



ABSTRACT

Title of Abstract : POTENTIAL PHYSICAL AND CHEMICAL CONTENT OF SOIL FROM COAL MINE WASTE EXPLORATION IN REDUCING PATHOGENIC MICROBIAL CONTENT

Authors of Abstract : Tika Dhefiana¹, Blego Sedionoto², Riyan Ningsih³

Affiliation : Others

Correspondence E-mail : dhefianatika@gmail.com

Adsorbents are porous solids that can bind and absorb substances from liquids or gases, serving to remove contaminants. Adsorbents are classified into porous and non-porous types (Dewi & Sa'diyah, 2024). Clay minerals such as kaolinite, montmorillonite, and bentonite are highly potential as natural adsorbent media for reducing pathogenic microorganisms in domestic wastewater. Clay also acts as a mechanical filtration medium that traps bacteria, viruses, or protozoa as wastewater passes through, and the use of physical or chemical activation can reduce the content of pathogenic microbes by more than 90% (Sedionoto et al., 2022). Assessing cation exchange capacity and clay content is very important for research on the use of clay in liquid domestic waste treatment.

The purpose of this study was to determine the cation exchange capacity parameters of coal mine exploration waste soil in adsorbing *E. coli* pathogenic microbes.

This study is a laboratory experiment aimed at analyzing the physical and chemical quality of coal mine exploration waste soil in its ability to reduce *E. coli* pathogenic microbes. The study was conducted during September-October 2025. The research samples were coal mine exploration waste soils in the Samarinda City area of East Kalimantan, originating from depths of 1 meter and 2 meters below the soil surface.

The results showed that coal mine exploration waste soil at a depth of 1 meter had a cation exchange capacity of 24.33 meq/100 g, while coal mine exploration waste soil at a depth of 2 meters had a cation exchange capacity of 31.79 meq/100 g. The clay parameter value obtained at a depth of 1 meter was 21%, while at a depth of 2 meters, the clay value was 13%. Based on the analysis results, the soil texture at a depth of 1 meter was classified as loam, while the soil texture at a depth of 2 meters was classified as silt.

In general, coal mine exploration waste soil from a depth of 2 meters shows a higher CEC than that from a depth of 1 meter, even though the clay content is lower. Based on the analyzed physical parameters of the soil, the depth of 1 meter (loam) has a higher proportion of clay, while the depth of 2 meters (silt) has a lower proportion of clay. This data can be used as a basis for further experiments to examine the reduction capacity of *E. coli* pathogenic microbes, with the potential for differences in adsorption capacity between the two depths related to differences in CEC and soil texture.

Keyword : *E. coli*; mine soil; pathogenic microbes