

Cold Process Soap Making - Basic Introduction

Cold process soap is made by combining oils and sodium hydroxide (lye) that causes a chemical reaction called saponification.



Equipment List:

Note: Any equipment that comes in contact with lye or raw soap should not be used with food

Stainless steel pot (for melting solid oils)

- Never use aluminum or cast iron or non-stick containers since they can adversely react with lye.

Digital Scale

Heat proof container for mixing lye with water.

- Do not use glass (has been known to crack due to temperature extremes)
- This can be stainless steel or heavy duty plastic (look for recycle symbol #5)

Containers for measuring oils

Thermometer - For testing temperatures of lye and oils. (Digital)

Heat proof mixing utensils that are heavy duty plastic, silicone or stainless steel

- Spatula, whisk, spoons

Immersion blender (stick blender)

Soap Mold(s)

Clean up related: paper towel, spray bottle with vinegar

Safety Equipment:

Rubber/latex gloves - Protect hands from lye and raw soap

Safety glasses / Face Shield - Protect eyes from lye and raw soap

Mask with filter (optional) - Protect lungs from the lye fumes

Long sleeve shirts, cover legs and feet

What's In A Soap Recipe?

Basic Ingredients:

- Oils / fats
- Distilled water
- Lye (sodium hydroxide)
- Essential oils
- Color (mica powder is an easy way to start)
- Additives (exfoliants such as oatmeal, poppy seeds, tea)

Oils / Fats

Any oil or fat can be used to make soap.

Best to start with recipes that use 3 or more different oils. Different oils and fats give different characteristics to your soap. Some may provide hardness to the bar, while others provide lather, conditioning and cleansing. Some recipes use common cooking oils, while some will use exotic expensive oils.

When you find a recipe, an understanding of the oil characteristics will give you an idea of what qualities your soap will have. You can find charts on line for characteristics that oils will add to soap as well.

Note: Not all soap is created equal. Soap making is a chemical formula. You need a good understanding of percentages of each type of oil, understanding their characteristics. **You can't just change the oils that are in the "soap recipe"** Straight substitutions of oils usually means a change in the amount of Lye used in a recipe. Using a lye calculator is necessary to figure out how much lye you would need for your oil combination.
(beyond the scope of a beginner soap making class)

Here's an example of some of the oils commonly used in soap making. (There are many more oils, these are just the commonly used ones.)

Avocado Oil: (used 15-20% in a recipe) excellent for dry and sensitive skin and makes a softer soap

Castor Oil: (use up to 10% in a recipe) boosts lather

Cocoa Butter: (use up to 15% in a recipe) Makes a hard bar with creamy lather.

Coconut Oil: (use up to 30% in a recipe) creates a hard bar with great lather and cleansing power

Crisco Shortening (use 5-20% in a recipe) is usually a blend of soybean & cottonseed oil, and makes nice soap, moisturizing and gives a low creamy lather.

Olive oil: (can use up to 100% in a recipe) contributes to the hardness of the bar (starts out soft, but cures hard), limited bubbles. Is conditioning to the skin.

Note: Dark green olive oil can affect the final color of your soap

Palm Oil: (up to 25% in a recipe) Hardening agent used a lot with coconut oil

Note: Palm oil is controversial. Palm plantations in South-East Asia have led to devastating deforestation and loss of habitat for animals such as Orangutans. If you choose to use Palm oil, please consider using oil that has been certified as sustainable and try to learn more about where exactly it's being grown.

Shea Butter: (use up to 15% in a recipe) Moisturizes and nourishes your skin

Sweet Almond Oil: (used 15-20% in a recipe) useful for dry skin. Moisturizes and conditions the skin

What Does Superfat mean?

If you had exactly enough oil in your recipe to use up every little bit of lye, your soap would be considered to have 0% superfat. There are not extra oils in the bar

However, if you have a little bit more oil in your recipe your soap becomes “superfatted”. This makes the soap extra gentle and moisturizing.

0-4% superfat is considered low

5-8% superfat is most commonly recommended.

A lye calculator will help you figure this out. Some recipes will also tell you the percentage of superfat.

Lye Calculator - Next Level Info

Using a lye calculator tells you the ratio of distilled water and lye to use for the oils that your're using in your soap. It will also give you information on the characteristics you can expect in your soap's formulation.

You can find free lye calculators online

[Soap Calc Lye Calculator](#)

[The Sage Lye Calculator](#)

When you start the soap making journey, you can enter the soap formula you're using, and you can “check” that

SoapCalc ©		Recipe Name:		Print Recipe		
Total oil weight		48.00	Sat : Unsat Ratio		61 : 39	
Water as percent of oil weight		38 %	Iodine		40	
Super Fat/Discount		5 %	INS		152	
Lye Concentration		25.862 %	Fragrance Ratio		0.8	
Water : Lye Ratio		2.89713	Fragrance Weight		2.408	
		Pounds	Ounces	Grams		
Water		1.140	18.240	517.095		
Lye - NaOH		0.398	6.363	180.384		
Oils		3.000	48.000	1360.776		
Fragrance		0.150	2.400	68.039		
Soap weight before CP cure or HP cook		4.688	75.003	2126.284		
#	Y	Oil/Fat	%	Pounds	Ounces	Grams
1	☐	Tallow Beef	50.000	1.500	24.000	680.388
2	☐	Stearic Acid	20.000	0.600	9.600	272.155
3	☐	Castor Oil	10.000	0.300	4.800	136.078
4	☐	Kokum Butter	10.000	0.300	4.800	136.078
5	☐	Mango Seed Butter	10.000	0.300	4.800	136.078
Totals			100	3.000	48.000	1360.776
Soap Bar Quality		Range	Your Recipe	Lauric		1
Hardness		29 - 54	60	Myristic		3
Cleansing		13 - 22	4	Palmitic		15
Conditioning		44 - 69	38	Stearic		41
Bubbly		14 - 46	13	Ricinoleic		9
Creamy		16 - 48	85	Oleic		27
Iodine		41 - 70	40	Linoleic		3
INS		136 - 163	152	Unsaponifiable		1
Additives			Notes			

the formula has the correct lye and distilled water amounts. You can start to see what characteristics to expect from your soap

Water:

Use only distilled water



About Lye and Safety

Mixtures that contain lye should be clearly marked.

If lye solution is accidentally swallowed, call poison control and see medical treatment immediately

- Keep children and animals away when working with lye

Lye mixtures and raw soap are very alkaline and caustic.

When working with them, you should ALWAYS wear gloves, long sleeves and safety goggles.



If lye solution or raw soap gets in your eyes, rinse thoroughly with water and promptly seek medical attention.

If you spill some lye solution or raw soap on your skin, rinse thoroughly with plenty of cold water. Seek medical treatment if you have damaged large areas of skin or have persistent pain

Why Do We Need Lye?

Without lye, the oils in your recipe would stay oils. A chemical change must happen in order to create soap.

The oils and butters in your recipe are made up of fatty acids and glycerol. When you add heat and water, the fatty acids bond with the sodium part of the "sodium hydroxide" and form soap. The glycerol and the hydroxide parts form glycerin, (which is great for your skin!) No actual lye is left in the finished soap.

Combining Lye and Water

USE DISTILLED WATER

ALWAYS POUR LYE INTO WATER. Doing it the opposite way could possibly cause overheating and a lye volcano.

Do this outside (be upwind if there's a breeze)

Avoid breathing in lye fumes

- Turn your head away while first mixing the lye into the water
- Work at arm's length while you stir to dissolve the lye
- Consider wearing a full face mask (Thin white dust or allergy masks aren't sufficient for this job)



Using Scents in Soap Making

You can use either Fragrance oils or Essential oils to scent your soap.

What is the difference between essential oils vs fragrance oils?

Essential oils (EO's) are steam-distilled pure plant extracts used for scenting, flavoring, or healing applications in aromatherapy.

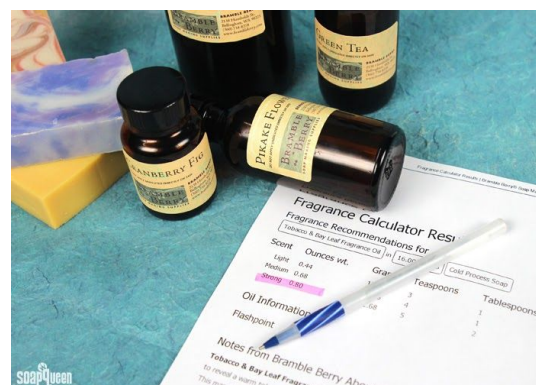
Note: Not all essential oils are created equal.

Many essential oil brands are NOT safe for internal use because they are not totally pure. When using essential oils, find a brand that you can trust to be Totally Certified Pure Therapeutic Grade .

Be careful when using essential oils. Having the essential oil come in contact with your skin can also result in a burn or skin reaction

Fragrance oils (FO's) are synthetically made chemical scent compounds.

The amount that you use in your batch of soap is dependent on the essential oil or fragrance oil that you're using as well as how strong you want to make your scent. You'll need to do a little research. There is definitely some trial and error with this. The suggested amount is usually a percentage of the amount of oils that you're using, or listed by the size of soap batch that you're making.



Check out these links to figure out scent amounts to use.

<https://www.brambleberry.com/calculator?calcType=fragrance>

[Lovely Greens essential oil calculator](#)

[Essential oil usage rates - modern soap making](#)

Each fragrance and essential oil have a maximum usage rate that is deemed safe for bath and beauty products. Using more than this amount can cause skin irritation. Even with the highest scent recommendation, some scents don't make it through cold process soap making. Cold process is a harsh environment, as it goes through several pH changes.

Use caution with essential oils for babies and pregnant women.

Adding colors to your Soap

You can color your soap using:

Cosmetic micas can be used to create beautifully vivid and bold cold process soaps.

Spices: Turmeric = orange

Cocoa Powder = brown



Using *clays* and *botanicals*, *fruits* and *vegetables* are great natural options, but it's best to have some experience making soap before getting into these (beyond beginner course)

How To Use Micas in your soap

Pre-Dissolving:

- Mix together with a ratio of 1 teaspoon of pigment with 1 tablespoon of lightweight oil like sunflower, avocado. You can also use glycerine
- Add 1 dispersed teaspoon at a time at trace until you get a color you like.

Sprinkling in at trace without pre-dissolving will also work, but you might get speckles of color.



Soap Additives - Optional

Additives let you add characteristics to your soap, whether it's to add color, contrast, harden your soap or add an exfoliant.

Exfoliants are the easiest to add to your soap. You will add these when your soap has reached trace.

Examples:

(ppo - per pound of oil in your recipe)

Coffee grounds- (exfoliation)

- used grounds are less likely to bleed color into soap.
- Usage rate: 1 tsp / ppo

Oats - (exfoliation, soothes itchy skin)

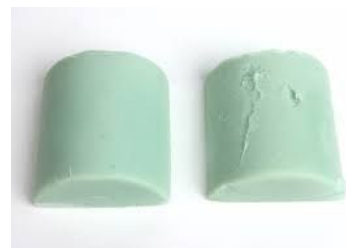
- grind in a coffee grinder to a fine powder
- Usage rate: 1 tsp/ppo

Poppy seeds - (exfoliation, attractive speckled look to your soap)

- ½ tsp / ppo
- Grind in a coffee grinder to a fine powder
-

Sodium Lactate - optional

- Can be added to your soap to help harden the bar and make it easier to remove from the mold.
- Use a ratio of 1 tsp PPO and add to the cooled lye mixture



Soap Making Terms:

Trace: When you add your lye solution to your oils and start blending, it will start to thicken. When a soap mixture has reached “trace”, that means that it has thickened enough to hold an outline when you drizzle soap batter across the surface of itself.



- False trace: If you stop for a few seconds and notice streaks of oil on the surface. It's not done.
- Light trace: refers to soap batter with no oil streaks and has the consistency of thin cake batter. (Used when swirling colors)
- Medium trace: looks like thick cake batter or pudding consistency
- Thick trace: consistency of thick pudding that holds its shape when poured.

Gel Phase: When soap goes through “gel phase,” it means that it has heated up to a higher temperature than when you first poured it into your mold.

- Helps colors “pop” and show up more brightly
- Soap will want to do this on it's own unless you soap at a very low temperature
- You can help it along by insulating the mold with towels or blankets
- You need to peek every so often for the first couple of hours to make sure that your soap isn't cracking on top (over heating). If it's cracking, move it to a cold location.
- Your soap does not need to go through a gel phase. (personal choice)



General Cold Process Soaping Making Steps:

1. Gather all of your ingredients and and pre-weigh themor you could weigh them while your lye mixture is cooling.
2. Gather your soap making equipment (reminder: no aluminum or non- stick items)
 - Measures
 - Containers
 - Safety Equipment
 - Immersion blender
 - Mold(s)
 - Parchment or freezer paper
 - Things to clean spills with (vinegar in a spray bottle, paper towel etc)
 - I'd suggest covering the surface that you're working on)

3. Mix the lye solution

- Well ventilated area
- Safety Gear!!
- Sprinkle the lye into the water slowly, while stirring
- Set the lye in a safe place away from children and pets
- When the lye has dissolved, set lye solution aside to cool.

4. Prepare the oils

- Melt the solid oils on low-medium temperature
- When most of the solid oils are melted, remove from heat and while stirring the leftover bits will melt.
- Combine the liquid oils and melted oils and stir.

5. Mix the lye solution

- Well ventilated area
- Safety Gear!!
- Sprinkle the lye into the water slowly, while stirring
- Set the lye in a safe place away from children and pets
- When the lye has dissolved, set Lye solution aside to cool.

6. Monitor the temperatures of the lye water and the oils. Ideally they should be between 90-115 °F (32-46 °C). The 2 mixtures should be around a 10 degree difference. (some sources say can be up to 20 degree difference)

7. Pour the lye solution into the oils

- Use an immersion blender to combine the mixtures to achieve trace.
 - Keep the blender submerged to prevent splattering.
 - When the mixture thickens to the texture of thin pudding, stop stirring for a moment and check for false trace (where the oil comes to the surface)
 - Your next step in the recipe will determine if you're working with it at thin trace or medium trace.

8. Add your extras

- Scent, mica powder, exfoliant
- Note: Some items may cause your soap to thicken faster, so work quickly and methodically.

9. Pour soap into mold(s)

- Smooth the top
- Smacking your soap mold on the counter to remove any bubbles
- To help prevent soda ash, cover your soap with plastic, parchment paper, cardboard or piece of wood
- Cover with a towel or blanket to retain heat if your soap is in a cool place.
 - Alternatively, if avoiding gel phase, place the mold in the refrigerator or freezer

10. Monitor the soap

- Check over the next couple of hours to see that it's not overheating (cracking)
- Soap will get darker in places and look jelly-like. This is normal
- Let the soap stay in the mold for 24-48 hours.

11. Cleaning Up:

- Use your vinegar spray bottle when cleaning up any spills.
- Set all of the soap making equipment and utensils aside overnight
- You can clean them the next day.
- Wear gloves with cleaning soap making equipment (in case there's a lye crystal lurking)
- **It is harmful for your pipes and dishwasher and sewer systems if you wash fresh soap that has not finished saponification**

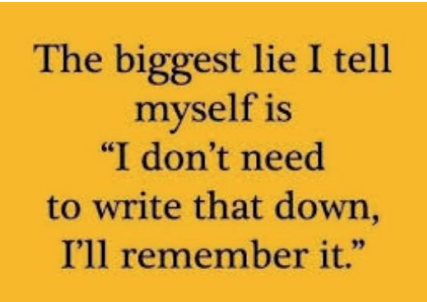
12. Finishing Up

- Remove the soap from the mold(s)
 - Usually 24-48 hours after pouring (formula dependent)
- If you find it's too soft and not separating from the mold, leave it for another day.
- You can slice into bars right away, or leave the soap in the loaf shape for another day or so and then slice. (slices easier if it's not super soft)
- Place soap on a rack for curing for 4-6 weeks

Things I learned About Soap Making

RESPECT THE LYE!

Keep it simple for your first couple of batches. There's a lot of chemistry at work, and the results are sometimes a surprise.



The biggest lie I tell myself is
"I don't need
to write that down,
I'll remember it."

Keep a journal of what you did or tried. There's a 4-6 week waiting period between making and testing out your soap. You will forget what you've done!

Don't judge how well your soap turned out based on the first couple of days after you made it. Let your soap cure, then decide. Colors balance out, colors will change.

There are so many variables that can affect your soap. Not all recipes will behave the same during the process.

You will figure out what works best for you. Which scent, how strong you want your scent to be, which combination of oils become your favorite, what's your favorite temperature for combining the lye solution to the oils.

The temperature at which you combine your oils and lye mixture will determine how quickly it will trace. Something to keep in mind if you extra time for making multicolored soap

Not all recipes on Pinterest are great recipes! Personally I found a few sites of soap makers that I follow and have tried recipes, read reviews and have faith in their formulas.

Some of my go to websites for recipes:

<https://lovelygreens.com/>

<https://www.lovinsoap.com/>

<https://thenerdyfarmwife.com/>

There are Soap Making facebook groups. I find them very helpful.

Soda ash.....it's a thing....doesn't affect your soap, only the appearance. (Bar on the right has soda ash on top)
You can wipe it off after your soap is cured with a damp cloth or use a steamer.



Learn to use a lye calculator when you become a “soap snob” and are looking for specific characteristics in your soap. Also a good idea to run recipes that you find online to confirm lye ratios and you’ll learn more about the different oil combinations and the effect on your soap. (the next level in soap making)

What happened to my soap? Check out this link. It goes through common troubleshooting situations. [What's Wrong With My Soap?](#)

If you have any questions, feel free to email me. deestokoe@me.com

Where To Buy Supplies:

[Hashbrown's Homestead - Red Deer Soap and More](#)

<https://www.windypointsoap.com>

[Voyageursoapandcandle.com](#)

Lovelygreen’s Soap Recipe - Earl Grey Tea

[Hard Oils](#)

256 grams / 9 oz Coconut oil

42 grams / 1.48 oz Shea Butter

9 grams beeswax (helps to make a harder bar) -- Optional

Liquid Oils

304 grams / 10.7 oz Olive Oil

120 grams / 4.23 oz Sunflower oil

80 grams / 2.8 oz Castor Oil

Lye Mixture

200 grams / 7 oz distilled water

113 grams / 4 oz sodium hydroxide (lye)

Optional Additives:

Kaolin clay - dissolve 10 mL (2 tsp) clay into 30 mL (2Tbsp distilled water)

Earl Grey Tea - 1-5 mL (¼ - 1 tsp) - sometime I just use what's in one tea bag

Scent:

Essential or Fragrance Oils (2-4% of total oils) Dependent on which scent you're using.

Refer to scent calculator

Directions:

1. Assemble all of your equipment and safety gear before you start!
2. Weigh out your hard oils in your pot that you'll be melting them in
3. Weigh out your liquid oils
4. Weigh out your distilled water and lye. In a ventilated area, slowly add the lye to the water. Stir gently to dissolve the lye. Set safely aside to cool. **DO NOT BREATHE IN THE FUMES OR ALLOW THE LYE OR LYE SOLUTION TO COME IN CONTACT WITH YOUR SKIN!!**
5. Heat your hard oils until they are melted.
6. Combine your liquid oils and your melted oils
7. When both your lye solution and oils are 38-43 °C, slowly pour the lye solution into the oils.
8. Using a stick blender, begin blending the soap mixture. Use short blasts with the blender (protect the blender motor from burning out)
9. Continue mixing the soap until it reaches a light trace.
10. Add your extras: fragrance or essential oils and any colourants you are adding. Stir thoroughly.

11. Pour soap into molds and leave it for a day or two to continue to saponify, cool and harden.
12. Once hardened, remove from mold, cut and allow to cure for 4-6 weeks.

Hashbrown's Basic Soap Recipe

(2 lb batch)

Hard Oils:

200 grams Coconut oil
200 grams Crisco
75 grams Cocoa butter

Liquid Oils:

200 grams Olive oil
200 grams Avocado oil

Lye mixture:

295 grams distilled water
120 grams Sodium Hydroxide (Lye)

Essential or Fragrance Oils (2-4% of total oils) Dependent on which scent you're using.
Refer to scent calculator

If using micas: Pre dissolve the powder in glycerine (to avoid spots)

Bridget's Cold Press Soap Recipe

15 oz Coconut oil
15 oz Olive Oil
6 oz Avocado Oil
6 oz Cocoa Butter

13 oz distilled water
6 oz sodium hydroxide (lye)

Essential or Fragrance Oils (2-4% of total oils) Dependent on which scent you're using.
Refer to scent calculator

If using micas: Pre dissolve the powder in glycerine (to avoid spots)