and animal waste from livestock. The community also carries out agricultural activities around the Wanggu river. The downstream part of the Wanggu River also has a high nitrate content, this is because nutrients are also carried from the middle part, coupled with agricultural activities in the downstream part of the river.

Figure 3 shows the chemical parameter studied to determine the characteristics of the Wanggu River is hardness (temporary). Temporary hardness testing in this study was divided into 3 sub-parameters, namely total hardness (Ca-CO), calcium hardness (Ca), and magnesium hardness (Mg). Experiments carried out directly in the laboratory are Total Hardness and Calcium Hardness (Ca). In addition, calculation results were obtained from the temporary hardness test.

Figure 4 shows the chemical parameter studied to determine the characteristics of the Wanggu River is hardness (temporary). Temporary hardness testing in this study was divided into 3 sub-parameters, namely total hardness (Ca-CO), calcium hardness (Ca), and magnesium hardness (Mg). Experiments carried out directly in the laboratory are Total Hardness and Calcium Hardness (Ca). In addition, calculation results were obtained from the temporary hardness test.

Figure 1
DifferenceTDS and TSS Values at Monitoring Points at Local Water Company Tirta Anoa, Kendari City



A B

Figure 2.

Differences in Nitrate levels at Monitoring Points at Local Water Company Tirta AnoaKendari City

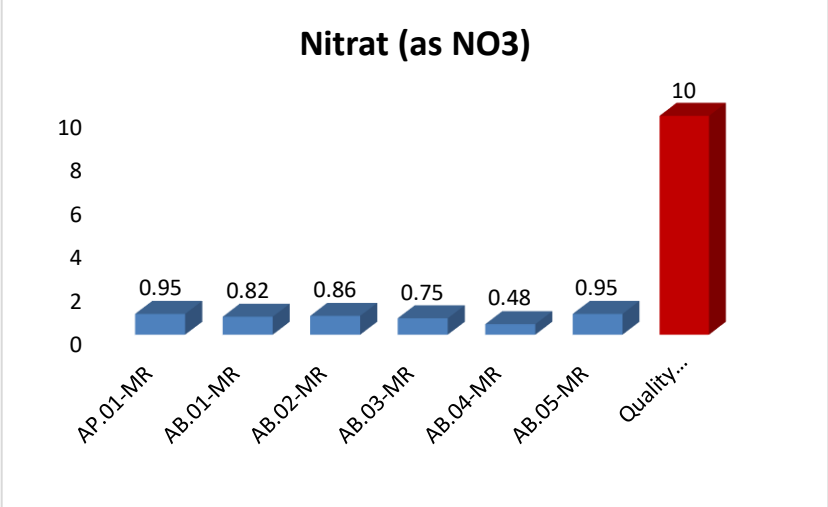


Figure 3.

Differences in Total Hardness levels at Monitoring Points at Local water Company Tirta Anoa Kendari City

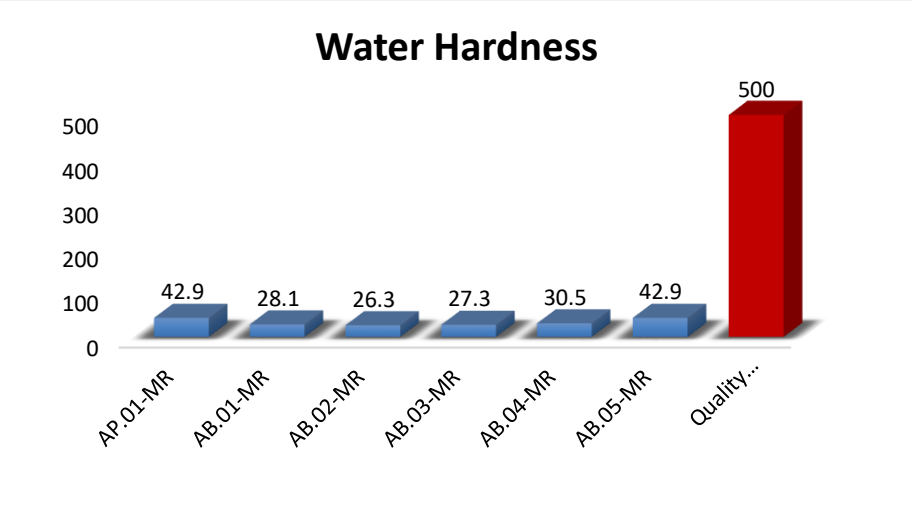
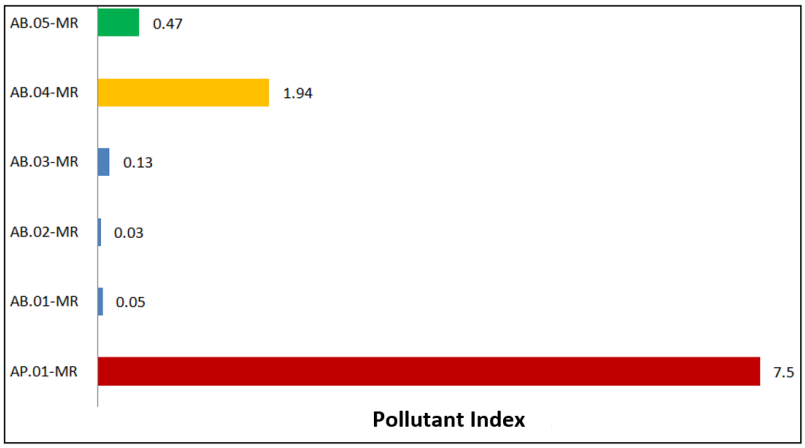


Figure 4.

Distribution of Pollution Index Values



Discussion

Pollution IndexWaters of Local water company Tirta Anoa, Kendari City

Spread Local water company Tirta Anoa Kendari City Pollution Index value can be seen in Figure 1, while details of the results of calculating water quality status using the Pollution Index method are listed in Figure 4.

Based on the results of the Pollution Index (IP) analysis, it can be seen that almost all observation stations still comply with quality standards, except for station 7 (AP.01-MR) which is included in the lightly polluted category according to the Water Quality assessment scale, Republic of Indonesia Government Regulation number 22 of the year 2021 concerning Environmental Protection and Management.[5]The high Pollution Index value at station 7 (AP.01-MR) could be caused by the relatively high pollution load received at this station. The monitoring point station (AP.01-MR) is a river estuary area which is a place for accumulation of waste materials from land and sea. This is indicated by the decreased concentration of pH, TSS, TDS parameters at stations located far from the estuary of the Wanggu and Pohara Rivers and the concentration of E. coli at this station is the highest when compared to other stations.

There was an increase in the water pollution index value at one monitoring point, station 7 (AP.01-MR), because it was located at the mouth of a river, so the urban drainage flow was affected by various activities, causing water pollution to increase. At stations 1, 2, 3, 4, 5, and 6, which are areas of the Wanggu River watershed and the Pohara watershed passing through urban areas and household industries, an average Pollution Index value was obtained at 1.69. An increase in TDS values in waters causes obstruction of light penetration into water bodies, making it difficult for organisms to carry out photosynthesis, which results in a decrease in DO values. Besides that, increasing temperature can also cause a decrease in DO values because increasing temperature causes an increase in oxygen consumption.

Increase in water temperature of 10°C causes oxygen consumption, but dissolved oxygen tends to decrease due to the increase in temperature. Meanwhile, at point 7 which is around the Wanggu watershed, a pollution index value of 7.5 was obtained. This means that the waters are classified as lightly polluted. At this station, the new Ci/Lij value for the temperature parameter was 3.07 and the new Ci/Lij value for the pH parameter was 1.99. At station 4, an increase in the pollution index value was found to 2.87, a difference of 0.02 from the pollution index value obtained at station 7, which was 7.5. The pollution index value is classified as lightly polluted, so this condition needs to receive attention from local agencies to minimize sources of pollution, especially for clean water processing needs which can then be used by the community in the Kendari City area through Local water company Tirta Anoa.

Conclusion

The water quality (physics, chemistry, biology) of Local water company Tirta Anoa's processed water which has been consumed by the community in West Kendari District using the IP and Storet analysis methods shows a Pollutant Index with a rating scale category of 4 (good) and the water quality scale is in the lightly polluted category, characterized by high physical parameter values for TDS and biological parameters for Total coliform and E.coli which have passed the threshold for class 2 water quality standards according to Indonesian Government Regulation Number 22 of 2021 concerning Environmental Management and Protection.

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