## INTRODUCTION

THE GOAL OF THIS DESIGN PROJECT WAS TO MAKE A USABLE, MARKETABLE SOAP WITH SPECIFIC DESIRED QUALITIES

IN ORDER TO CREATE A SOAP LIKE THIS, EXTENSIVE BACKGROUND RESEARCH WAS CONDUCTED ON EACH THE FOLLOWING:

- THE HISTORY OF SOAPMAKING
- THE MODERN MARKET FOR SOAP
- THE CHEMISTRY BEHIND THE PROCESS OF SOAPMAKING
- THE CHEMISTRY BEHIND THE FUNCTION OF SOAP
- FOR MORE INFORMATION

SEE <u>HTTPS://DRIVE.GOOGLE.COM/FILE/D/1XA6VFR4MPEZOCHO\_GN</u> <u>HSJXSYNP-YBBAU/VIEW</u>



https://www.studyrankers.com/2016/10/to-study-saponification-reactionfor-preparation-of-soap.html

- BASIS OF SOAPMAKING: THE PROCESS OF SAPONIFICATION
- SAPONIFICATION: TRIGLYCERIDE + LYE (NAOH OR KOH) -> GLYCEROL + SOAP

# DESIGN CRITERIA AND CONSTRAINTS

-TO PRODUCE A SOAP WITH PRIMARILY THE FOLLOWING CHARACTERISTICS:

- CREAMY LATHER: A TARGET OF <u>40</u> ON A RECOMMENDED RANGE OF 16-48
- CONDITIONING: A TARGET OF <u>50</u> ON A RECOMMENDED RANGE OF 44-69

-SECONDARILY, THESE QUALITIES WERE DESIRED TO SOME EXTENT:

- HARDNESS: TARGET OF <u>35</u>, RANGE OF 29-54
- CLEANSING: TARGET OF <u>15</u>, RANGE OF 12-22
- BUBBLY LATHER: TARGET OF 14, RANGE OF 14-46

-TO HAVE A PINK-PURPLE HUE

-TO CONTAIN LAVENDER ESSENTIAL OIL

(GROUP 3 SOAP CALCULATOR)

# MOLD SELECTION AND PACKAGING

- THE MOLDS WERE CHOSEN TO BE CIRCULAR WITH DEPTH OF ABOUT AN INCH AND A HALF
- THIS IS OPTIMAL FOR MULTIPLE USES SUCH AS WASHING HANDS, AND BODY SOAP
- THE PACKAGING TIES IN WITH THE ENGINEERING THEME; IT IS A COST-EFFECTIVE SHINY PURPLE COLOURED WRAPPING PAPER. THE SOAP IS ALSO ENCIRCLED BY A SILVER TIE, REPRESENTING THE IRON RING ASSOCIATED WITH ENGINEERING





ENGINEERING BRANDED SOAP THAT APPEALS TO DIE-HARD ENGINEERING STUDENTS

EACH PACKAGED SOAP INCLUDES VARIOUS TIPS FOR FIRST YEAR ENGINEERING COURSES



## WHY BUY LI?

- PLEASANT FLORAL SCENT
- PURPLE COLOUR FOR ENGINEERING
- CREAMY LATHER

## METHODOLOGY

- 2 1. MEASURE OUT THE MASS OF THE OILS AND PLACE THEM INTO A METAL CONTAINER
  - 2. UNDER A FUME HOOD, CAREFULLY POUR THE SODIUM HYDROXIDE INTO DEIONIZED WATER AND STIR UNTIL DISSOLVED.
  - 3. PLACE THE CONTAINER OF OILS ON A HOT PLATE AND HEAT UNTIL MELTED. LEAVE TO COOL FOR 3-5 MINUTES.
  - 4. ADD SODIUM HYDROXIDE SOLUTION AND USE IMMERSION BLENDER TO EMULSIFY THE TWO PHASES.
  - 5. ONCE THE MIXTURE THICKENS CONSIDERABLY, ADD THE LAVENDER OIL AND DYE. CONTINUE BLENDING UNTIL VERY LITTLE OIL REMAINS ON TOP.
  - 6. POUR MIXTURE INTO MOLDS AND LEAVE TO HARDEN FOR ONE WEEK. WAIT AN ADDITIONAL TWO WEEKS BEFORE USING TO ENSURE SOAP IS FULLY CURED.

### **COST AND PRICING**

PRICE PER BAR: \$4.75

REVENUE FROM 5 BARS: \$23.75

COST OF 5 BARS: \$19.65

PROFIT: \$4.10

COST OF MANUFACTURING:

24 GRAMS OF LAVENDER 40/42 OIL: \$10.51

68.1 GRAMS OF NAOH: \$2.03

475 GRAMS PLANT-BASED OILS:\$4.80

1.00 GRAMS OF ULTRAMARINE VIOLET DYE: \$0.31

PACKAGING: \$2.00

TOTAL (PER 500G): \$19.65

# SOAP CALCULATOR

- THE PURPOSE OF OUR SOAP CALCULATOR WAS TO PROVIDE US WITH THE MOST OPTIMUM COMPOSITION BASED ON THE PARAMETERS WE PROVIDE IT, AND IT DOES SO BY USING VALUES FROM(SOAP CALCULATOR).
- UPON TAKING THE DATA FROM SOAP CALCULATOR, WE ADDED THE ABILITY TO CALCULATE AND OPTIMIZE FOR PRICE.
- ONE THING THAT WE ADDED RECENTLY WAS THE FORMULA REQUIREMENTS FOR LAVENDER FRAGRANCE, AND ULTRAMARINE DYE.

# CHARACTERISTICS OF THE SOAP

- CHARACTERISTICS OF SOAP ARE DETERMINED BY THE FATTY
  ACIDS USED
- THE FATTY ACIDS COME FROM OILS, AND PROVIDE THE SOAP WITH DIFFERENT QUALITIES
- DIFFERENT QUALITIES SUCH AS MOISTURE CONTENT AND VOLATILITY CONTENT ARE IMPORTANT TO LOOK AT, AS USUALLY WE WANT TO AVOID HIGH VOLATILE CONTENT
- HIGH FATTY ACID CONTENT MAKES THE SOAP MORE DRYING



- THE SOAP COMPOSITION FAVORS CONDITIONING AND CREAMY LATHER.
- OILS THAT WE USED ARE COCONUT OIL, GHEE BUTTER, CRISCO OIL, CORN OIL, CANOLA OIL , LAVENDER 40/42 OIL





### 2.1 Ingredients List:

Ingredient:	Mass (g)	Volume (mL)	Cost (\$)
Coconut Oil 76 Deg	64.125	69.701	1.14
Ghee Butter	159.125	157.55	2.63
Crisco Oil	147.25	181.79	0.76
Corn Oil	42.75	46.467	0.13
Canola Oil	61.75	67.120	0.14
Lavender 40/42 Oil	24.00	28.441	10.94
Ultramarine Violet Dye	1.00	1.81	0.31
Total:	500	551.07	15.61

0

### REFERENCES

S, A., & K, V. (2019). PREPARATION OF SOAPS BY USING DIFFERENT OIL AND ANALYZE THEIR PROPERTIES. NATURAL PRODUCTS CHEMISTRY & RESEARCH, 7(1), 357. DOI: 10.4172/2329-6836.1000357

SOAP CALCULATOR. (N.D.). RETRIEVED NOVEMBER 17, 2019, FROM

HTTP://WWW.SOAPCALC.NET/CALC/SOAPCALCWP.ASP.

TO STUDY SAPONIFICATION REACTION FOR PREPARATION OF SOAP - LAB WORK. (2016, OCTOBER 30). RETRIEVED NOVEMBER 13, 2019, FROM HTTPS://WWW.STUDYRANKERS.COM/2016/10/TO-STUDY-SAPONIFICATION-REACTION-FOR-

PREPARATION-OF-SOAP.HTML.