

# Drinking Water Sources Feasibility Test Based On Escherichia Coli As an Indicator Of Pollutant In Sultan Village Stunting Locus Of

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## Drinking Water Sources Feasibility Test Based On Escherichia Coli As an Indicator Of Pollutant In Sultan Village Stunting Locus Of

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**Abstract.** Introduction: Water quality parameters are indicated by the presence of *E. coli* bacteria. These bacteria come from human feces, warm-blooded animals, and non-fecal coliforms. Decree of the Health Minister of the Republic of Indonesia Number 907/MENKES/VII/2002 concerning requirements and supervision of drinking water quality states that good drinking water has a zero total coliform and fecal coliform. Methods: This research uses a descriptive approach with a cross-sectional design. It aims to determine the quality of water sources in Sultanate village. Ten (10) water sources were used as the samples using total sampling method. The collected samples were then taken to the laboratory to be tested with a series of MPN tests Results and Discussion: The results show that the amount of *Escherichia coli* bacteria in water samples in Sulkatan Village was 0MPN/100 ml. It is due to the location of the water source that is far from industrial activities, household waste and residential areas. Conclusion: The quality of the tested well-water samples is good and within normal limits in accordance with the Decree of the Health Minister of the Republic of Indonesia Number 907/MENKES/VII/2002

**Keywords:** Water, *E. coli*, Sultanate

### BACKGROUND

Water is the main need of every living creature; Humans can survive for quite a long time, 3-6 months, without food. The human body consists of 50-80% water. Without water, humans can only survive for 3 days (Soputan et al., 2019). Water quality parameters are indicated by the presence of *E.coli* bacteria. These bacteria come from human feces, warm-blooded animals, and non-fecal coliform bacteria (Dheenani et. al. 2016).

According to the Decree of the Minister of Health of the Republic of Indonesia Number 907/MENKES/VII/2002 concerning requirements and supervision of drinking water quality, good drinking water has a total coliform and fecal coliform content of zero (0) (Darma, 2020). Data from the statistics center shows that 77 of 263 rivers have been polluted. Poor sanitation, especially due to *E.coli* bacterial contamination, causes diarrhea in babies and toddlers. The impact of diarrhea is poor nutritional status, causing growth failure or stunting (Arda, 2020).

The prevalence of stunting in Wonosobo Regency is ranked first, namely 28.1% according to the Health Service. Meanwhile, based on electronic community-based nutrition recording and reporting in 2022, it is 19.23% (in the Preamble to Wonosobo Regent Regulation Number 43 of 2022) (Laksono, AD, & Megatsari, H., 2020:109 - 115). Decreased nutritional status occurs due to insufficient nutritional intake and frequent infections. Environmental factors, circumstances and family behavior that facilitate infection affect the nutritional status

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of toddlers (Slodia et al., 2022). This research aims to test the suitability of water sources using E.coli bacterial parameter indicators.

## THEORETICAL STUDY

*E. coli* is a type of fecal coliform bacteria that originates from feces or warm-blooded animals. Many studies state that microbial coliforms are most often found in water pollution, and have the highest prevalence in polluted water (Khotimah, 2013).

Research results in Indonesia In 2019, 38 rivers were heavily polluted out of 96 rivers, river water pollution mostly occurred in cities which have a very strategic role at the national level, including as centers of government, business and industry (Directorate General of Pollution and Damage Control Environment, 2019). Water pollution can be a factor in the emergence of waterborne diseases, such as diarrhea, typhoid and leptospirosis. The problem that arises most often in contaminated water results in diarrhea (DA, SA, NH, 2017).

This disease can also result in growth disorders, especially in children, or nowadays it is often called stunting. We think that the incidence of stunting in Sulkatan Village is related to poor sanitation, which is initiated by contamination with coliform bacteria (E.coli).

## RESEARCH METHODS

This research uses a descriptive approach with a cross-sectional design. This aims to determine the quality of water sources in Kasultanan Village. Sample examination was carried out at the Wonosobo Regency Microbiology Laboratory. The population includes water sources in the Sultanate area which residents use for their daily needs. Ten (10) water sources were sampled using the total sampling method. The water to be tested is collected in a sterile cylindrical container and stored in an ice box at a temperature of 18–20°C for ± 24 hours. Then it was taken to the laboratory to be examined with a series of MPN tests consisting of a presumptive test using Lactose Broth (LB) media with the 3 tube method, a confirmation test using Brilliant Green Lactose Broth (BGLB) media, a complete test. The test uses endo media, agar, and the identification test uses biochemical test media (Cappuccino & Welsh, 2017).

## RESULTS AND DISCUSSION

### RESULTS

Testing the *Escherichia coli* bacteria content in water samples using the Most Probable Number (MPN) method gave the following results.

Table 1. Examination of *Escherichia coli* bacteria content in source samples

public <sup>6</sup> water using the Most Probable Number (MPN) method

No	code	MPN Test	results
		<i>Numbers(M</i>	
1	a	0/ 100ml	Q
2	b	0/ 100ml	Q
3	c	0/ 100ml	Q
4	d	0/ 100ml	Q
5	e	0/ 100ml	Q
6	f	0/ 100ml	Q
7	g	0/ 100ml	Q
8	h	0/ 100ml	Q
9	i	0/ 100ml	Q
10	J	0/ 100ml	Q

<sup>3</sup> The results of the examination for *Escherichia coli* bacteria in water samples in Sulkatan village were 0MPN/100 ml. Fulfills the requirements stipulated in the Quality Standards <sup>5</sup> of the Ministry of Health of the Republic of Indonesia number 492/MENKES/Per/IV/2010 concerning drinking water quality requirements. It is stated that drinking water must not contain pathogenic bacteria and the E. Coli level in it is a maximum of 0/100 mL of sample.

### Discussion

#### 1. Water sources

Ten (10) water sources in this study came from mountain springs, far from fecal pollution. The habit of defecating in the open/river/yard causes unhealthy air pollution thereby reducing the quality of water sources (Kurniawati, 2020).

#### 2. Water quality

Table 1 shows that 10 water samples from 10 sources are suitable for consumption. This is because the water source is located far from industrial activities, household waste and several sources say that many forests have been cleared for fields near the water source so that wild animals do not carry out activities near the water source.

The research results also show that several factors that influence water quality are densely populated residential areas and household-scale industries or other business activities whose waste is discharged into rivers, causing high levels of river pollution. The distance between household waste disposal sites and water sources tends to be close to each other, thus affecting water quality (Ardiyanto, 2018; Surabaya PK, 2018).

Even though the research results show that the water from 10 springs in Sultanate Village is suitable for consumption, it must still be checked regularly to determine its suitability status and avoid contamination. One of these contaminations may come from E.coli bacteria which cause several diseases such as diarrhea, urinary tract infections, nausea and vomiting (Safitri et al., 2022).

## CONCLUSIONS AND RECOMMENDATIONS

The quality of the well water samples tested was within normal limits <sup>7</sup> in accordance with the Decree of the Minister of Health of the Republic of Indonesia Number 907/MENKES/VII/2002. However, regular checks <sup>11</sup> must be carried out to maintain the quality of the water source.

## THANK-YOU NOTE

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