**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI**

**COLLEGE OF SCIENCE.**

**FACULTY OF BIOSCIENCES.**

**DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY.**

****

**CHAPTER ONE**

**INVESTIGATING THE BACTERIAL LOAD IN WATER SUPPLY IN THE POLY TANKS IN SOME SELECTED KNUST HALLS OF RESIDENCE**

**BY**

AFFUL BAIDOO PAA KWESI DAVID 4005520

AKOWUAH ALBERT NANA SARFO SENIOR 4008120

OKANTEY PRISCILLA 4030820

NKANSAH SARKODIE YAA FOSUA 4028320

BEKOE ANDY OTENG 4016620

1. **INTRODUCTION**

**1.1 Background**

Water has always been an important and life-sustaining resource to humans as it is essential to the survival of all organisms. It is vital in metabolic processes and serves as a solvent for many bodily solutes. Although water forms a major part of the earth’s surface, much of it is not available to humans in a form that can readily be used and as such can lead to Water scarcity. Water scarcity poses significant challenges to maintaining water quality in storage tanks by promoting stagnation and reducing water turnover. Water supply systems in universities play a crucial role in meeting the daily needs of the students, including drinking, sanitation, and hygiene practices (Kristanti et al., 2022). The human body is made up of over 70% of water (Akuffo, I., Cobbina, S.J., Alhassan, E.H., Nkoom, M. et.al., 2013).

Water storage refers to the practice of collecting or holding water in a contained area for a long period of time for future use. The supply of water always requires storage, as consumption is varying. This water can be stored using various means such as cisterns, ponds, poly tanks and reservoirs. Storage is a crucial factor regarding water quality because in such systems, the risk of a water quality impairment is high. Storage involves a risk of contamination before use, especially in non-piped and piped systems with irregular supply. Within halls of residence, water storage tanks serve as critical components of the water distribution network, storing and supplying water to residential areas in times of water shortage. However, water storage tanks which are commonly used to supply water in the residential halls can serve as reservoirs for bacterial contamination. The quality of water in storage tanks can be influenced by factors such as increase in water temperature, the availability of nutrients, a lack of disinfection residual and stagnation periods (Smith et al., 1990) potentially leading to bacterial contamination and compromising water safety.

Understanding the bacterial load in water storage tanks is essential for evaluating the overall microbial quality of the water supply in the selected residential facilities. By investigating the presence of bacteria in these storage tanks, this study aims to provide insights into the abundance of bacterial populations that may impact the water quality.

**1.2 PROBLEM STATEMENT**

Despite the importance of water storage tanks in ensuring the availability of water within the selected halls of residence, there exists a knowledge gap regarding the extent and nature of bacterial contamination within the storage tanks. Existing research has highlighted the importance of microbial indicators, such as coliform bacteria, in determining water quality (Bej et al., 1991a, 1991b; Niyoyitungiye et al., 2020).Microbial contamination of water in storage tanks, can arise from various sources such as biofilm which may even form in the tanks as a result of the water being kept for a longer period of time, reducing the water quality and inadequate maintenance. Biofilms that develop on the inner surfaces of the poly tanks can act as reservoirs for bacteria, including pathogenic species that can proliferate in these water storage tanks providing protection against disinfection and facilitating bacterial persistence. It is usual to infer the possibility of the presence of indicator organisms such as *E. coli* which indicates faecal contamination.

**1.3 JUSTIFICATION**

The research aims to fill a knowledge gap by providing valuable insights into the extent and nature of bacterial load present in the water storage tanks. The research also seeks to determine the presence or absence of bacteria in water storage tanks in the selected halls of residence.

**1.4 MAIN AIM**

The main objective of this study is to determine the bacterial quality of the water.

**1.5 SPECIFIC OBJECTIVES**

The specific objectives of this study are to determine;

* The presence of bacteria in the water.
* The concentration of bacteria in the poly tanks.

**REFERENCES**

Bej, A. K., McCarty, S. C., & Atlas, R. M. (1991a). Detection of coliform bacteria and Escherichia coli by multiplex polymerase chain reaction: Comparison with defined substrate and plating methods for water quality monitoring. *Applied and Environmental Microbiology*, *57*(8). https://doi.org/10.1128/aem.57.8.2429-2432.1991

Kristanti, R. A., Hadibarata, T., Syafrudin, M., Yılmaz, M., & Abdullah, S. (2022). Microbiological Contaminants in Drinking Water: Current Status and Challenges. In *Water, Air, and Soil Pollution* (Vol. 233, Issue 8). https://doi.org/10.1007/s11270-022-05698-3

Niyoyitungiye, L., Giri, A., & Ndayisenga, M. (2020). Assessment of Coliforms Bacteria Contamination in Lake Tanganyika as Bioindicators of Recreational and Drinking Water Quality. *South Asian Journal of Research in Microbiology*. https://doi.org/10.9734/sajrm/2020/v6i330150

Seyram, K. S., Franck, L., Mariam, D., & Naoyuki, F. (2016). Identification and tracking of microorganisms from the biofilms of container walls used for water storage: Case of rural communities in Burkina Faso. *African Journal of Microbiology Research*, *10*(43). <https://doi.org/10.5897/ajmr2016.8227>

American Museum of Natural History (2012). What is Water? | AMNH. [online] American Museum of Natural History. Available at: https://www.amnh.org/explore/ology/water/what-is-water.

BYJUS. (n.d.). Uses of water - Different uses of water like domestic uses of water etc. [online] Available at: https://byjus.com/chemistry/uses-of-water/.

Slavik, I., Oliveira, K.R., Cheung, P.B. and Uhl, W. (2020). Water quality aspects related to domestic drinking water storage tanks and consideration in current standards and guidelines throughout the world – a review. Journal of Water and Health, 18(4), pp.439–463. doi:https://doi.org/10.2166/wh.2020.052.