I. INTRODUCTION

1.1. Background

The human skin, being the body's largest organ, is a host to two distinct categories of sweat glands: eccrine and apocrine glands (Kobielak et al., 2015; Swann, 2010). Eccrine glands are distributed extensively throughout numerous anatomical locations, while apocrine glands predominantly inhabit regions of the skin characterized by the presence of hair follicles, such as the anogenital area, areola, eyelid, and axilla (Haskell, 2010). These specialized glands play a crucial role in thermoregulation and excretion. The sweat they produce contains a diverse array of constituents, including branched-chain aliphatic amino acids, fatty acids, lactic acid, and glycerol, all of which collectively contribute to the composition of perspiration. Despite these components, the secretions from these glands typically lack odorous attributes (Lam et al., 2018).

The human body harbors a diverse array of indigenous microbial communities, commonly referred to as normal flora, which establish residence in various bodily regions, including the skin (Da Silva & Domingues, 2017). These microorganisms predominantly assume non-pathogenic roles and have a mutualistic or commensal relationship with their host (Ohalete et al., 2012). Notably, the composition of these resident microbiotas has been closely linked to the emergence of undesirable body odor, particularly when they metabolize the initially scentless sweat secretions produced by the axillary glands (Mogilnicka et al., 2020). Among the noteworthy contributors to this olfactory phenomenon are several prevalent skin bacteria, such as those belonging to the *Staphylococcus, and Micrococcus* genera (Lam et al., 2018; Troccaz et al., 2015). This intricate interplay between the microbiome and body odor underscores the multifaceted nature of the skin's microbial ecosystem and its role in olfactory perception.

With the growing prominence of body odor as a prevalent concern, a myriad of innovative deodorant formulations have been developed to address this ubiquitous issue (Ozeki & Moro, 2016).

Deodorants, categorized as cosmetic products, assume a pivotal role in functioning as antiperspirants, effectively combatting and mitigating undesirable body odors (Komala et al., 2019). These formulations encompass a range of compounds, including aluminum salts, triclosan, odor-neutralizing agents, and plant extracts, all of which have garnered attention for their documented antimicrobial attributes (Komala et al., 2019; Manayi & Saeidnia, 2014; Shahtalebi et al., 2013). These attributes, primarily characterized by the potential to impede bacterial growth, hold significant promise in attenuating the generation of unpleasant body odors. By their multifaceted compositions, deodorants have evolved into effective tools for addressing both physiological and societal concerns related to body odor (Oliveira et al., 2021). However, the prevalence of health issues caused by chemical-based deodorants, such as allergic reactions, dermatitis, and endocrine interference, has led to a compelling research endeavor focusing on the development of a novel deodorant solution, denoted as "Deodorant X" (Weatherly & Gosse, 2017). This innovative deodorant formulation incorporates the use of “Extract X," renowned for its remarkable antibacterial properties.

1.2. Objective and Hypothesis

This research paper aims to investigate the effectiveness of Deodorant X against two axillary bacteria, *Staphylococcus epidermidis* and *Micrococcus luteus*, as well as provide a suitable and effective solution for addressing health concerns commonly associated with conventional deodorants. By leveraging the natural antibacterial attributes of Extract X, this study endeavors to contribute to the development of a safer and more skin-friendly alternative in the realm of personal hygiene products.

The hypothesis posits that the novel deodorant formulation will exhibit notable *in vitro* antibacterial efficacy against axillary bacterial isolates. This efficacy will be demonstrated through a reduction in the colony forming units (CFU) count, signifying its potential to effectively mitigate the production of unpleasant body odors caused by these specific bacteria.

1.3. Research Scope

This research project encompassed a comprehensive analysis, spanning the examination of bacterial growth and the establishment of a standard curve, the assessment of the deodorant's efficacy concerning its ratio against bacteria, the evaluation of the novel deodorant's antibacterial properties, and an investigation of its effectiveness over time. A concise overview of these research components is illustrated in Figure 1.1 to provide a clear depiction of the study's scope.

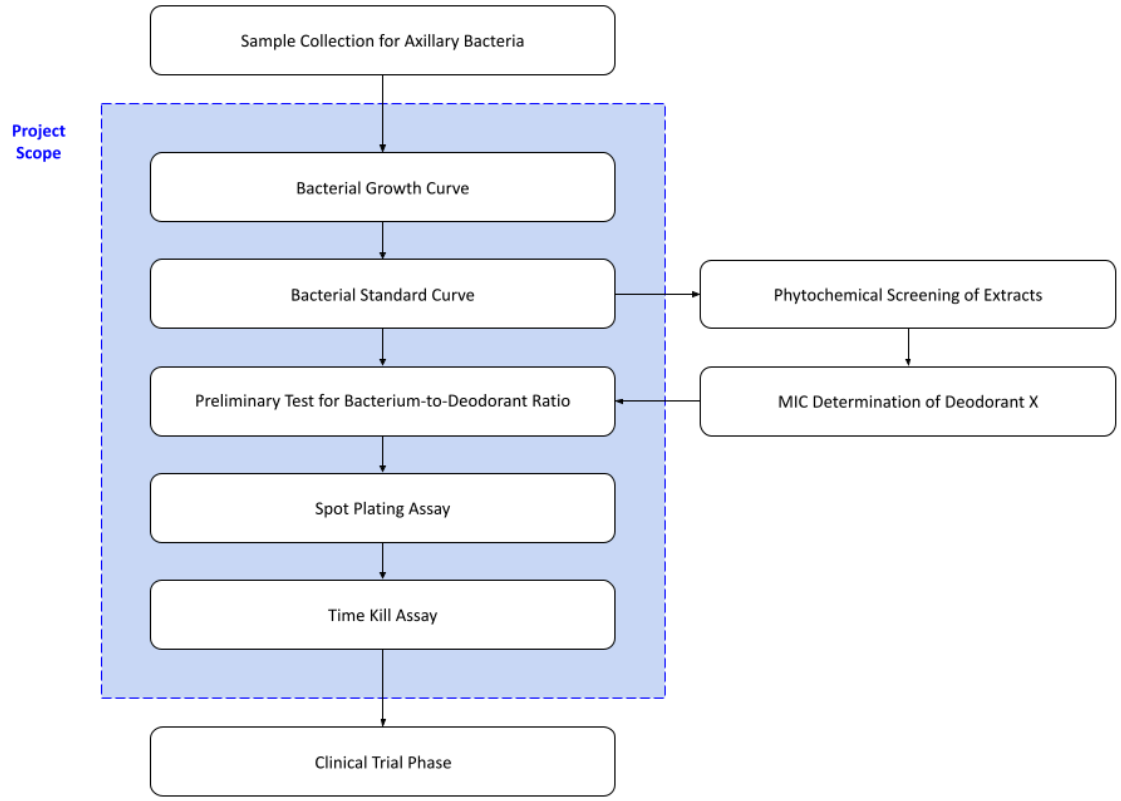

Figure 1.1. Overview of the experimental procedure.