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L.U.V.E.

Laureate

- "Worthy of great of honor and distinction"
- We create our soaps with great care and love, thus we **uphold the highest honor** to each one of our soaps

U (You)

- YOU are the reason why we make our soaps and we prioritize you over everything
- Putting our customers first shows the effort and hardwork we instill into each of our products. Our handmade products are created with thought of love and affection

L.U.V.E.

Value

- The regard that something is held to deserve; the importance, worth or usefulness of something
- We value our customers with the utmost care, we believe that customer satisfaction gives us more freedom to create the products we love

Enjoy

- Our goal is to **create products that everyone will enjoy** despite their age, gender, and status
- We want to create a product that everyone can afford

Context and Background

- Within our project, our task was to plan and propose an idea on how to create an effective soap with ideal qualities to be then made and shown to a public audience.
- By searching for and providing **context**, formulating a **design**, and articulating our **brand**, our group aims to design a soap, and work well with each other.
- Our soap was created through a saponification reaction between triglycerides and lye. Saponification reactions are a form of neutralization reaction, where the 3 carbon chains of the triglyceride are removed off itself to create the soap molecules itself, water, and glycerol.

Saponification process

$$(Triglyceride) \begin{pmatrix} 0 \\ CH_2 - 0 - \overset{0}{C} - R \\ 0 \\ CH_2 - 0 - \overset{0}{C} - R \end{pmatrix} \xrightarrow{(CH_2 - OH)} \begin{pmatrix} CH_2 - OH \\ CH_2 - OH \end{pmatrix} \xrightarrow{(CH_2 - OH)} \begin{pmatrix} K^+ 0 - \overset{0}{C} - R \\ CH_2 - OH \end{pmatrix} \xrightarrow{(CH_2 - OH)} \begin{pmatrix} K^+ 0 - \overset{0}{C} - R \\ CH_2 - OH \end{pmatrix} \xrightarrow{(CH_2 - OH)} \begin{pmatrix} K^+ 0 - \overset{0}{C} - R \\ K^+ 0 - \overset{0}{C} - R \end{pmatrix}$$

Design Criteria and Constraints

Design Criteria

- The design to our soap was very broad. As a result of this, we took a lot of time in conducting an in depth literary survey to ensure that our design was fully-developed.
- Our soap is very well made, comprised of a few **select oils** that allow the soap to have nearto-perfect hardness, cleansing, and conditioning qualities.
- The soap colour and design were also meant to have a **minimalistic design** to forgo the use of extra, unneeded materials, and to match our brand.

Constraints

- Our soap had to be made with a **cold-process system** due to the lack of time between the proposal and final assessment of our soap brand.
- Within the initial project **only 10 oils were considered** within the creation of the soap calculator, and because of that any other oils required more time to calculate.

Ingredients

Coconut Oil

- Our soap required a **hardness** target value that was enough to **hold its rigidity** when exposed to minor amounts of water
- Thus, coconut oil was the main ingredient and the essential ingredient required into creating its fixated structure with a **hardness value of 79**
- It also has the **highest cleansing value (67)**

Ghee

- Has a high hardness and cleansing value which we required for our soap
- Also has the highest creamy lather value (40)

Crisco

• Has a relatively **high value of conditioning (70)** and equally high values of hardness and creamy lather which complement the higher values of qualities to contributing to our conditioning and creamy lather properties

Crisco, Coconut oil, and Ghee







Mold and packaging selections

Molding Selections

- We chose a baking pan mold that closely resembled that of a soap bar
- This way the look of the soap was kept at a **minimalistic and simple design** to reflect the ingredients in the soap
- Since the **pan had a large volume**, it allowed us to make at least 5 iterations of the soap bar at a high mass and large size, being about 112g ea.

Packaging Selections

- We believed that the size of the bar should at least be big enough to grip on the hand, with the size of our bar being relatively big, whereas a small bar would easily slip.
- In addition, **the metal pan is a reusable container**, allowing us to produce less waste and **use less money on the production of our soap**, and to be sustainable with our design.



Design in Action: Green Chemistry and Sustainability

- To separate ourselves from the competition we ultimately believed that an **all natural**, **and waste free product** is an ideal way to attract modern markets into buying our products
- A product that entirely communicates the **needs of the customers and the environment** is an effective product and an efficient way to reduce our global carbon footprint
- As chemical engineering students, we personally believe that it is more **systematic to solve a problem without using a surplus of materials or produce any waste**
- By incorporating a **simple yet inexpensive product design**, we have attained a solution that accommodates everyone
- A percentage of the population are unable to use certain products due to **allergies and sensitivity to certain scents** allow our soap to cater to them due to our design choice
- This not only allows us to save costs in the long run but shows our **compassion** for those who cannot use our soap.



Options and Iterations

- This soap process could have also been done with **different but similar ingredients**, in regards to the oils being used.
- Our three main oils used were coconut oil, crisco, and ghee. To achieve the same hardness, creamy lather and conditioning, we could have substituted the crisco for avocado oil.
- Olive oil has high conditioning properties, this also could have been used instead of crisco.
- To improve the actual mold of our soap, we could have used a more **flexible mold** instead of using a metal baking tray to avoid the use of parchment paper that caused the **uneven surface of our soap**.

Soap calculator as designed vs as made

	As designed	As made
Hardness	35	42
Cleansing	20	17
Bubbly lather	30	17
Creamy Lather	44	24
Conditioning	57	50

The **hardness** of the soap was **higher** than our targeted value because a **higher cleansing value** was desired.

The **bubbly lather** was also **lower** than the targeted valued because it is **affected by the cleansing value** which was lower than expected.

Creamy lather was **lower** than targeted because it is affected by the **other properties** of the soap which were all lower than desired.

The conditioning value was also lower than desired as a result of a low creamy lather value.



- A soft feeling soap on the skin was desired in order to **accommodate** for market wants by consumers.
- However, the bar must also remain stiff when in contact with water, as soaps are near water when in use within household environments
- An equal balance was preferred to maintain the structural integrity and effectiveness of the soap.

Cleansing

- The purpose of soap is to aid in **breaking down unwanted molecules on skin**. A higher cleansing target was aimed for to ensure that the main function of the soap was fulfilled.
- A high cleansing value meant a higher ability to **latch onto oils or dirt** onto skin, which was achieved.
- A proper value of cleansing was achieved through a **balance** of bubbly lather and creamy lather.

Bubbly lather

- In order to account for our soap having a higher creamy lather value, we decided to have a lower bubbly lather because they are inversely proportional.
- This property was **not of great importance** to use because it would only cause the soap to **produce more bubbles**.
- However, if we reduce bubbly lather by a great amount, cleansing is severely sacrificed thus we kept the value at the **bare minimum that** would still give us a high enough factor for cleansing.

Creamy lather

- Upon lowering the bubbly lather value, we decided that the consistency of the soap will **increase effectiveness** when the creamy lather was put in the **forefront** of our soap design.
- Despite sacrificing the amount of bubbles or foam created by the soap, a creamy soap corresponds to creating a different texture.
- It allows for a more soft and smooth feeling soap.

Conditioning

- We wanted our soap to enhance the softness of the user's skin so a high conditioning value would allow **more emollients to remain on the skin**.
- This helps to preserve more of the moisture on the skin leaving it **nourished and soft**.