

Soap Making By Paul Yates

I've been making soap for family & friends for about eight years now following what is known as the Cold Process Method. It's not an overly complex process, think of it as cooking while wearing protective equipment and clothing. It is however potentially dangerous if you do not follow some simple steps. With this in mind I'm splitting this instruction sheet into two parts. Part 1 will give you some background into soap making and introduce you to the online Lye & fragrance Calculators that you will eventually use in part 2.

Part 1

I'll begin by recommending you watch as many soap making videos as you can on YouTube. These will give you an added insight into the equipment that is required along with the procedures that you need to follow. I've no doubt that you will come across some video clips where the instructor is using little or no safety equipment. I put these in the "You can learn just as much observing something being done badly as you can correctly category." If you're able to lay your hands on a soap making book, do so. Every bit of knowledge you can gain will help you.

Soap has its origins in cooking fires being used hundreds of years ago. The ancient cooks noticed that when the fire place was scrubbed clean, that bubbles formed in the water used to clean the fire pit. They realised that they had formed from the dripping animal fat that had mixed with the wood ash. Any animal fat mixed with a strong alkaline, in this case wood ash, will produce a form of soap. This process is known as saponification. It's worth watching a saponification video on YouTube to cement your knowledge of the chemistry involved. A by product of this saponification process is the production of glycerine. Glycerine is widely used in the production of plastics and also by the catering industry. So stop and think for a moment, the soap that you purchase and use at home is most probably a by product of the commercial production of glycerine. Is it any wonder it's often very harsh on your skin.

You don't have to use animal fats to produce soap, vegetable oils work very well and these are the oils that I use to make my soap. I've mentioned that a strong alkaline is required to make soap. How strong? **Very strong!!** You will need to use caustic soda. It is at this point that the majority of you will decide..... "I'm not using that on my skin!" Well stop and think for a moment. What do you think is used in the commercial production of soap that you use on a daily basis? That's why lots of commercial soaps irritate your skin, the amount of caustic soda used by them is higher than required. So get on board and try making some for yourself. Caustic soda is chemically known as Sodium Hydroxide, it is often referred to as Lye when making soap. If your inquisitive friends ask what's in your soap, tell them its a Lye Solution. They won't have a clue what it is, and will trust it

enthusiastically. If you tell them it's caustic soda, they'll run for the hills. When purchasing caustic soda, make sure that you read the ingredients label on the rear of the container. Some products that are labelled as caustic soda contain a mixture of Sodium Carbonate & Caustic Soda. These are of no use when it comes to soap making. They are not strong enough and your soap mixture will not set. I've included a couple of pictures to show you what to look out for when you purchase your caustic soda.

You are able to make soap for use by yourself and to give away to friends and family in the form of a present. You are not allowed to sell your soap without having it Product Tested. This is not cheap and only viable for commercially sized batches. I'm going no further on the topic of Product Testing, if it's a route that you wish to go down you will have to research the subject yourself. I only make soap for friends & family.

You will need to wear suitable clothing when it comes to making soap. I've mentioned that you will need to use caustic soda (Lye). Lye solution doesn't sound dangerous or unpleasant does it? Be warned, if you spill or splash any, it will burn you. It will also burn through your clothing if you're not careful. So, no bare arms, wear safety glasses & rubber gloves. I also fill up a pint glass of water to use as an eye wash just in case of an emergency. I use neat vinegar to neutralise spilled Lye solution. Avoid having pets & small children in the area that you use to make your soap.

I use dedicated equipment for the use of soap making. You will need :-

An accurate set of scales.

A jug to mix your Lye solution.

A saucer to pour your Lye crystals on to when measuring.

A steel spoon to mix your Lye solution.

Two homebrew type thermometers.

A Bane-Marie.

A hand mixer.

Moulds of your choice, I use silicone baking moulds.

A silicone squeegee to pour the mixed soap into the mould.

Cling film to cover the soap once it's in the mould.

An old towel or blanket.

You will also need access to the internet.

The different oils that you use when making soap all have their own Saponification Factor. This will determine how much Lye Solution is required to turn the measured quantity of oil into soap. The different oils all have their own special benefits when it comes to skin care. There really are numerous oils to choose from when making soap. It's worth going on line and doing a bit of research yourself, in time you'll be formulating your own recipes.

Coconut Oil is super cleansing and produces large bubbles.

Castor Oil is great for shampoo bars.

Olive Oil moisturises the skin and creates creamy lather.

Sunflower Oil produces a lather that is incredibly conditioning on the skin.

Almond Oil is wonderfully moisturising.

Beeswax helps to harden your finished product.

It is possible to purchase all of your oils and Lye from dedicated soap making suppliers. Go on line and decide if these are the products that you wish to purchase. A good starting point would be:-

<https://www.thesoapkitchen.co.uk>

I tend to buy most of my oils from Asian food stores. They readily stock coconut oil, castor oil and almond oil.

In soap making literature you will see references to Sweet Almond Oil, this is the oil that is supplied in Asian food shops but it is not prefixed as sweet.

You don't need to purchase expensive Olive Oil, in fact cheaper pumice oil works better in soap making.

I add Vitamin E to my soap recipes. It's wonderful for skin care and also helps to preserve the life of your finished product.

If you use Beeswax, only use the show grade cappings wax. This will be the cleanest and purest wax you have.

I've mentioned that you'll need access to the internet.

Google:- The Sage Lye Calculator it will take you to:- <https://www.the-sage.com/lyecal/>

You need to be familiar with this website before you start. Log on and have a look at the site. I'll now take you through the site and add some basic procedures you'll need to follow when making soap.

So step one is to log onto the Sage Lye Calculator.

You will see that there is an option to select:-

Units Of Measure. Select grams.

Select Sodium Hydroxide (NaOH)

Scroll down and you will see a table of possible ingredients. There are two columns of Vegetable Oils and one of Animal Fats.

Locate the Olive Oil box and enter 500 now locate Sunflower Oil and enter 250 find Almond Oil, Sweet and enter 100 go to the beeswax box and enter 28.

At the bottom of the table click on the tab calculate Lye.

This will take you to a new screen. You will see that it tells you to use between 220 & 329 millilitres of liquid.

There is a table that indicates the percentage of each individual ingredient in the recipe.

Olive Oil is calculated as 56.95 %. At the bottom of the percentage table, the Total Weight as 878. This is the figure you will need to enter into the Fragrance Calculator, more of that later.

Locate the Lye Table. You will see that there is a list of possible quantities of Lye (caustic soda) to add to your liquid of choice. I always use the middle 5% to 8% excess fat range. I tend to go for around 6%, if I were making this recipe I would weigh out 110g of caustic soda to add to 300ml of water.

**When you start making soap for real, always add your measured amount of caustic soda to your pre measured amount of liquid.
Never add liquid to caustic soda it will react violently.**

Once caustic soda is added to a liquid it will get **very hot**. Keep stirring and make sure that all of the crystals are dissolved. **The Lye solution will also give off strong fumes. Make sure that your kitchen window & door is open to allow a good flow of air. Alternatively, mix the mixture outside.**

You will see that there are some basic soap making instructions at the bottom of the page. They tell you to combine your fats and Lye solution when they are both at a temperature of between 100^o F & 125^oF. That's between 38^oC & 51^oC. Your two solutions need to be at the same temperature. I would aim for 45^oC when making soap. There is a problem though, in this recipe we are using Beeswax. **If you intend adding Beeswax to your soap then this temperature needs to be increased to 66^oC.** If you mix the two solutions at a lower temperature than this, the Beeswax will start to solidify in solution.

Having got the two solutions to a steady 66^oC you can now combine them. They will need to be stirred continuously at a steady pace. If you go mad with the whisk you will have splashes everywhere. These are going to burn through your clothing so be careful. You will see the solution start to thicken, this is saponification in action, your oils are breaking down at an atomic level and turning into soap, glycerine is being produced and will remain in the mixture. This is a very important part of the process, it is referred to as Trace. When your mixture has reached trace, you will notice the mixture visibly holds together where you had previously been stirring. A similar sight happens when jam reaches its setting point. This is the point where you will add your Essential oils and vitamin E. You will have prepared these in advance and have them close at hand, the tops and pipettes within the bottles need to have been removed before you start heating your oils. The soap can gel very quickly and set in the pan if you're not careful when you start to add your essential oils.

The amount of Essential Oil required is also calculated using the Sage Calculator. Open up a fresh tab on the internet and Google Sage Fragrance Calculator.

This will take you to:- <https://www.the-sage.com/fragcalc/>

In the select a product type section, use the drop down arrow and click on Soap – Cold Process (weight of fats only)

In the Product Weight box enter 878 and then select grams.

Go to Select A Scent and use the drop down arrow choose Ylang-ylang.

Click on the calculate tab.

You will see that there is a table of quantities to use to give us the required level of fragrance. In this case I would use 25ml of Ylang-ylang essential oil for a highly scented soap.

The Fragrance Calculator also includes a list of Fragrance Oils. These tend to be alcohol based. I have known these to turn my soap to a gel within moments of being added. The resulting soap was unappealing to look at though did work fine in practice.

AN IMPORTANT NOTE ABOUT ESSENTIAL OILS

Do a bit of research into any essential oils that you intend to use. Aroma therapy books are a good source of information along with the internet. Rosemary for example acts as a stimulant. You wouldn't want to use this oil in a soap that you are going to give as a present to a family member suffering with cancer.

I also add Vitamin E to my soaps. It will act as a preservative and is also excellent for skin care. Add Vitamin E in a ratio of between 1% & 3%. For this recipe I would add 25ml of Vitamin E.

So now you've added your oils and vitamin E. Keep stirring. Now pour the soap mixture into your silicone moulds. Use your silicone squeegee to get all of the mixture into your moulds.

Use a piece of cling film to cover the soap mixture and seal it in the mould. Now cover the sealed mould with an old blanket or towels. The saponification process will generate heat naturally. By keeping this heat in you will aid this reaction. Leave the soap in the moulds for a minimum of 24 hours. You may need to leave the soap in the moulds for longer if it is slow to set.

Once set, turn the bars of soap out onto a wire cake tray. **Leave them to cure for at least six weeks.**

Don't be tempted to use them before they are ready. The alkaline solution will take time to complete its work on the oils and will still be active even though the bars of soap appear to be solid. I would recommend that you leave your soap for longer than six weeks if you can. Put a couple of bars aside and try them after six months. They will lather better, stay firmer and last longer.

When using your home made soaps, let them drain after use. If they are left in a soap dish with even a small amount of water they will soon turn to a mush.

These are the basic steps to soap making. Don't even dream of making any soap until you have watched a number of You Tube videos. You also need to have become familiar with both the Sage Lye & Fragrance calculators. Read this section through several times to become familiar with the process required.

Part 2

So now you have a bit of background knowledge, let's have a go at making some soap.

The recipe I'm going to demonstrate is an advanced recipe in that I am using goats milk and bees wax.

You will see that I have frozen my goats milk. If I use goats milk straight from the fridge, it will curdle when the Lye is added to it. By adding Lye to frozen milk, it will heat up naturally as part of the chemical reaction and return it to a liquid form. This jug of mixture can then be heated in a water bath until it reaches the correct temperature, which for this recipe will be 66°C. Remember that recipes that include beeswax have to be made at a temperature that is high enough to keep the wax liquid.

It's difficult to be 100% accurate when measuring oils as you will see when I make my soap. If my recipe calls for 250g of Olive Oil, I'm happy to go a bit over or under. Providing I enter the measured amount I actually use into the Lye Calculator, it will give me the exact amount of Lye that I need when I hit the Calculate Lye Tab. **The Lye measured does have to be what is produced by the calculator.**

My recipe will be
250g Olive Oil
250g Coconut Oil
100g Almond Oil
28g Show Grade Beeswax
200ml Frozen Goats Milk
90g Lye
15ml Vitamin E
Mixed at 66°C.

Once solidified, the soap is left to cure for a minimum of 6 weeks.

So wearing old clothing, marigold gloves & eye glasses I make a start measuring. This is where a bit of reality kicks in. You will see that I zero my scales with the pan on top. I then measure each ingredient after resetting the scales to zero after an ingredient has been measured.

If you're wondering why I haven't followed the above recipe religiously, I wanted to demonstrate that if you add too much of an item, all is not lost. You try removing 7g of Almond Oil that's just been added to Olive Oil. The goats milk is frozen, am I really going to remove 1g of iced milk from a cube.

My actual measurements turned out to be:-

253g Olive Oil
256g Coconut Oil
107g Almond Oil
29g Show Grade Bees Wax
201g Frozen Goats Milk
17ml Vitamin E

These actual measurements when fed into the Lye Calculator gives me a revised measurement of Lye of 93g

It is vitally important that you enter your actual measured amounts into the Lye Calculator.

Below is a screen shot from the Sage Lye Calculator that I used when making this recipe.

Created by

Service provided by Majestic Mountain Sage
<http://www.thesage.com>

Liquids

For the size of fat batch that you are using, we recommend that you use approximately **161 to 242 milliliters of liquid**.

WARNING: Always add your solid form lye, sodium hydroxide or potassium hydroxide, to the liquid. If the liquid were added to the solid form lye a violent reaction could result. This means you could have a "volcano" erupt out of your container.

Fats & Oils			Lye Table (NaOH)	
Fat	Amount (grams)	% in recipe	% excess fat	Lye Amount (grams)
Almond Oil, Sweet	107	16.59	0	98.06
Coconut Oil	256	39.69	1	97.08
Olive Oil	253	39.22	2	96.10
Beeswax	29	4.50	3	95.12
Total Weight	645		4	94.14
			5	93.16
			6	92.17
			7	91.19
			8	90.21
			9	89.23
			10	88.25

0% to 4% excess fat range: Proceed with caution! We do not recommend this unless actual saponification values are known and used.
5% to 8% excess fat range: This is the range we use most often.
9% to 10% excess fat range: Creates a softer soap because of the amount of excess fat.

You will see that by adding the Lye to the frozen goats milk the temperature is raised to 32°C. This then needs to be raised to 66°C so that it can be mixed with the oil mixture.

Once added together, use a hand mixer to blend your ingredients until they reach trace.

When your ingredients have reached trace, pour the mixture into a silicone mould. Use a hand squeegee to clean out the pan. Cover the poured mixture with cling film. Keep the soap warm by covering over with an old blanket, this will aid the saponification process. I found that after 8 hours my soap was at 42°C.

Make sure you leave the soap until it is firm before removing it from the mould. It needs to be left on a cake rack to continue curing for at least 6 weeks.

Once your soap has cured it will be ready to use. You need to leave your wet soap to dry on a suitable stand between each use or it will become rather mushy.

Good luck with your soap making. I look forward to seeing your results.



Wear protective safety equipment



Get all of your equipment and ingredients ready before you start



Important:
caustic soda. Always add the caustic
y after use. Store in a dry place. Do n
not mix with acids. Do not use in cont
lacquered surfaces. Not to be used i

Hazardous Ingredients:
Sodium Hydroxide.

Caution:
o metals. Causes severe skin burns a
ic life with long lasting effects. Keep
: breathe dust/fume/gas/mist/vapour
handling. Avoid release to the enviro
protective clothing/eye protection/fac
se mouth. Do NOT induce vomiting.
mediately all contaminated clothing. F
F INHALED: Remove person to fresh
athing. IF IN EYES: Rinse cautiously

Check that you are using 100% Sodium Hydroxide as displayed in Hazardous Ingredients

ater and, avoiding contact with eyes and skin,
own the drain. To unblock a drain, mix 100g c
tic Soda with 1 litre of cold water, pour the so
wait for 30 mins. If this does not work, seek p

Important:
ld water to caustic soda. Always add the Drai
oda to the water. Always reseal tightly after use
not mix with other cleaning products. Do not m
contact with aluminium. Avoid varnishes & lacq
Not to be used in drinking water.

Hazardous Ingredients:
Sodium Carbonate, Sodium Hydroxide.

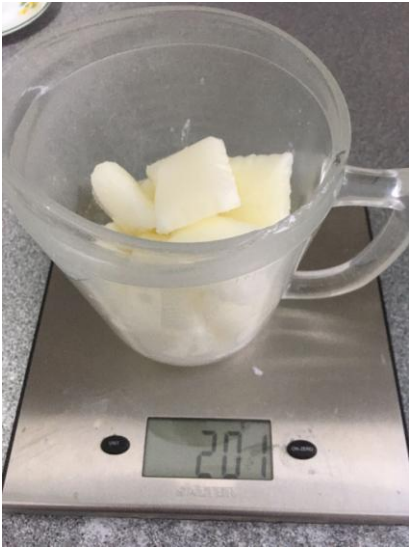
Caution:
e corrosive to metals. Causes severe skin bur
Harmful to aquatic life with long lasting effects
ontainer. Do not breathe dust/fume/gas/mist/v
oroughly after handling. Avoid release to the e
protective gloves/protective clothing/eye prote
n. IF SWALLOWED: rinse mouth. Do NOT inc
IN (or hair): Take off immediately all contamin
n with water/shower. IF INHALED: Remove pe



NO PETS OR SMALL CHILDREN



Zero your scales prior to measuring each ingredient. These measured figures are then entered into the Lye calculator.



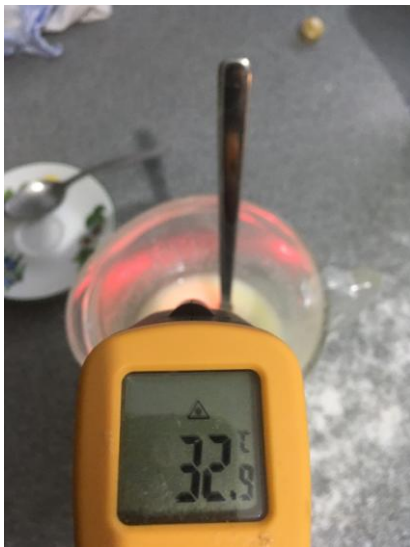
Remember to freeze your goats milk.



It's critical that you use the correct amount of Lye.



Always add Lye crystals to liquid.



Your Lye & liquid mixture will get hot naturally



Warm your oils in a Bane-Marie



Both mixtures need to be at 66°C before mixed



Goats milk discolours when hot



Add the mixtures when they have reached the correct temperature & start mixing

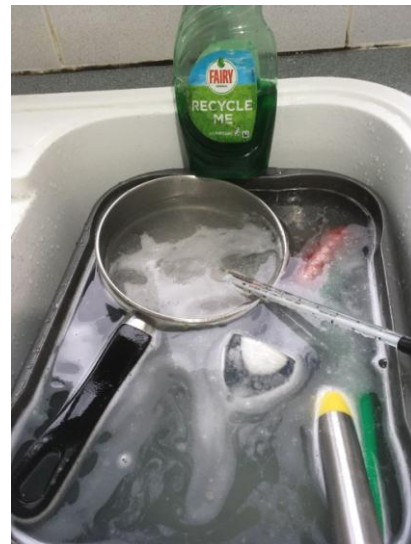




When your mixture reaches trace pour into a silicone mould. Cover with cling film & then cover with an old blanket.



Keep any excess as a test bar.



Clean your equipment in hot water & detergent



The finished soap curing on a cake rack.
Remember to use a suitable stand to dry your finished soap on when in use.