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Extension of the results of the water quality laboratory test in the lake, Wanar Village, Pucuk District, Lamongan Regency

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Abstract

Water is a natural material needed for human, animal and plant life, namely as a medium for transporting food substances, as well as a source of energy and various other purposes. Water quality is one of the most important things in the superiority of plants in Wanar Village. Laboratory tests are used in this study because to determine the results of water quality in Wanar Village, Pucuk District, Lamongan Regency. The results of the laboratory test of the water of the Wanar village lake show that the physical parameters including temperature and turbidity have met the water quality standard requirements, while the TDS does not meet the water quality standard requirements. Chemical parameters including pH and nitrate met the water quality standards, while iron, COD and BOD did not meet the water quality standards. Bacteriological parameters including coliform and E.coli did not meet water quality standards. So it can be concluded that the laboratory test results show that the water of the lake in Wanar village is feasible as a means of irrigation, but the lake water is not suitable for consumption by the residents of Wanar village and its surroundings.

Key words: Wanar Village, Lake Water, Water Quality

INTRODUCTION

Wanar is a village located in Pucuk sub-district, Lamongan Regency, East Java, Indonesia. Wanar village is divided into 3 hamlets, namely Badu, Tulung, and Wanar. This village has advantages in terms of the economy in accordance with behavioral skills that are useful for gardening and interior design, landscape and various kinds of skills for making house decorations in accordance with other landscaping. there are many kinds of plants for garden purposes that are deliberately sold and used as a livelihood for local residents. The majority of the population as farmers who rely on rain because the reservoir is not able to meet the needs of the farmers. Water is a natural material needed for human, animal and plant life, namely as a medium for transporting food substances, as well as a source of energy and various other purposes (Arsyad, 1989). Water is one of the most abundant chemical compounds in nature. However, the availability of water that meets the requirements for human needs is relatively small because it is limited by several factors. Water that is actually available for human needs is only 0.62%, including water found in lakes, rivers and groundwater (Effendi, 2003).

Water quality, namely the nature of water and the content of living things, energy substances, or other components in the water. Water quality is expressed by several parameters, namely physical parameters (temperature, turbidity, dissolved solids, etc.), chemical parameters (pH, dissolved oxygen, BOD, metal content, etc.), and biological parameters (presence of plankton, bacteria and so on). Budi, 2014) The quality of ground water and surface water is influenced by natural and non-natural factors (human activities). are fertilizers and agricultural waste, insecticides, domestic waste and industrial waste.Water quality will vary according to space and time, partly due to the factors mentioned above (Arundhati, 2005).The purpose of this study was to determine the quality of the type of water in the village lake Wanar, Puncak, Lamongan Regency.

METHOD

This research was conducted by quantitative observation method. According to Sugiyono (2012), observation is a technique of collecting data relating to human behavior, work processes, natural phenomena. data obtained directly from the object under study is a data source that directly provides data to data collectors and is obtained from direct observations to the field by taking water samples and presented in the form of data, documents, tables on the research topic and obtained from sources of books related to water quality, namely using guide books (Ghufran, 2005). While quantitative research is methods to test certain theories by examining the relationship between variables. Usually, these variables are measured with research instruments so that data consisting of numbers can be analyzed based on statistical procedures. The laboratory tests carried out represent the physical, chemical and microbiological parameters contained in Permenkes 492 of 2010, covering physical parameters including odor, turbidity, taste, color, and amount of dissolved solids (TDS). Chemical parameters include pH, iron, fluoride, hardness, chloride, valence chromium, manganese, nitrate, nitrite, zinc, cyanide, sulfate, copper, aluminum. Bacteriological testing includes testing for the presence of coliforms and colitis (Amani, 2016).

RESULTS

Counseling for healthy elderly is carried out using lecture, discussion, and question and answer methods. The evaluation results obtained almost 80%, the elderly can answer the questions given. This means that the elderly know and understand the material that has been delivered by the speaker. Based on the results of research at the Wanar village lake that the observations show the results of the water temperature meet the requirements, dissolved oxygen (DO) does not meet the requirements, turbidity meets the requirements, TDS does not meet the requirements, pH meets the requirements, Nitrate meets the requirements, iron does not meet the requirements, COD does not qualified, BOD did not meet the requirements, total coliform did not meet the requirements, E.Coli did not meet the requirements. From the results of the laboratory test, the picture above shows that the physical parameters including temperature and turbidity have met the requirements of water quality standards, while TDS does not meet the requirements of water quality standards. Chemical parameters including pH and nitrate met the water quality standards, while iron, COD and BOD did not meet the water quality standards. Bacteriological parameters including coliform and E.coli did not meet water quality standards. So it can be concluded that the results of laboratory tests show that the water of the lake in Wanar village is suitable as a means of irrigation, but the lake water is not suitable for consumption by the residents of the village of Wanar and its surroundings.

DISCUSSION

Good clean water is water that is not excessively polluted by chemicals that are harmful to health, including iron (Fe), fluoride (F), manganese (Mn), acidity (pH), nitrite (NO_2), nitrate (NO_3) and other chemicals. The content of chemical substances in clean water used daily should not exceed the maximum permissible levels for drinking water and clean water quality standards (Jahri, 2019). River water generally contains iron (iron, Fe) and manganese (Mn). The content of iron and manganese in water comes from the soil which does contain a lot of minerals and metals that are soluble in groundwater. Iron is soluble in water in the form of ferrous oxide. These two metals, at high concentrations, cause brownish-yellow stains for iron or blackish for manganese, which are aesthetically pleasing. The content of these two metals leaves brown and black deposits on bathtubs, or household appliances. Chloride content generally increases with increasing mineral content. High levels of chloride, followed by high levels of calcium and magnesium, can increase the corrosivity of water. This results in the corrosion of metal equipment. Chloride content > 250 mg/l can give a salty taste to the water because this value is the chloride limit for water supply, which is 250 mg/l (Effendi, 2003).

The content of Mg and Ca ions in water will make the water hard. High water hardness can be detrimental because it can damage equipment made of iron through the process of rusting (corrosion), can also cause deposits or scale on the equipment. High hardness is caused mostly

by Calcium, Magnesium, Strontium, and Ferrum. The problem that arises is the difficulty of foaming soap, so people do not like to take advantage of the clean water supply. Nitrite is a derivative of ammonia. From this ammonia, with the help of the bacteria Nitrosomonas sp, is converted into nitrite. Nitrite usually does not last long and is usually a temporary state of the oxidation process between ammonia and nitrate (Marisi, 2016). The state of nitrite describes the ongoing biological process of overhauling organic matter with very low dissolved oxygen levels. Nitrite content in water is relatively small because it is immediately oxidized to nitrate. pH expresses the intensity of the acidity or alkalinity of a dilute liquid, and represents the hydrogen ion concentration. Drinking water should be neutral, not acidic/alkaline, to prevent the dissolution of heavy metals and corrosion of the drinking water distribution network. The standard pH for clean water is 6.5 – 8.5. Water is a very good solvent, if it is helped by a non-neutral pH, it can dissolve various chemical elements in its path.

BOD measurements are needed to determine the pollution load due to the population effluent or the industrial average, and to design biological treatment systems for the polluted water. The more BOD content, the greater the number of bacteria. The high levels of BOD in the water indicate the content of other substances as well as large levels automatically the water is categorized as polluted. COD is the amount of oxygen needed so that the waste materials in the water can be oxidized through chemical reactions. DO (Dissolved oxygen) DO is the level of dissolved oxygen in water. The decrease in DO can be caused by water pollution containing organic matter, causing disturbed aquatic organisms. The smaller the DO value in the water, the higher the level of pollution. DO is important and related to the sewer system and waste treatment (Rosyidah, 2016).

Natural sources of fluoride are fluorspar (CaF2), cryolite (Na3AlF6), and fluorapatite. The presence of fluoride can also come from burning coal. Fluoride is widely used in the steel, glass, metal plating, Il-22 aluminum, and pesticides industries. Small amounts of fluoride are beneficial for preventing tooth decay, but concentrations exceeding the range of 1.5 mg/liter can result in staining of tooth enamel, known as mottling. Excessive levels can also have implications for bone damage. Excess zinc (Zn) up to two to three times the RDA reduces copper absorption. Excess up to ten times the RDA affects cholesterol metabolism, alters lipoprotein values, and appears to accelerate the onset of atherosclerosis. Doses of zinc (Zn) consumption of 2 grams or more can cause vomiting, diarrhea, fever, extreme fatigue, anemia, and reproductive disorders. Zinc (Zn) supplements can cause poisoning, as can acidic foods and stored in cans coated with zinc (Zn) (Almatsier, 2001).

Sulfate is a chemically stable compound because it is the highest form of oxide of elemental sulfur. Sulfate can be produced from the oxides of sulfide compounds by bacteria. These sulfides include metallic sulfides and organosulfur compounds. In contrast, by anaerobic heterotrophic bacteria, sulfate can be reduced to sulfuric acid. Chemically, sulfate is an inorganic form of sulfide in an aerobic environment. Sulfate in the environment (water) can be found scientifically and or from human activities, for example from industrial waste and laboratory waste. In addition, it can also come from the oxidation of organic compounds containing sulfate, including the paper, textile and metal industries.

Excessive organic matter content in water can break down into substances that are harmful to health. In bacteriological parameters, pollution indicator bacteria or sanitation indicator bacteria are used. Sanitation indicator bacteria are bacteria that can be used as an indication of fecal pollution from humans and animals, because these organisms are organisms found in the digestive tract of humans and animals. Water contaminated by human or animal waste cannot be used for drinking, washing food or cooking because it is considered to contain pathogenic microorganisms that are harmful to health, especially pathogens that cause digestive tract infections (Ita, 2019).

CONCLUSIONS AND RECOMMENDATIONS

Wanar is a village located in Pucuk sub-district, Lamongan Regency, East Java, Indonesia. Wanar village is divided into 3 hamlets, namely Badu, Tulung, and Wanar. Water is a natural

material needed for human life, animals and plants use water as a medium for transporting food substances, it is also a source of energy and various other purposes. So that water becomes a natural resource that meets the needs of many people who need to be protected so that it can still be useful for life and human life and other living things on earth.

Quality is a quality characteristic required for certain uses of various water sources. Water quality criteria are a basic standard regarding the requirements for water quality that can be utilized. Water quality standard is a regulation prepared by a country or a region concerned. Water quality can be determined by conducting certain tests on the water. The tests carried out are chemical, physical, biological, or appearance tests (smell and color). So it can be concluded that the results of laboratory tests show that the water of the lake in Wanar village is feasible as a means of irrigation, but the lake water is not suitable for consumption by the residents of the village of Wanar and its surroundings.

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APPENDIX

Figure 1. Laboratory test

Figure 2. Outreach to residents