AN INITIAL STUDY OF THE AIR POLLUTION THROUGH RAINWATER IN AN INDUSTRIAL AREA OF CIKARANG, WEST JAVA, INDONESIA (A CASE STUDY)

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ABSTRACT: *The aim of this research is to determine the results of the measurement of acidity and alkaline rainwater in the Cikarang city. The methodology in this research is made by randomization to collect the rainwater in many places around Cikarang area. The results obtained in this report 1) Development in the Cikarang city affect the measurement results rainwater 2). The natural environment in the Cikarang City also affects measurement results rainwater. Most of Cikarang areas has acidity rainwater because of industrial process.*

Keyword: industry, air pollution, rainwater, cikarang.

1. INTRODUCTION

Analysis of water included in the quantitative analysis for determining the concentration of a substance in a mixture of other substances[1]. Water encountered in daily life, namely rainwater. Usually rainwater containing substances that come mixed with rain water in the form of soluble solids and gases.

Rain water content varies and depends on the place. As a result, the water content of rain will vary in each places[2]. Mineral analysis of the chemicals are too many in number in the water, the water can be a source of disaster that can be detrimental to the survival of all creatures around it. Actually, the water pollution is made by factories and households, the content of chemicals in the water increased and eventually the water quality is declining[3]. Therefore, the necessary water analysis to determine and calculate the chemical substances contained in the water so it can be seen that the water harmful to health, the appropriateness of the consumed or already polluted or not[4].

For example, although the mountains or in a remote forest with air that is free and clear of contamination, rainwater that fell on it always contains ingredients - dissolved materials, such as CO_2, O_2, and N_2, and materials - suspended material such as dust and particles - other particles carried by rain water from the atmosphere[5, 6]. Usually the water contains chemicals to a certain degree, both inorganic chemicals and organic chemicals.

The water analysis included in the quantitative chemical analysis for determining the concentration of a substance in a mixture of other substances[7-10]. Principle analysis of the water used is the principle of titration and the method used is the color indicator and is generally included in the volumetric analysis[11, 12].

Acid rain with high acidity can cause respiratory problems in humans. Mist containing sulfuric acid together with inhaled air and into the human respiratory tract can damage the lungs can even cause skin burns. Causing corrosion and damage the building. Acid rain can accelerate the corrosion process[13]. Corrosion processes can occur in some of the metal material. Plants wither, dry up and die.

Identify the problem in this research is how to balance the pH of rainwater in the Cikarang area, as well as the influence of environmental conditions on the level of pH of rainwater in Cikarang[14]. The objective of this lab is that we are able to test or analyze some of the physical properties and chemical properties of water are qualitatively and quantitatively.

II. Methodology

Place and Time Measurement

The measurement spot is in the Cikarang City, location rainwater measured at the new area of Cikarang, South and North Cikarang[15-17]. Sampling time rainwater and pengkurannya conducted from 7 March to 11 March 2016.

Population and Sample

The population of this measurement is the environmental influences both the development and the natural conditions in the Cikarang city. The sampling technique in this measurement is to take rain water that is new or fresh and have not been exposed to the mixture, so taken immediately when it rains, so that the total measurement really only rainwater. Determination of the amount of rainwater samples in these measurements were taken in moderation.

Data Retrieval Techniques

In this measurement data using the following method :

1. Sample

Samples are used to obtain the measurement results. That will be done by using a measuring device

2. Measuring instrument

Measuring instrument used is a measure TDS Water Tester, these tools will be used in rainwater samples are still fresh. So that would be the result of measurement of rainwater in the Cikarang city

III. Results and Discussion

Research Result

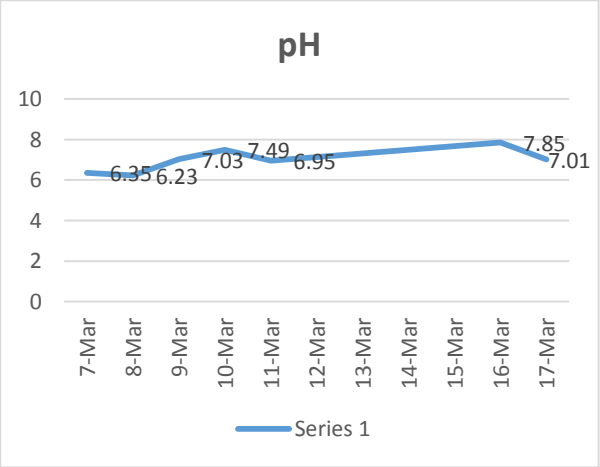

Figure 1. Graphic of acidity (pH: 7 March – 17 March 2016)

The graph provides information on the research results the pH value of the period 7 March to 17 March 2016. In the graph looks quite stable pH value changes. The highest pH value is 7.85, the results of the study on 16 March. Seen on 7, 8 and 11 March, water pH less than 7 are acidic. On 9, 19, 16 and 17 March, water pH over 7 is alkaline.

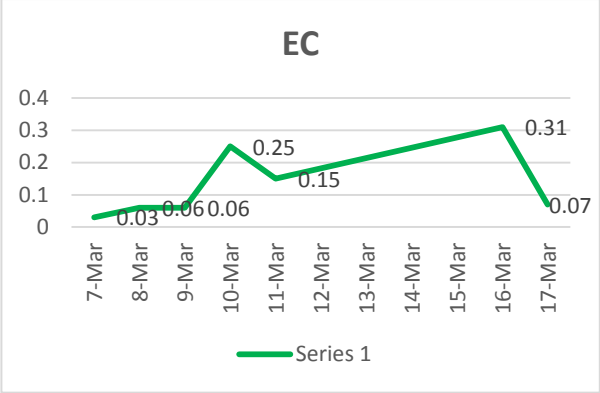

Figure 2. Graphic of EC (7 March – 17 March 2016)

The graph provides information on the research value EC of the period 7 March to 17 March 2016. In the graph shown significant changes in the value of EC. The highest value is EC 0:31, the results of the study on 16 March., Lowest EC value is 0:03, the results of the study on 07 March.

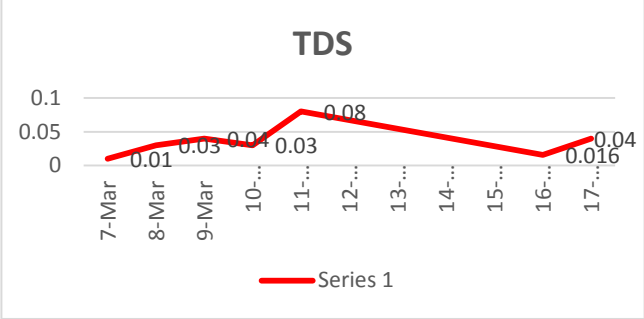

Figure 3. Graphic TDS (7 March – 17 March 2016)

The graph provides information on research results TDS value of the period 7 March to 17 March 2016. In the graph shown significant changes in the value of TDS. The highest TDS value is 0:08, the results of the study on 11 March., Lowest TDS value is 0:01, the results of the study on 07 March.

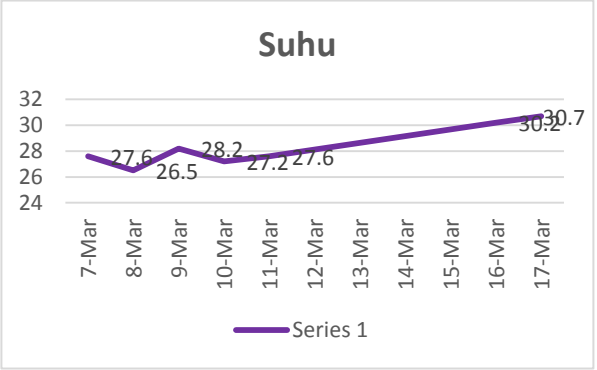

Figure 4. Graphic of Temperature (7 March – 17 March 2016)

The graph provides information on research results temperature value of the period 7 March to 17 March 2016. The graph shown significant changes in temperature value. Value The highest temperature was 30.7 ° C, the results of the study on 17 March., Value The lowest temperature was 26.5 0 C, the results of the study dated March 08

Measurements were made on 07 March 2016 to 17 March 2016 in several areas in the Cikarang city. Cikarang town measurement results in the table above shows that there is instability in the outcome measure pH values in city, the difference in pH value changes on different days so signifika ie between 1 (one) to 2 (number). The measurement results obtained highest pH was 7.49 and the lowest pH pengkuran result is 3:18. And there is also a significant change is the temperature. The lowest temperature is 23.5 ° C and the highest temperature of 30.7 ° C. And the results of measurement results lows EC 0.01 and the highest measurement result is 0:31. TDS measurement results and the lows 0.01 and the hingest result is 0.2.

Explanation of Results of Measurement

Results of pH measurement in the Cikarang city figures show an average of less than 7. The measurement results showed that in an average the Cikarang city has a rain water is acidic. This is because the Cikarang city is an industrial area. The industrial area shown that urban climate has different characteristics to the climate surrounding area that still has elements naturally quite a lot. Change elements of the natural environment into an artificial element leads to changes in the characteristics of micro climate. Various human activities in urban areas, such as industrial activity and changing the water cycle components. In the other hand, the gases produced by this process can be carried by wind up to hundreds of kilometers in the atmosphere before it turned sour and are deposited onto the ground.

Figure 5. The activities and mapping of industrial area in Cikarang.

Most of Cikarang industrial process is produce crude oil, plant, and steel and iron industry. Sulfur diokasida so colorless gas that is released as a byproduct when fossil fuels containing sulfur is burned.

Cikarang East is the location where the lowest pH measurement results. Because in the new area of Cikarang and East Cikarang are the most industry area with solid material, such as steel and iron. In the Cikarang city for greening the environment is not good, which cannot be balanced with developments in the growth of industries[18, 19]. The traffic activity in Cikarang also cause the acidity of rain water, one of them the activities cars and large size trucks.

Activity Cikarang industrial town also cause rising temperatures, which average above 25^{o}C.

IV. CONCLUSIONS

1. The results of rainwater in the Cikarang city showed that rainwater has a acidity (pH) value below 7 results.
2. The new industrial area in Cikarang and the east Cikarang have the lowest pH, because most of industries processes steel and iron.
3. The Cikarang city has to concern about the greening area to balance the growth of industries.

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