# CALIFORNIA STATE SCIENCE FAIR
# 2017 PROJECT SUMMARY

**Name(s)**

**Alexandra M. Bermudes**

**Project Number**

**J1601**

**Project Title**

## Strains of Photorhabdus Isolated in the Santa Monica Mountains Are Most Similar to Each Other and Strains from Wisconsin

**Abstract**

**Objectives/Goals**

The overall goal of these experiments were to determine if Photorhabdus sp are present in the Santa Monica Mountains and compare them with other known strains.

**Methods/Materials**

E. coli MG1655 was used as a negative control and Photorhabdus luminescens HM was used for comparison of DNA sequences. After isolating three novel strains of Photorhabdus from the Santa Monica Mountains, the first test was to sequence their 16S rRNA as a #fingerprint# for identification. In order to do so, genomic DNA was isolated from each bacterium grown in liquid culture. Results of the genomic isolation showed a variety of concentrations of DNA, with all of them being sufficient to proceed to the next step. PCR was used to amplify the 16S rRNA DNA for each of the strains, which was verified by gel electrophoresis. DNA sequencing reactions were assembled and then sent out for commercial sequencing. The completed DNA sequences were downloaded from the sequencing service web site and compared using the program BLAST (Basic Local Alignment Search Tool) for similarity. In order to assess possible physiological differences, the pigment profile of pigments produced by the strains on two media, LB agar and tryptic soy agar were compared.

**Results**

The DNA sequencing results showed that each of the three Photorhabdus strains that were isolated are most similar to each other and highly similar to know strains of Photorhabdus temperata from Wisconsin, and different from Photorhabdus luminescens strain HM. The pigment profile results showed E. coli was without a pigment while the three new strains produced the same light yellow color and the Photorhabdus HM had a dark orange pigment.

**Conclusions/Discussion**

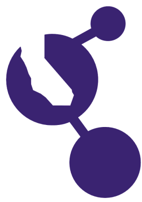
With only a few base pairs difference, the bacteria isolated can be concluded to be a new substrain of Photorhabdus temperata. The pigment profiles were also consistent with the three new strains being the same strain and being different from Photorhabdus luminescens.  Overall, this project is the first to report the presence of Photorhabdus temperata in the Santa Monica Mountains.

**Summary Statement**

Isolation of novel strains of Photorhabdus and their relationship to other strains.

**Help Received**

I preformed all technical aspects of the project besides the DNA sequencing, in which I used a commercial sequencing service. Method demonstration and lab access and equipment were provided by Prof. David Bermudes in the Department of Biology at California State University Northridge.



# CALIFORNIA STATE SCIENCE FAIR
# 2017 PROJECT SUMMARY

**Name(s)**

Gia S. Boisselier

**Project Number**

**J1602**

**Project Title**

## Microorganisims beneath the Santa Clara River


**Abstract**

**Objectives/Goals**

The objective of this project was to observe and compare the different microorganisms in the Santa Clara River.

**Methods/Materials**

Observed Winogradsky columns made from one-liter bottles containing Mud or dirt samples from various locations along the river and water from source locations or tap. Egg yolk and newspaper nutrients were added as carbon and sulfer sources for the microbes. Documented using a camera for 12 weeks at a temperature range. The independent variable was the soil. The constants were the temperature and the amont of ingredients.

**Results**

The results showed the microbe growth in the Windogradsky columns did not vary compared to each other and that the salt water did not affect the microoganisms in the soil. Some pigmentation and coloring of the microbes developed, but no main difference occurred between the samples. Hypothesis that saltwater near the mouth of the river would affect microorganisms which in turn impact vegetation and wildlife was refuted. Vegetation and wildlife around the Santa Clara River did not vary as much as expected.

**Conclusions/Discussion**

Microbes in the Winogradsky columns formed over a period of 12 weeks and although the hypothesis was refuted the results are important because they show the different types of bacteria and vegetation/wildlife around the Santa Clara River which may impact how farmers and residents use the river. It may also influence people to be aware of the wildlife and vegetation on the river.


**Summary Statement**

I observed and compared microorganisms in the soil along the from Santa Clara River using Winogradsky columns to determine if they influence the environment..

**Help Received**

I built the columns myself and gained an understanding of the how Winogradsky columns work through my research.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**

Riley A. Carpenter

**Project Number**

**J1603**

**Project Title**

# Mold Growth: What Are the Factors of Mold Growth?

**Abstract**

**Objectives/Goals**

The objective of this experiment was to determine if different household conditions affect the rate of mold growth on stored bread.

**Methods/Materials**

Bread, gallon size zip-lock baggies, humidifier and thermometer with humidity level readings. Bread was stored in bags in different locations with different temperatures and humidity levels, measurements were taken each day and mold was visually observed.

**Results**

Mold grew first on the bread that was located in a room with higher temperatures and humidity levels.

**Conclusions/Discussion**

Different temperature and humidity levels proved to affect the rate of mold growth on bread. Higher temperature and humidity levels caused mold to grow faster, indicating storing bread at lower temperatures will keep longer.

**Summary Statement**

I showed different temperature and humidity levels affect the rate of mold growth on stored bread.

**Help Received**

My mentor, Anne Pfaff, offered suggestions and ideas for researching mold on different websites. My 8th grade teacher reviewed the grammar of my papers.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**

Segen M. Chambers

**Project Number**

**J1604**

**Project Title**

# Yeast Morphology Changes with Fermentation in Neutral vs. Acid pH

**Abstract**

**Objectives/Goals**

Comparison of yeast growth morphology in neutral vs acidic pH when in solution during fermentation, and on agar after fermentation.

**Methods/Materials**

Built a homemade microscope using cellphone and inverted laser pointer lens for magnification. Directions found online at Instructables.com.

Fermented three yeast strains separately in two batches each, one with neutral pH, and another batch with acidic pH 2.5. Compared morphology on wet mounts with homemade microscope.

Culture samples also plated onto malt agar to compare colony morphology after fermentation at neutral vs acid pH

**Results**

Acidic pH had variable effects on morphology, specifically on formation of visible clumps (called flocs) during fermentation. Strain 1, a non-flocculating yeast, showed no changes from neutral to acid pH. Strain 2 was known to form flocs in neutral pH, but showed total loss of flocculation in acid pH. Strain 3 also formed flocs in neutral pH, but showed increased flocculation in acid pH.

Unable to observe colony growth characteristics on agar. No growth on plates was observed after 4 days from any of the six culture-fermentation flasks.

**Conclusions/Discussion**

pH levels can drastically change the morphology of yeast during fermentation, specifically with regards to clumping morphology called flocculation. The effect can vary based on the strain or species of yeast, and may have been caused from evolutionary changes over time where flocculation or lack of flocculation gave the yeast a survival advantage in its environment.  My guess is that other environmental differences such as temperature, nutrient source and light could also affect morphology. Morphology of simple organisms like yeast is a characteristic that can be used in taxonomy to classify and distinguish different species.

**Summary Statement**

I observed that acidic pH can change the morphology of yeast during fermentation, with differing effects on different species or strains.

**Help Received**

My primary mentor was Ms. M. Tuttle, undergrad in Dept. of Microbiology, CSU Chico. My father helped me build the microscope using power tools. My mother demonstrated how to make a wet mount, and supervised me when working with HCl and boiling solutions.

# CALIFORNIA STATE SCIENCE FAIR
# 2017 PROJECT SUMMARY


**Name(s)**

Sadies M. Dinh


**Project Number**

**J1605**

**Project Title**

## Does Dog Drool Kill/Prevent Bacteria?


**Abstract**

**Objectives/Goals**

Objective: My objective was to learn if dog saliva could really kill or prevent bacteria.

**Methods/Materials**

Materials: For my project I used dog saliva, sterile petri plates with agar, and cotton swabs.

Method:I took cotton swabs and rubbed both ends on the ground in my backyard. I put a bit of ground in an agar dish. Next, I did the same with a cotton swab that my dog licked. Then I closed the petri dishes, labelled them, put them in a warm, dry place and waited patiently for results.

**Results**

Result: The result of my experiment was that the agar plate with the dog drool had less bacteria than the petri dish without the dog drool.

**Conclusions/Discussion**

Conclusion: The result of my experiment did support my hypothesis, since the agar plate with the dog drool had less bacteria than the plate without the dog drool. This shows that the dog drool did kill or prevent some bacteria but, had other bacteria growing from the dog#s mouth.


**Summary Statement**

How does dog drool affect bacteria?


**Help Received**

I did this project by myself.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY


**Name(s)**

Ruchika S. Dixit


**Project Number**

**J1606**

**Project Title**

# How Quorum Sensing and Media Affect Bacterial Bioluminescence


**Abstract**

**Objectives/Goals**

Electricity is not dependable in small villages in third world countries, making light a scarce resource. To solve this problem, I wanted to explore if bioluminescent bacteria called Vibrio Fischeri can be used as an alternative light source. My goal was to increase the bacteria's luminescence by experimenting on media in which it grows and bacteria#s density (cells/ml).

**Methods/Materials**

I ran two tests on the bacteria. In the first, the independent variable was the media. For this experiment, I made five different media and grew bacteria in each of them. The first was a control, with no extra chemicals, the second with Chitosan, third with Fatty Aldehyde, fourth with L-Cysteine, and fifth with FMNH2.

For the second experiment, the independent variable was cell density. I grew bacteria in five different densities, using the McFarland Standards (McF) as a measure of cell density, 0.5 McF in the first, 1 McF in the second, 2 McF in the third, 3 McF in the fourth, and the most dense being 4 McF, the fifth.

In each experiment, I took pictures of the bacteria at 24 hours, 48 hours, and 72 hours, and ran them through an image processor, called ImageJ, which can measure the amount of light in a picture.

**Results**

I found that in the media experiment, Chitosan had less luminescence than the control at 24 hours, but at 48 hours, the luminescence increased notably, then dropped after 72 hours. For Fatty Aldehyde, all 3 days were lower than any other chemical, and the luminescence didn#t change much over time. FMNH2 and L-Cysteine appeared to be similar to the control.

In the density experiment, every density had the highest luminescence at 24 hours, less at 48 hours, and the least luminescence at 72 hours. At 24 hours, 2 McF had the most luminescence followed by 0.5 McF and 1 McF. 3 McF and 4 McF had the least luminescence.

**Conclusions/Discussion**

Both media manipulation and density variation increase bacterial luminescence. Chitosan in media and 2McF density can be used to build a prototype of an alternative light source.


**Summary Statement**

By growing the bacteria in media with added chemicals or in different cell densities, can I increase the amount of light that is produced by the bioluminescent bacteria, Vibrio Fischeri?


**Help Received**

I conducted the project at Schmahl Science Lab under the mentorship and supervision of Mr Carroll. I did all the work by myself.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY


**Name(s)**

Sarah M. Hansen


**Project Number**

**J1607**

**Project Title**

# Do Yeast Adapt to Environmental Stress Faster with an Increased Mutation Rate?


**Abstract**

**Objectives/Goals**

I wanted to see if yeast introduced to environmental stress will eventually recover and grow at a rate similar to non-stressed yeast. I also wanted to see if the stressed yeast would recover faster with an increased mutation rate.

**Methods/Materials**

Yeast were grown in YPD medium as a baseline. YPD medium with high NaCl concentration or with vinegar were inoculated from the YPD culture. Two tubes of each condition were created and passaged daily for 21 days. One set of yeast were subjected to UV light every other day to increase the mutation rate. The yeast growth rates were calculated from optical density measurements over multiple hours of growth but during the logarithmic growth phase.

**Results**

Yeast introduced to environmental stress did have lower growth rates but recovered in the case of high salt conditions but not under vinegar conditions. An increased mutation rate did not help the yeast adapt to environmental stress. Rather, the UV treated yeast actually showed a slightly slower growth rate.

**Conclusions/Discussion**

It was surprising that the vinegar condition did not recover because in a previous study, yeast grown under acidic conditions did adapt. I noticed that over time the vinegar media became cloudy and material collected on the side of the tube. I suspect that this changed the available nutrients for the vinegar yeast. If I were to do this experiment again I would measure the growth rates more frequently during the adaptation phase rather than a single growth rate measurement after 21 days.


**Summary Statement**

I grew yeast under environmental stress to see if they would adapt faster if they had an increased mutation rate from UV light.


**Help Received**

My dad helped me learn lab techniques, do statistics and get a shaking incubator to grow the yeast. My mom helped with the poster layout. Several mentors from the San Carlos district helped by giving me tips and ideas.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**

Herin Kang

**Project Number**

J1608

**Project Title**

# Algae Oxygen Generator


**Abstract**

**Objectives/Goals**

This engineering project is building an oxygen generator using micro algae. High carbon dioxide concentration from breathing can cause headaches and breathing discomfort. Thus, regular ventilation and air circulation is needed for healthy living. However, air circulation is not always easy in an indoor environment. Because of temperature and air quality differences between indoor and outdoor regular ventilation often wastes energy and let allergens indoors.
The indoor algae oxygen generator system was designed to provide oxygen alternatively using photosynthesis.

**Methods/Materials**

The oxygen generator consists of four main components: a container for the algae, an air pump to continuously pump air bubbles into the container with algae, the algae (mixed with water and nutrients), and an LED lamp to provide light. During the initial testing, my analysis showed that to provide oxygen for an actual bedroom (990 cubic ft. of the measured space) would require fairly large system, so a simulator room (8 cubic ft.) was made instead. By comparing the size between the two rooms, I could calculate the size and energy cost for the actual generator. To determine the effectiveness of the generator, a carbon dioxide sensor was used to determine the carbon dioxide level (ppm).

**Results**

My results showed that the algae oxygen generator reduced the carbon dioxide concentration effectively. An oxygen generator with approximately 0.7 gallon of algae in 8 cubic ft. simulator room was able to convert carbon dioxide into oxygen at the same rate as a person consuming oxygen in a normal bedroom. Between regular bottle container and slim design container, the latter showed faster reduction of carbon dioxide.

**Conclusions/Discussion**

Based on my analysis, a generator with size of 6 ft. by 6 ft. by 4 inch wall-mountable design can provide enough oxygen. Estimated energy cost of the full size oxygen generator would be 27 cents per day, which is much less than air conditioning or heating energy would require in many circumstances.
With more design improvement, I believe there is an opportunity for commercial application of the algae oxygen generator, where normal ventilation is not ideal.


**Summary Statement**

I designed an oxygen generator using micro algae that saves energy and provides an alternative when normal window ventilation is not ideal.

**Help Received**

I designed the algae generator and the simulator room but got help from my dad on building the simulator room using various tools (drills and saw, etc.).

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY


**Name(s)**

Shino Kawazu


**Project Number**

**J1609**

**Project Title**

# The Effect of Different Water Sources on Lactic Acid Bacteria Activity


## Abstract

**Objectives/Goals**

The objective of this experiment is to learn how different mineral contents of water and sugar (tested separately) affect lactic acid bacteria activity. Its purposes include understanding moderation, finding a potential alternative to obtain energy, helping nutrition balance and preventing muscle fatigue.

**Methods/Materials**

Bottles, rice bran, sugar, varying waters, irrigation tubing, shutoff valves, pH strips, thermometer. Used personally made device to measure gas production with the water displacement method. Measured temperature, gas level, and acidity at least once a day. For second trial, used same types of waters but used different kinds of sugars.

**Results**

Of the two trials already conducted, experiment has shown varying results; sometimes, but not always, higher mineral content of the water and/or sugar resulted in more gas production and when graphed, there were logarithmic and linear functions.

**Conclusions/Discussion**

Within the trials already completed, there seems to be a general positive correlation between mineral content of water/sugar and gas produced by the lactic acid bacteria. The intention/origin of the water and the seasons also affect overall gas production. It is concluded that it is crucial for humans to consume minerals - as already shown through other studies - but this experiment supports this idea from the perspective of lactic acid bacteria.


**Summary Statement**

I showed the total gas produced by lactic acid bacteria are dependent on the mineral contents of water and sugar.


**Help Received**

My parents assisted with the building of devices for the experiment. My Biology teacher reviewed the procedures and results.

# CALIFORNIA STATE SCIENCE FAIR
# 2017 PROJECT SUMMARY

**Name(s)**
Clara Luisetti; Elsie Luisetti

**Project Number**
**J1610**

**Project Title**
## Is Water Wasted by Pre-Rinsing and Pre-Scrubbing Our Dishes?

**Abstract**

**Objectives/Goals**
To determine whether a pre-rinse or pre-scrub helps to wash dishes in a dishwasher and test the effectiveness of various detergents.

**Methods/Materials**
Twelve kitchenware samples were covered with a biofilm indicator, Glo Germ, and checked with ultraviolet (UV) light to ensure the surface was coated in biofilm. The dishes were divided into three sets containing 3 plates and 1 plastic container. Set A had nothing done to it. Set B was rinsed under water for 1 second. Set C was scrubbed for 1 second under water. The sets were run through a dishwasher with water only. Pictures were taken of all samples under an UV light before and after each procedure. The amount of biofilm remaining on the kitchenware after the dishwasher cycle was recorded. We repeated this process three more times and each time inserted a different dishwashing detergent.

**Results**
To determine if a pre-rinse or pre-scrub was more effective in cleaning kitchenware, we averaged all of the results from Set A, B and C for all four experiments. The more biofilm that remained on the dishes, the dirtier they were. The least amount of biofilm remained when kitchenware was pre-scrubbed prior to a dishwasher cycle, averaging 20% of the biofilm remaining. The second closest was doing nothing prior to washing the kitchenware, with 24% of biofilm remaining. The kitchenware with the most biofilm was the pre-rinse set, averaging 44% of biofilm remaining. To determine if any detergents produced better results, we averaged our results for all conditions for each experiment. We used a different detergent each time. Experiment A-water: 35% of the biofilm remained on the kitchenware. Experiment D-Bright Green: 33% of the biofilm remained. Experiment B-Kirkland Tablets: 29% of the biofilm remained. Experiment C-Cascade Complete: the cleanest dishes with 21% of biofilm remaining.

**Conclusions/Discussion**
Pre-scrubbing is 4% more effective than doing nothing to your dishes prior to running them in the dishwasher. We doubt that a 4% increase in cleanliness warrants the water wasted in the pre-scrubbing process. Cascade Complete produced the best results by 8%. We suggest that you scrape food off your plate, place your dishes directly into the dishwasher, and use a Cascade Complete Dishwasher Pac for the most effective and water conscious clean.

**Summary Statement**
This project analyzes the effects of a pre-rinse, a pre-scrub, or doing nothing at all on different types of dishware and the effectiveness of different dishwasher detergents.

**Help Received**
Our mom helped us buy the products and take pictures to create photo displays of our project.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**

Lori O. Lust

**Project Number**

J1611

**Project Title**

## Fungus Among Us

**Abstract**

**Objectives/Goals**

I researched types of mold (fungus). My project was to find out if aloe juice will help fruit from molding. I choose this topic because I don#t know very much about mold and I want to learn more.

**Methods/Materials**

2 bowls, water, aloe juice, sticky notes, fresh strawberries, 6 plastic containers, disposable gloves, lab notebook. Filled bowls with water and aloe juice. Dipped some strawberries into bowls of water and some into bowls of aloe juice. Set strawberries aside in plastic containers labeled water or aloe juice. Each day for 4 days, inspected strawberries, wearing gloves, individually for signs of mold. Logged results in my notebook. Did this for 3 separate trials.

**Results**

I thought that the aloe juice would help the strawberries from molding and it did. Almost all of the strawberries, from water and aloe, started to mold but there was one strawberry on day 4 from the aloe juice that only had some small bruises.

**Conclusions/Discussion**

In conclusion my hypothesis was correct because the strawberries dipped in water had more mold than the ones dipped in aloe juice. Using aloe juice to wash strawberries did not make much of a difference in producing mold.

**Summary Statement**

Although there was 1 strawberry that did not mold, aloe juice did not show a significant benefit as opposed to using water.

**Help Received**

I gathered my supplies and conducted my own experiment.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**

Themi D. Perera

**Project Number**

**J1612**

**Project Title**

# A Natural Solution to Contaminated Environments: Effects of Different Nitrogen Sources on the Biodegradation of Crude Oi

**Abstract**

**Objectives/Goals**

The objective of this study is to investigate the impact of different nitrogen sources on the degradation of crude oil by a common soil microorganism, Pseudomonas putida.

**Methods/Materials**

Minimal media recipe (Bushnell Haas) was prepared and agar was added (2% w/v) to create solid growth media. Filter sterilized nitrogen sources (NO3, NH3, Urea) were added to the liquid media prior to sterilization via the autoclave to reflect different nitrogen conditions. P. putida was inoculated onto the plates. Sterilized crude oil was added to the plate above the organism. Plates were inoculated at 30 degrees C for 5 days. Growth will be observed (+/-, growth or no growth respectively).

**Results**

Results demonstrated that P. putida is capable of enhanced growth in the presence of crude oil under carbon and nitrogen rich conditions. Growth of the organism was not observed on the minimal media plates with variable nitrogen conditions.

**Conclusions/Discussion**

These data suggest that nutrient rich environments are required for P. putida to successfully grow in and utilize crude oil, and these findings can be used to help improve developing formulas for enriching oil degrading bacteria.

**Summary Statement**

Using different nitrogen sources to enrich bacteria, I discovered that P. putida needs a wide variety and abundance of nutrients to successfully degrade crude oil.

**Help Received**

Tara Mahendrarajah was my lab supervisor and taught me the procedures. Dr. G. Flores at CSU Northridge provided microbe cultures and the lab. My science teacher Mrs. D. Shah answered any questions I had.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**
Gwendolyn M. Shernock

**Project Number**
J1613

**Project Title**
# The Effects of Glyphosate on Freshwater Bacillariophyceae

### Abstract

**Objectives/Goals**
Glyphosate is the most widely-used agricultural chemical ever. It is one of the many homo sapien-ensued factors that affects our environment. The purpose of my project was to determine how glyphosate effects bacillariophyceae, as to determine how agricultural runoff effects Pacific algal blooms.

**Methods/Materials**
To test glyphosate's effect on freshwater bacillariophyceae, I left twenty beakers - each with freshwater bacillariophyceae, purified water, medium, and various increments of glyphosate, ranging from 0.05 to 0.4 milliliters - for twelve hours, and collected data before and after glyphosate exposure. I compared the two sets of data to determine what measurement of glyphosate resulted in higher cell-count.

**Results**
I found that samples containing 0.05 milliliters of glyphosate, with lesser concentrations proportional to those in aquatic environments, yield the greatest cell reproduction, while samples that had 0.1 milliliters of glyphosate produced a decline in cells.

**Conclusions/Discussion**
Based on my results, I conclude that agricultural chemicals positively affect marine algal bloom growth. In recent years, toxic bacillariophyceae blooms, pseudo-nitzschia blooms, in the Pacific Ocean have been growing at an alarming rate, and thus negatively affecting the health of marine wildlife. My findings can be used to understand how homo sapiens are influencing our environment, and what we can do to help it.

**Summary Statement**
I found that glyphosate positively affects bacillariophyceae growth, and concluded that agricultural chemicals positively affect marine algal bloom growth.

**Help Received**
My vice principal Kevin Trone advised me throughout my project. I consulted Jordan Mayor and Genevieve Rozhon when composing my research and hypothesis. Freshwater bacillariophyceae cultures were purchased from Flinn Scientific. I made the bacillariophyceae medium.

# CALIFORNIA STATE SCIENCE FAIR
## 2017 PROJECT SUMMARY

**Name(s)**
Ella M. Wedderburn

**Project Number**
J1614

**Project Title**
# The Ugly Side of Beauty: To Evaluate the Microbial Contamination of Specific Cosmetic Products


## Abstract

**Objectives/Goals**
For my project, I studied the amounts of colonies of bacteria produced from used makeup. It was hypothesized that if the same brand of makeup is given to five different test subjects then, the makeup will produce different amounts of bacteria no matter the test subjects. This experiment can benefit makeup users by seeing the amounts of bacteria and realizing that there is a better solution to keep makeup clean.

**Methods/Materials**
I first gave three test subjects an Elf Cosmetics face brush and face powder and instructed them to apply it twice a day for seven days. I also had one brush and face powder compact that was never used so that I could see the difference between the two. The next step was swabbing each of the products and applying it on the Petri dishes. I let the Petri dishes sit in a shoebox at an average room temperature for one week. I documented each day by taking pictures and counting a number of colonies in each dish.

**Results**
My experiment resulted in large amounts of colonies of bacteria in the dishes. The number of colonies ranged from none to almost ninety. Although there was only a small number of colonies in some dishes, that doesn#t mean that the coverage of the dish is less. From my research, I discovered colonies that look similar to images of Staphylococcus which guided me in making some estimates on what types of bacteria could have possibly been in the dishes.

**Conclusions/Discussion**
My hypothesis was if the same brand of makeup is given to five different test subjects then, the makeup will produce different amounts and types of bacteria no matter the test subjects. My hypothesis was correct because each person provided a different amount than the rest. This experiment can apply to people who want to be aware of what they put on their faces and how to prevent it. If people see how much bacteria can live on faces, they may want to prevent that and revise the way they take care of their makeup. They may look into investing in brush cleaners to help eliminate the bacteria on brushes.


**Summary Statement**
A number of colonies of bacteria were counted to determine the amounts of bacteria transferred from the human face, using face brush and face powder.

**Help Received**
My science teacher proofread my essays and provided me with a space in her classroom to do my experiment.