

Parameters of Mineral Water that is Safe for Health

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ABSTRACT – Water is a very valuable material in the life cycle and needs of everyday life, especially to be consumed as mineral water. Mineral water is stated to be health-safe if it fits the standards. The quality of mineral water must also be the best for health by being constantly monitored and evaluated. This paper reviews mineral water itself and its sources, parameters, processing steps, and quality management-controlling.

Keywords: mineral water, water quality, water parameters.

A. DEFINITION

Water is a very valuable material in the life cycle. Every creature that lives on this earth is in dire need of water. Especially for humans, the need for water is an absolute because as much as 70% of the substances that make up the human body are composed of water. Water is needed for the needs of everyday life and will be different in each region and at the level of life of living things. If the level of life is higher, it is certain that the amount of water needs will also increase (Djaelani, 2021). The most significant of the various water demands is the need for water as water that can be consumed.

According to the Decree of the Minister of Health of the Republic of Indonesia Number 492/MENKES/PER/IV/2010, mineral water is water that has passed the processing process or there is no processing process that meets the provisions for health or mineral water requirements. The Minister of Health of the Republic of Indonesia No.852/MENKES/SK/IX/2008 states that Mineral water is stated to be health-safe if it fits the standards, which include microbiological, physical, radioactive, and chemical requirements included in obligatory or extra parameters.

B. MINERAL WATER SOURCES

Water sources are one of the main components in the procedure for providing clean water, the absence of a source of water can cause the system for providing clean water to disrupt its function.

- a. Mountain Water. Mountain water sources are generally located in the deep soil layer which is not affected by the dry season or rainy season.
- b. Groundwater. This groundwater extraction procedure involves a drilling method to remove the water, which is then sucked up using a water pump.
- c. PDAM Water. Ground water and river water that has been treated with the aim of killing harmful bacteria by using chemical solutions such as chlorine. This process is carried out by the 'Perusahaan Daerah Air Minum' or abbreviated as PDAM

Among the three water sources, it turns out that mineral water corporations are more interested in mountain water since it typically has extremely excellent quality, such as minerals essential for health and no substances that would endanger human health.

C. MINERAL WATER PARAMETERS

Mineral water can be said to be good if the water is clear, has no color, has no taste, and also does not have an odor. Mineral water that is good for the human body should not contain pathogenic microorganisms or various creatures that can pose a danger to human health, and also there should be no chemical substances harmful to the body that will replace the role of the body. Water should also not have corrosive properties. This goal was made to prevent diseases caused by consuming bad water.

Considering that basically there is no 100% pure water that is suitable for health, so it must be cultivated in such a way, so that the necessary conditions must be fulfilled, at least it must be close to the conditions that have been determined. The requirements for water provisions that are seen as good can be broadly distinguished as follows:

a. Physical Requirements

The physical requirements used for mineral water should be that the water has no color, no smell, no taste, and clear water. If you do not have one of these physical conditions, it

can be stated that the water is not good for health. But if these physical requirements have been met, it cannot be said that the water has good quality for consumption. Because there are still opportunities for seeds that cause disease or substances that can be harmful to health.

b. Bacteriological Requirements

All mineral water to be consumed must be free from contamination by pathogenic bacteria. To declare the mineral water to be drunk is free from the presence of bacteria or the absence of bacteria, by utilizing coliform and *Escherichia coli* bacteria. Inspection of mineral water using the Membrane Filter Technique, 90% of the water samples will be seen within four weeks should not contain coliform and *Escherichia coli* bacteria. If later there is a deviation from the provisions that have been in effect, then the water can be declared not to meet the requirements and need to be followed up. Coliform bacteria and *Escherichia coli* are commonly used as bacteriological indicators, because the germs caused by these bacteria are found in human feces and these bacteria are quite difficult to remove by boiling the water.

c. Chemical requirements

Mineral water can be said to be good if the water is not contaminated with excessive minerals or chemical substances that will endanger health. Therefore, it is expected that chemicals or substances contained in mineral water will damage the material from the place for storing the water, but chemicals or minerals that can be utilized by the body should be contained in the levels that should be in the mineral water source. The requirements for mineral water quality should be required in accordance with the applicable provisions in the Regulation of the Minister of Health of the Republic of Indonesia No. 492/menkes/per/IV/2010 which states that there are two parameters, namely mandatory parameters and additional parameters. The mandatory parameters are divided into parameters that are directly related to health and also parameters that are not directly related to health, the additional parameters include pesticide lead, sodium, nickel, mercury, and others.

D. PROCESSING THE MINERAL WATER

Mineral water treatment is the process of separating water from impurities physically,

chemically and biologically. The process of processing clean water into mineral water in principle is filtration and disinfection. The filtration process is intended not only to separate suspended contaminants but also to separate colloidal mixtures including microorganisms from the water, while disinfection is intended to kill microorganisms that were not filtered out by the previous process. Several factors can affect the quality of mineral water produced by this process, including the quality of raw water (clean water), the type of equipment used, maintenance of equipment, handling of treated water, and others (Pipes et al., 1987). The sequence of mineral water production processes at mineral water depots is as follows:

a. Water storage

The water taken from the source is transported using a water tank and then stored in a tendon tank. The tendon tanks are made from food grade materials and are free from materials that can pollute the water. The requirements for transportation tanks are specifically used for mineral water, easy to clean and disinfect, provided with security, must have a "manhole", filling and releasing water must go through faucets, hoses and pumps used for loading and unloading raw water must be properly covered, stored safely and protected from possible contamination. transport tanks should be cleaned, sanitized, and disinfected both inside and out at least once every three months.

b. Gradual filtering

The filtering stages consist of:

- (a) Sand filter or sand filter, useful for removing pathogenic organisms, namely bacteria and viruses from raw water by being absorbed by the sand filter.
- (b) Activated carbon filter or carbon filter, as an absorbent of odors, tastes, colors, residual chlorine and organic materials. The longer the water is in contact with the carbon filter, the more substances are absorbed.
- (c) Fine filter and microfilter, to filter out particles measuring 0.04-100 microns or bacteria larger than the size of the microfilter.

c. Disinfection

Disinfection is intended to kill pathogenic bacteria. The disinfection process using ozone (O_3) takes place in a mixing tank. The

minimum ozone level is 0.1 ppm and the ozone residue immediately after filling is in the range of 0.006-0.1 ppm. Disinfection measures other than using ozone, namely by storing ultra violet (UV) with a wavelength of 254 nm or a power of 2,537 degrees Angstrom. The process of disinfection of UV rays is by passing water into a tube or pipe that is irradiated with a UV lamp.

d. Filling.

Filling into the water container is carried out using a tool and is carried out in a hygienic filling place.

e. Closure.

The closure of the water container can be done with a lid brought by consumers and or provided by the mineral water dept.

E. MINERAL WATER QUALITY MANAGEMENT

Based on the Decree of the Minister of Health of the Republic of Indonesia No.492/MenKes/Per/IV/2010, mineral water providers are state-owned enterprises, cooperatives, private enterprises, individual businesses, community groups, and/or individuals conducting the provision of mineral water. Mineral water providers use water from various sources of clean water as raw material for the provision of mineral water.

To maintain the quality of mineral water consumed by the community, external and internal monitoring of mineral water quality is carried out (Howard, 2002). External monitoring of mineral water quality is supervision carried out by the District/City Health Office which includes Sanitation Inspection, water sampling, water quality testing, analysis of laboratory results, recommendations, and follow-up. Monitoring of mineral water quality internally is supervision carried out by mineral water providers to ensure the quality of mineral water produced in accordance with regulations. External and internal quality control is carried out by checking the quality of mineral water with laboratory tests to determine contamination with Coliform bacteria (coli type bacteria) or Eschersia coli contamination. The method commonly used in laboratory tests for microbiological examination is the double tube method. Based on the Decree of the Minister of Health of the Republic of Indonesia No.492 /MenKes/Per/IV/2010, every 100 ml of the sample examined must not contain coli-type bacteria. The regulation also states that mineral water is safe for health if it meets the physical,

microbiological, chemical, and radioactive requirements contained in the mandatory and additional parameters. Mandatory parameters are mineral water quality requirements that must be followed and adhered to by all mineral water providers.

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