



# What's Lurking in Your Makeup?

## Effects of Bacterial Colonization in Cosmetics on the Skin

London Alarilla<sup>1</sup>, Cindy Calixto<sup>1</sup>, Faith Goodwin<sup>1</sup> and Jacen Moore<sup>1, 2</sup>

<sup>1</sup>UTEP Work With A Scientist Program,

<sup>2</sup>UTEP Department of Clinical Laboratory Sciences, El Paso, TX, USA



### Introduction/Background

When you go through your morning makeup routine, your primary goal is to improve your appearance. But how is that seemingly harmless, perfectly-applied layer of powder really affecting your skin? Most of the time, makeup doesn't have any major negative effects other than early morning frustration and the hassle of applying it. Makeup can, however, cause skin reactions including rashes or acne. Most of these reactions aren't severe or long-lasting, but how much your makeup affects your skin is very important in maintaining good skin health. In 4000 BC, the ancient Egyptians used copper and lead ore to create the world's first cosmetics (Gardner, S.- Web MD (2014)).

Over the centuries, women put their health at risk utilizing and manufacturing cosmetics. For example, women swallowed ox blood to improve complexions, used ash from burnt matches to contour the eyes, berries to stain the lips, and urine to fade freckles. Some cultures used arsenic, lead, mercury, and leeches to give themselves a pale facade, which was deemed beautiful (http://www.webmd.com/beauty/makeup/history-makeup).

Now, there are scientifically-advanced products that can do everything including hiding pores, smoothing out complexions, and turning sleepy, panda, eyes into an illusion of youthful, healthy, eyes. Thankfully, we've come a long way from using dangerous materials for makeup. Today, the multibillion dollar cosmetic industry must meet government standards about how makeup is processed and what can and can't be included in products. Most serious injury likely to be received from cosmetics today is a skin irritation or rash. Yet, despite many methods of safety testing in the industries, health concerns and questions remain regarding the dangers of cosmetic ingredients.

### Thesis/Hypothesis

**Thesis-** Bacteria found in used cosmetic products negatively affect facial skin cells.  
**Hypothesis-** Bacteria present in used makeup can cause problems with the skin.

### Questions

What effect does facial skin type have on the types and quantity of bacteria that form on the skin?

What effects do bacteria in used makeup have on the skin?

### Materials

- I. Trypticase Soy Agar plates with 5% sheep blood
- II. Sterile swabs
- III. Inoculating loops
- IV. 37°C incubator
- V. Subjects bring their own foundation (Powdered cosmetics- face powder, blush, and bronzer)
- VI. Gram stain kit
- VII. Glass microscope slides
- VIII. Microscope
- IX. Biomerieux Vitek Instrument
- X. Coagulase reagent
- XI. API Strips

### Methods/Procedures

- I. Samples will be collected from subjects with dry skin, oily skin and oily/dry mixed skin (n=5/group)
- II. Using sterile swabs, samples will be collected from the subject's makeup container/compact and face, then streaked onto blood agar plates
- III. Label and incubate the plates upside down in a fresh 37° incubator overnight
- IV. Colonies will be observed and identified colonies using:
  - I. Gram staining
  - II. Coagulase testing
  - III. Agglutination testing
  - IV. API testing
  - V. Automated identification testing using a Vitek instrument
- V. The number of colonies and bacterial types will be compared between skin types
- VI. Associations between bacterial colonization of skin, skin issues and makeup containers will be evaluated

### Expected Outcomes

1. We expect to identify common types of bacteria (such as Staphylococcus) on the skin of the different subjects
2. Bacterial colonization patterns and numbers of bacteria will likely be different amongst skin types
3. Individuals having makeup with high bacterial counts may have more skin issues.

### Future Directions

Although this is not part of the current experiment, this research project could have the potential to open doors in finding a way to create a solution, either made of chemicals or natural substances, to make a treatment research could be utilized to create something to benefit both the eminence of the make up, but also help keep the facial skin clean.

### References

- Gardner, S. (Ed.). (2014, July 28). History of Makeup. Retrieved May 30, 2015, from <http://www.webmd.com/beauty/makeup/history-makeup>
- Affairs, C. (2007, August 6). Old Make-Up Can Harbor Bacteria. Retrieved May 30, 2015, from [http://www.consumeraffairs.com/news04/2007/08/old\\_makeup.html](http://www.consumeraffairs.com/news04/2007/08/old_makeup.html)
- K. F., T. I., T. K., A. T., K. U., & Y. S. (2014, August 1). Internal structure changes of eyelash induced by eye makeup. Retrieved May 30, 2015, from <http://www.ncbi.nlm.nih.gov/pubmed/25423741>
- Nall, R. (Ed.). (2015, January 28). Types of Bacteria Found in Makeup. Retrieved May 30, 2015, from <http://www.livestrong.com/article/68575-types-bacteria-found-in-makeup/>

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