**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY.**

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**DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY.**

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**IDENTIFICATION, ISOLATION AND CHARACTERIZATION OF BACTERIA AND**

**FUNGI ON EARBUDS USED BY STUDENTS ON KNUST CAMPU.**

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**CHAPTER 1**

**1.0 INTRODUCTION**

**1.1 Background of the study**

The constant need to communicate and share information in this modern era via handheld electronic devices is an essential part of life in many parts of the world (Karabay et al., 2007). However, poor hygienic practices are performed against possible microbial presence on such handheld electronic devices. Hand-held electronic equipment like mobile phones, tablets, laptops and earphones are communication devices that come in contact with various surfaces, ranging from human skin to tabletops, and are transported everywhere due to their functions and portability (Elkholy & Ewees, 2010). Earphones specifically the earbuds, which are wireless version of the convention wired earphones or earpiece, are known to be shared and used by multiple persons due to their ease of access, portability and size (Bhaskar & Sumitha, 2022). All these in conjunction with external factors like the humid nature of the ear canal are associated with the risk of microbial load(Srikanth et al., 2008). The majority of portable electronic gadgets are shared, therefore some individuals have developed the practice of periodically cleaning their devices. However, the same cannot be said about the individuals that are using the earbuds in particular (Magee *et al*., 2005).

Earbuds are widely used tools for communication on university campuses, by students and officials alike (Singh et al., 2023). Studies have shown that the daily handling and the heat generated by the electronic devices create a prime breeding ground for all sorts of microorganisms that are normally found on the skin of humans and the environment (Ekrakene et al., 2009; Ekrakene & Igeleke, 2007). Previous studies have shown that the presence of medically important bacteria and fungi like Staphylococci (*Staphylococcus auricularis*, *Staphylococcus epidermidis*, *Staphylococcus capitis* and occasionally *Staphylococcus aureus*), *Coryneforms*, *Pseudomonas aeruginosa, Micrococcus lutes, Escherichia coli, Bacillus subtilis, Alternaria sp., Aspergillus niger, Cladosporium, Penicillin, Aspergillus flavus and Aspergillus fumigates* were the main bacterial and fungal isolates associated with electronic devices (Al-Abdallah, 2010).

**1.2 Problem of study**

Earbuds are portable wireless earphones that provide services that also leave them at the mercy of microbial load and buildup; this includes the risk of harboring all kinds of bacterial and fungal matter and in dire cases can cause infections (Abbinay & Bharathi, 2012). Despite it being a common accessory used daily, the microbial colonization of earbuds remains largely understudied. Due to the small nature of these earbuds, they are able to entrap moisture and serve as a breeding area for variety of microbes (Stroman et al., 2001). Microorganisms are ubiquitous and this turns the earbuds into a vehicle for the housing of bacteria and fungi since it is an accessory that interacts with both the human body and the environment (Finlay & Esteban, 2001). In addition to this, naturally occurring flora on skin can be hoarded on these earbuds which also contributes to the microbial buildup (Mackowiak, 1982). Wearing earbuds that are not cleaned properly and regularly may act as a reservoir for microorganisms on the earbud surface and often become carriers and spread microorganisms when they are shared amongst students on campus (Weinstein & Hota, 2004). Therefore, there is a pressing need to identify, isolate and characterize bacteria and fungi present on earbuds used by students on KNUST campus.

**1.3 Main aim**

The aim of this research is to determine the presence of bacteria and fungi on earbuds used by selected students in Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

**1.4 Specific objective**

* To isolate, characterize and identify the presence of bacteria on earbuds used by students in KNUST.
* To isolate, characterize and identify the presence of fungi on earbuds used by students in KNUST.

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