

Exposing several isolated body normal flora biology essay

[Science](#), [Biology](#)



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CHAPTER 1

INTRODUCTION

The investigation involved exposing several isolated body normal flora to a hairspray in order to test whether the microbe was sensitive to the particular hairspray or not. This kind of testing is very important in the cosmetic field because dermatologist need to ensure hairspray free from contamination of bacterial growth. Antimicrobial agents that contained in hairspray are almost similar to other hairspray because of their mode of action inhibit the growth of microorganism. The skin microbiome or skin microbiota, more properly referred to as skin flora, are the microorganisms which reside on the skin. Many of them are bacteria of which there are around 1000 species upon human skin from 19 phyla (Grice et al., 2009). Usually found in the

superficial layers of the epidermis and the upper parts of hair follicles. Skin flora are also usually non-pathogenic, and either commensals or mutualistic. The benefits bacteria can offer include preventing transient pathogenic organisms from colonizing the skin surface, either by competing for nutrients, secreting chemicals against them, or stimulating the skin's immune system (Cogen et al., 2008). However, resident microbes can cause skin diseases and enter the blood system creating life-threatening diseases particularly in immunosuppressed people (Cogen et al., 2008). The density and composition of the normal flora of the skin varies with anatomical locale. The high moisture content of the axilla, groin, and areas between the toes supports the activity and growth of relatively high densities of bacterial cells, but the density of bacterial populations at most other sites is fairly low. Hygiene to control such flora is important in preventing the transmission of antibiotic resistant hospital-acquired infections. The most effective (60 to 80% reduction) antimicrobial washing is with ethanol, isopropanol, and n-propanol. Viruses are most affected by high (95%) concentrations of ethanol, while bacteria are more affected by n-propanol (Kampf & Kramer, 2004). Hairspray is a common cosmetic product that is sprayed onto hair to keep it stiff or in a certain style, which are typically packaged in cans or bottles. The ingredients products are a blend of simple industrial polymers that provide structural support to hair. The most common hairspray ingredients are polyvinylpyrrolidone, polydimethylsiloxane, gum arabic, hydrocarbons, gum tragacanth and alcohols. This alcohol has tendency and ability to kill bacteria either inside hairspray container or on normal body flora. Ethanol is a great preservative but need to use it in high levels and it faces significant

environmental restrictions. Other compounds like benzyl alcohol, dichlorobenzyl alcohol, and even propylene glycol all have some anti-microbial effect and that is the reason why it is used in cosmetics product. However, it could be normal body flora can survive in extreme condition inside hairspray container or either on human skin even when it was sprayed by hairspray because of bacterial tolerable to chemicals content of hairspray. In addition, alcohol is not well tolerated by dry and sensitive skin. It causes more dryness and irritates sensitive skin. Some green products manufacturers are also pushing alcohol free products. But some say that the label is misleading because alcohol free does not always mean free of alcohol, but means free of ethyl alcohol. These alcohol free products of hairspray could cause bacterial growth. Therefore, the objectives of this experiment are to: To isolate and identify the normal body flora of human that tolerable to hairspray's chemicals content. To study and characterize the normal body flora of human isolated from human body.

CHAPTER 2

LITERATURE REVIEW

2. 1Normal Body Flora

The human body contains a large number of bacteria, most of them performing tasks that are useful or even essential to human survival. Those that are expected to be present, and that under normal circumstances do not cause disease, are termed normal flora. It is estimated that 5000 to 10000 different species of bacteria live in the human body (Sears, 2005). Bacterial cells are much smaller than cells, and there are about ten times as

many bacteria as human cells in the body, 1000 trillion (10^{15}) versus 100 trillion (10^{14}); (Sears, 2005). Though normal flora are found on all surfaces exposed to the environment (on the skin and eyes, in the mouth, nose, small intestine, and colon), the vast majority of bacteria live in the large intestine. The mixture of organisms regularly found at any anatomical site is referred to as the normal flora, except by researchers in the field who prefer the term "indigenous microbiota" (Todar, 2006). The normal flora of humans consists of a few eukaryotic fungi and protists, but bacteria are the most numerous and obvious microbial components of the normal flora. The normal microbial flora is relatively stable, with specific genera populating various body regions during particular periods in an individual's life (Baron, 2005). Normal body flora, by definition, does not cause disease in healthy individuals. Instead, they are commensalists or mutualists with regard to the host. That is, in addition to basically not harming the host, they can even do some good. Normal microbial flora inhabiting the human skin nails, eyes, oropharynx, genitalia, and gastrointestinal tract are harmless in healthy individual, these organisms frequently cause disease in compromised hosts (Baron, 2005).

2.2 The Bacteria

Bacteria are simple organisms that consist of one cell. They are among the smallest living things (Ahmad, 2004). Bacteria are generally simple structures. The bacterial cell lacks a membrane-bound nucleus; because of this bacteria are described as prokaryotes (Heritage, 2006). A cell wall is a fairly rigid layer surround a cell (Koch, 2003). The bacterial cell wall containing a special polymer called peptidoglycan (Heritage, 2006). It is

located external to the cell membrane that provides the cell with shape of cell, structural support, protection, and a filtering mechanism (Sendbusch, 2003). Any destruction of cell wall will kill the bacteria. Cells with many layers of peptidoglycan can retain a crystal violet-iodine complex when treated with acetone. These are called Gram-positive bacteria and appear blue-black or purple when stained using Gram's Method (Heritage, 2006). Gram-negative bacteria have only one or two layers of peptidoglycan and cannot retain the crystal violet-iodine complex, it will retained counterstain; safranin red color (Cappuccino & Sherman, 2005). Bacteria can be divided into pathogenic bacteria and non-pathogenic bacteria. Pathogenic bacteria are the bacteria cause diseases in human beings (Ahmad, 2004). Non-pathogenic bacteria are the bacteria not causing disease in human beings and also known as normal body flora (Quinn & Rosen, 2000).

2. 3The Hairspray

Hairspray is a cosmetic product which is sprayed onto hair to keep it stiff and keep it shiny, without flaking off, without failing in humid conditions.

Formulations and ingredients of hairspray continue to vary since its original introduction, due environmental regulations concerning propellants, product differentiation, health regulations which vary by country concerning specific ingredients, which causes a proliferation of similarly-formulated products.

Most common formulations of hairspray involve Vinylpyrrolidone/Vinyl Acetate (PVP/VA) which is a copolymer used for hold hair. Ethanol acts a solvent to carry the active ingredients in the formula. Isopropyl myristate, diethyl phthalate which is acts as additives for flexibility, butane together

with propane used as propellants. The emulsifier aminomethyl propanol serves as a buffering agent, by controlling and balancing the pH and the acidity of the mixture to make it neutral. Sodium benzoate acts as preservative and functions as a corrosion inhibitor. Cyclopentasiloxane is a volatile silicone used to make the film water repellent, and to eliminate tackiness. Sodium salt of pyrrolidone carbonic acid is a moisturizing agent which is drawing moisture from the air and holding it. It is also contain surfactants such as Benzalkonium chloride, major non-alcohol-based active ingredient commonly used for clinical.

2. 4Active Ingredient

In order to control microbial growth contamination and to stabilize any hairspray products, some form of preservative needs to be used. Substances that added to dosage forms to protect hairspray from microbial contamination are called antimicrobial preservatives. However, in many hairsprays no expiry date has been reported and may lose the preservative activity and became a potential risk for microbial contamination. In this situation, alcohol is used as active ingredient in hairspray because alcohol like ethanol is a great preservative but this ethanol need to use it in high concentration and it deals significant environmental restrictions. Other compounds like dichlorobenzyl, benzyl alcohol, and even propylene glycol all have some anti-microbial effect. These compounds are less effective at preserving products if it used in lower levels of concentration.

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