

СЕКЦИЯ 18

ГЕОЛОГИЯ, ГОРНОЕ И НЕФТЕГАЗОВОЕ ДЕЛО (ДОКЛАДЫ НА АНГЛИЙСКОМ И НЕМЕЦКОМ ЯЗЫКАХ)

WELL WATER AS DRINKING WATER ASSESSMENT BASED ON PHYSICAL AND CHEMICAL PARAMETERS IN SIDOARJO, INDONESIA

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As the main daily need, drinking water must always be available and of good quality. Consumption of drinking water will affect the condition of human health. This is because the higher concentration of the chemical content will increase the risk to human health (Rachmat, 2019). In Indonesia, many people use well water for drinking purposes. That is why it is necessary to ensure that drinking water from well water sources is safe for consumption. This can be assessed from several parameters, including physical and chemical parameters. This quality assessment is very important to be conducted to guarantee safety for the people who use this well water, especially for drinking purposes.

One of the cities in Indonesia where many people use well water as the drinking water source is Sidoarjo. The city of Sidoarjo is located in the eastern part of the island of Java, Indonesia. Several studies have stated that in Sidoarjo there has been a decline in the quality of well water, especially in Porong and Tanggulangin sub-districts, due to the Lapindo Mud that occurred since May 2006 (Davies, 2006). The decline of well water in this area is due to the Lapindo mud containing a lot of chemical content that exceeds the limit, even the chemical content of heavy metals such as Fe, Cd, and Cu (Dagdag, 2015). In addition, home industries that dispose of their wastes to the ground, the increasing population, and, still, the lack of public awareness is also the factors that caused the decrease of water quality. Thus, the purpose of this paper is to ensure that the well water in the area is suitable for consumption as drinking water with several physical and chemical parameters.

One of the closest areas to the Lapindo mud area is the Tanggulangin sub-district. Lapindo mud is located in the Porong sub-district, which is directly adjacent to the Tanggulangin sub-district. Tanggulangin is to the north of the center of the Lapindo Mud and is lower than Porong, where the Lapindo Mud is located (Matahelumual, 2013). This allows for a decrease in the quality of well water, apart from being caused by human activities.

In January-February 2022, water quality testing was carried out in Tanggulangin sub-district (Kedensari village) by taking 5 samples from 5 wells with an average depth of 6 m. The sampling locations can be seen in Figure 1. Several physical and chemical parameters, including temperature, turbidity, pH, chloride, and sulfate have been tested based on Indonesian national standards. In addition, the taste and smell of water samples were also observed. The test results are compared with the applicable standards in Indonesia, namely the Regulation of the Minister of Health of the Republic of Indonesia No. 492/Menkes/Per/IV/2010 concerning Requirements for Drinking Water Quality.

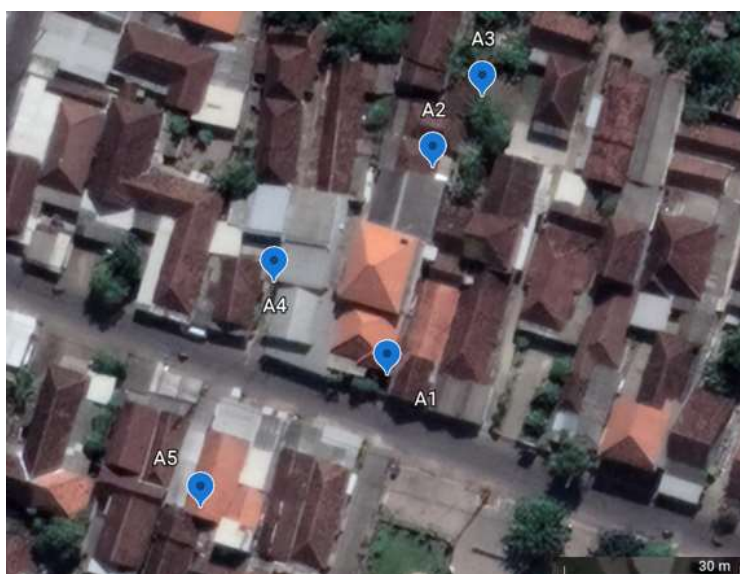


Fig. Sampling location in Kedensari village, Tanggulangin, Sidoarjo

SEKSIJA 18. GEOLOGIA, GORNJE I NEFTEGAZOVJE DELO (DOKLADI NA ANGLIJSKOM I NEMECKOM JAZYKAX)

The test results based on physical and chemical parameters are shown in Table 1. Based on the physical parameters, the water is safe to use for consumption because the water temperature is not more or less than 3°C of the ambient temperature, and the turbidity of the water is not more than 5 NTU. Temperature measurement is important because the temperature can affect the occurrence of chemical processes in water which can be an indication of a decrease in water quality (Paul, 2019). It also affects public acceptance if the water has a temperature that is very different from the ambient temperature. Meanwhile, turbidity is an indicator of the presence of pollutants in water, including physical, chemical, and even microbiological pollutants (Khayan, 2017). In addition, based on observations, no smell or taste is arising from the water.

Meanwhile, based on chemical parameters, water is also safe to use for consumption. The pH of the water is still within the standard range, although the A4 sample has a relatively high pH. In addition, the content of chloride and sulfate in water is not more than 250 mg/l. Measurement of pH is the basic measurement to determine water quality. The pH value will have an impact on the health of humans, animals, even everyday household appliances (WHO, 2003). Meanwhile, chloride and sulfate can cause dermatitis, gastritis, and diarrhea (Ngibad, 2019; Hadiarti, 2015). So testing these chemicals is the right thing as part of determining the quality of drinking water.

Table

Water testing results based on physical and chemical parameters

No	Parameters	Unit	Standard	Samples					
				A1	A2	A3	A4	A5	
1	Physical	TA	C	Ambient ±3	28	28,8	28,6	30	29
2		TM	C		26,7	28,5	28,3	29,2	28,7
3		Turbidity	NTU	5	1,03	1,13	0,88	0,79	1,5
4		Smell		N	N	N	N	N	N
5		Taste		N	N	N	N	N	N
6	Chemical	pH		6,5-8,5	7,76	7,53	6,69	8,2	7,82
7		Chloride	mg/l	250	62,9	56,1	57,5	62,5	42,3
8		Sulfate	mg/l	250	32,6	26,26	25,22	26,56	16,97

Note: TA – Temperature Ambient, TM – Temperature Measurement

It can be concluded that well water in Kedensari village, Tanggulangin sub-district, Sidoarjo is safe for consumption, based on physical and chemical parameters that have been tested and compared with the regulations of the Ministry of Health of the Republic of Indonesia No. 492/Menkes/Per/IV/2010 concerning Requirements for Drinking Water Quality. However, it is necessary to carry out regular monitoring and testing of other parameters to ensure that the well water used for consumption is safe and healthy for the people in the area.

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