Cosmetic Engineering: The Science of Lip Gloss

Objective:

We will explore the importance of engineering in the field of cosmetics and the different components that make up a common cosmetic -- lip gloss. We will also explore the potential uses of algae in the field of cosmetics.

Introduction:

The field of cosmetics relies heavily on science and engineering in order to ensure safety, effectiveness, and appeal of products. This experiment explores the application of algae in cosmetics.

Unlike the rest of the skin, lips lack the capability of producing their own oils. This can lead to chapped lips and lack of protection from the sun and cold. Customized lip gloss can easily be made at home and in the classroom using natural oils, along with several other ingredients. In this experiment, we will be utilizing almond oil. However, we can replace almond oil with oil extracted from algae.

When creating a simple lip gloss, several key ingredients must be included -- oil, wax, butter, and fragrance.

Oil - Oils are, in general, thick and viscous liquids at room temperature. In lip gloss, they act as an **emollient**, which work to moisturize and soften skin.

Butter- Butters also function as an emollient. However, they are not liquid at room temperature, thus adding thickness to the gloss.

Wax- Waxes are a class of organic compounds. At room temperature, they are hydrophobic solids. They help to solidify the lip gloss, reducing runniness.

Fragrance and coloring- These components are not necessary in lip gloss and do not add any health or moisture benefits. However, they make the product more appealing and customized.

Ingredients:

½ tsp of beeswax
1 tbl of sweet almond oil
(Mineral oil, canola oil)

Utensils:

Double water baths
Hotplate(s)
Pot Holders, Mittens

Small glass jars (Shot glasses work well)

1 pinch of mica (need plastic spoon for adding)
1 pinch of color (need plastic spoon for adding)
5 – 10 drops of scent (Need plastic dropper for adding)
Stir rod/coffee stirrers
Lip gloss containers

Goggles and gloves should be worn by all participants.

Process for making Lip Gloss:

First add the sweet almond oil into the small jar (shotglass) and place inside the frying pan water bath, which is being glass heated by the hotplate. Let the oil heat up for 4 to 5 minutes. While the oil is heating up the scent, color, and mica should be chosen so that it is ready to be added. Once the oil is heated add the color then mica and last the scent, but make sure to stir after each one is added. Now that all the additives are mixed with the oil, the wax should carefully be added and kept in the frying pan hot bath. Continue to mix until everything is evenly dispersed.

The final step is to slowly pour the mixture from the shot glass into the lip gloss container. Allow it to cool for at least 10 minutes before use and especially with the twist up containers.

ALLERGY ALERT: Make sure that you are not allergic to any coloring, flavor or oil!!!

SAFETY

- **Please wear goggles and gloves.**
- **Please be aware that many of the contents for making lip gloss will be hot. Use oven mitts to protect yourself from hot objects.**
- **The lip gloss processing containers are made of glass. Handle them with care.**
- **The lip gloss should not be ingested.**

Results and Discussion:

1) Do you like your lip gloss formulation? What improvements could be made to the formulation of the lip gloss and what variables of the formulation would have to be adjusted?

2) How can algae oils be incorporated into the cosmetic industry and other consumer products? What is the benefit of using algae oil in these products?