

UWash

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Ingredients



Shape

How does *UWash* stand out from the rest?

- The W shape
- What better way to represent the University of Waterloo soap than a 'W'?
- The W is an easy symbol which separates our soap from all others, all the while telling the story of where our soap is from.





Creamy Lather

- Keeping User comfort a priority a creamy lather was insured while using *UWash*.
- For this reason we added Ghee which is high in palmitic acid a property necessary to ensuring a creamy lather.



Conditioning

Conditioning continues from the creamy lather and keeps the smooth feeling even after you have used the soap.

- Crisco is very high in linoic acid which is essential to conditioning and thus moisturizing.
- Crisco and Ghee are also moderately high in oleic acid, another pertinent ingredient to conditioning soap.



Hardness

Increasing Ease and Length of Use

- Coconut oil is very high in lauric and moderately high in myristic. These acids ensure hardness.
- Palmitic acid also contributes to hardness which is found in Ghee.



Low Cost

- While still delivering a high-quality soap with all the above-mentioned traits. The total cost of materials of our soap per the 500g of oil comes to \$4.46.
- We decided to have one smaller soap and one larger one in case people can't afford the larger one
- Our soap is sold at a price of \$2.50 for the smaller 33.2 g piece and \$4.99 for the larger 70.6g piece.

Cost Analysis

Price Analysis	NaOH	Packaging	Oils	Calculated Cost	Sale Price	
W	\$ 2.11	\$ 0.65	\$ 0.63	\$ 3.39	\$ 4.99	
Muffins	\$ 0.99	\$ 0.43	\$ 0.29	\$ 1.71	\$ 1.99	

Packaging



UWash
Group 37

Handmade Bar Soap. Not for consumption

Ingredients: Water, Sodium Hydroxide (Lye), Cocos Nucifera
(Coconut Oil), Ghee Oil, Crisco Oil

Mass: 70.6 g

Date created: November 5th, 2019



- For packaging we designed thin, hand-made boxes made from cardstock with a plastic window to view the W shape.
- The material are all recyclable and some portions made from recycled materials.
- Yellow and black represent Waterloo while being visually appealing
- The box is easy to carry, is sturdy and protects the soap
- Packaging more unique and gives it more spirit
- Inexpensive

Science of Soap Making

Saponification

- An exothermic reaction between a triglyceride (oils) with an alkali, called lye, NaOH in our case.
- NaOH is dissolved into water producing a lye solution.
- Lye solution is mixed with the melted oils.
- The lye splits the oil into fatty acid chains and glycerin. The sodium ion from the lye bonds with the fatty acid to form soap.
- Once in the mold, the saponification process takes about 24 to 48 hours and once this is done, the soap can take up to 6 weeks to fully cure.

SAPONIFICATION



acid
(oil)

+



base
(lye)

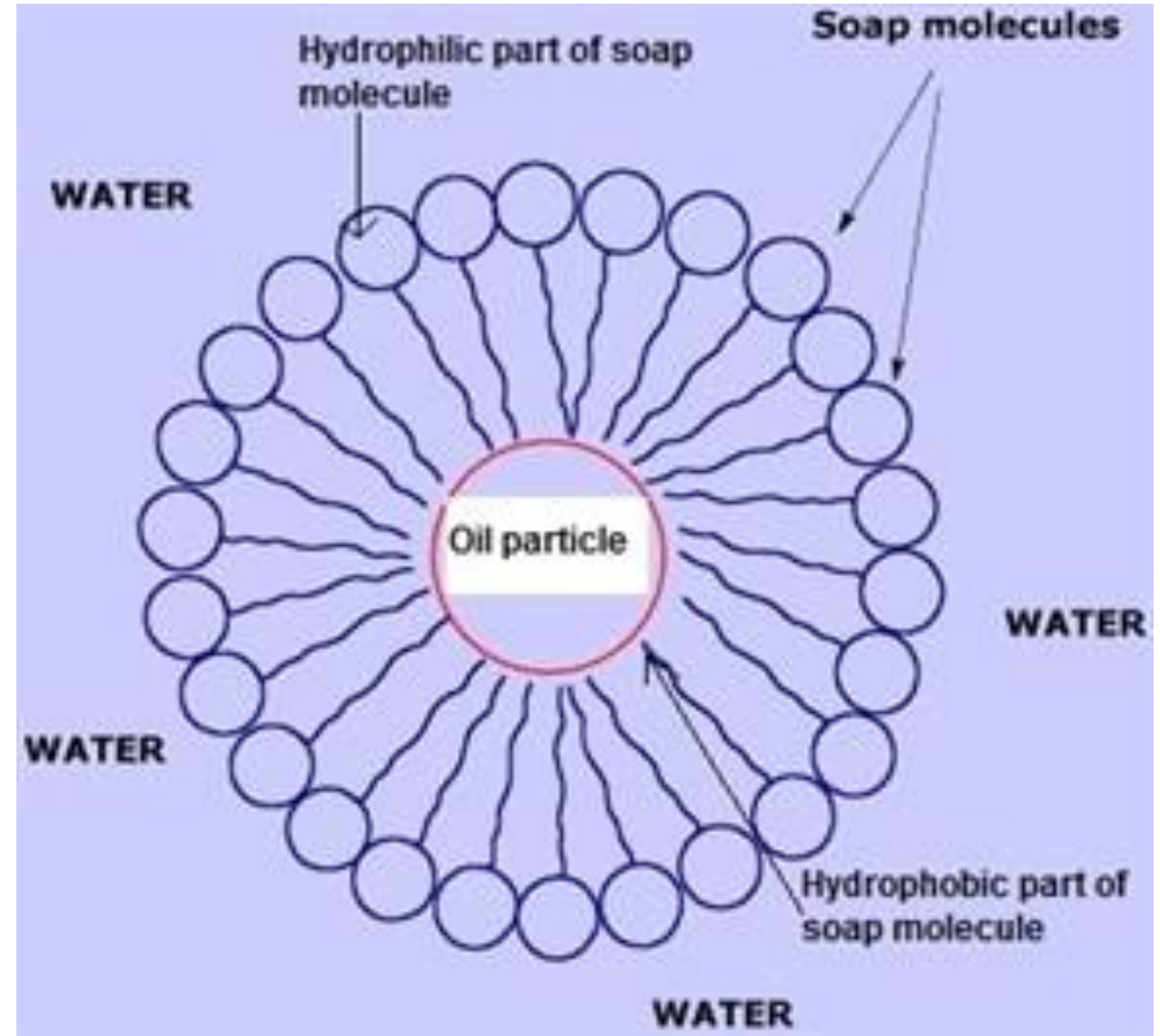
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salt
(soap)

How does Soap Work?

- The composition of soap is ideal for being able to clean all sorts of different particles. This is because soap is made up of mostly fat which has a hydrophobic tail and a hydrophilic head. Knowing, that non-polar compounds dissolve non-polar compounds and polar compounds dissolve polar compounds. Therefore water (polar) is unable to clean grease/oil (non-polar). Soap creates a micelle. The micelle is hydrophobic on the interior allowing it to surround grease, and hydrophilic on the exterior allowing for water to wash it away.
- Soap is also a surfactant. This means that it is able lower the surface tension. Thus causing water to react with other particle besides solely itself. This improves water's ability to dissolve other substances and wash them away upon application of the soap.



Soap Calculator

2			
3	Oils	Percentage	Quantity (g)
4	Coconut Oil, 76 deg	20%	98.90608928
5	Ghee, any bovine	11%	55.31785371
6	Crisco, old	69%	345.7760611
7	Avocado Oil	0%	0
8	Olive Oil	0%	0
9	Sesame Oil	0%	0
10	Corn Oil	0%	0
11	Grapeseed Oil	0%	0
12	Sunflower Oil	0%	0
13	Canola Oil	0%	0
14	Total	100%	500
15			
16			

Contribution to Overall Soap Properties							
SAP (NaOH)	SAP (KOH)	Hardness	Cleansing	Bubbly Lather	Creamy Lather	Conditioning	Cost
18.09981434	25.41886494	15.62716211	13.25341596	13.25341596	2.373746143	1.978121786	\$ 1.75
8.9614923	12.55715279	6.084963908	1.659535611	1.659535611	4.425428297	2.433985563	\$ 0.91
47.37132037	66.38900373	17.98035518	0	0	17.98035518	48.40864855	\$ 1.79
0	0	0	0	0	0	0	\$ -
0	0	0	0	0	0	0	\$ -
0	0	0	0	0	0	0	\$ -
0	0	0	0	0	0	0	\$ -
0	0	0	0	0	0	0	\$ -
0	0	0	0	0	0	0	\$ -
0	0	0	0	0	0	0	\$ -
Mass of Oils (g)			500				
Percentage of Water as a Percentage of Oils			38%				
Mass of Water (g)			190				
Mass of NaOH (g)	Mass of KOH (g)	Hardness	Cleansing	Bubbly Lather	Creamy Lather	Conditioning	Cost
Totals	74.43262701	104.3650215	39.69248119	14.91295157	14.91295157	24.77952962	52.8207559 \$ 4.46
Recommended Ranges		29-54	12-22	14-46	16-48	44-69	
Targets		37	17	25	42	60	
Objective Function		481.3309145					

	Hardness	Cleansing	Bubbly Lather	Creamy Lather	Conditioning
Lauric	Yes	Yes	Yes		
Myristic	Yes	Yes	Yes		
Palmitic	Yes			Yes	
Stearic	Yes			Yes	
Ricin oleic			Yes	Yes	Yes
Oleic					Yes
Linoleic					Yes
Linolenic					Yes

- What we were Targeting:
- Hardness
- Creamy Lather
- Conditioning

Properties

Oil	SAP - NaOH	SAP - KOH	Lauric	Linoleic	Linolenic	Myristic	Oleic	Palmitic	Ricinoleic	Stearic
Coconut, 76 deg	0.183	0.257	48	2	0	19	8	9	0	3
Ghee	0.162	0.227	4	2	1	11	19	28	0	12
Crisco, old	0.137	0.192	0	52	0	0	18	13	0	13
Avocado	0.133	0.186	0	12	0	0	58	20	0	2
Olive	0.135	0.19	0	12	1	0	69	14	0	3
Sesame	0.134	0.188	0	43	0	0	40	10	0	5
Corn	0.137	0.192	0	51	1	0	32	12	0	2
Grapeseed	0.129	0.181	0	68	0	0	20	8	0	4
Sunflower	0.135	0.189	0	70	1	0	16	7	0	4
Canola Oil	0.133	0.186	0	21	9	0	61	4	0	2

The soap calculator as well as the properties that our soap has are based on the data in this table. In this table you can see what acid each oil have. Each acid contributes to a property of soap and because some oils have greater values and amounts of acid, they exhibit more of a certain type of property. For example, in our soap we used a great amount of Crisco . This was due to Crisco's acid values. For example, Crisco has a relatively high linoleic value which makes sense since we were targeting conditioning in our soap and linoleic acid gives the property of conditioning. Oleic also gives conditioning. The other property we were targeting was hardness which palmitic and stearic acid contributes to.

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