The Miller Farm Guide to Cold Process Goat Milk Soap Makin’

Drawing of the Miller Farm dairy goats by Bailey Howard.
How It All Started

We here at Miller Farm starting running into a problem- if you can call it that- during the Fall semester of 2012 when our two does, Mish Mish and Goatrude were at peak milk production. Our amazing goats were actually producing more milk than the 10 residents of Miller Farm and our peers/professors/loved ones could drink or convert into yogurt and cheese.

After several farmers visited the Mother Earth News Fair in Seven Springs, Pennsylvania we got the idea to try out a new homesteading project with our milk: making homemade goat milk soap. Kirsten began playing around with different recipes and Miller Farm began selling successful batches to friends, family, and peers, as well as keeping a few bars in our own bathroom.

Miller Farmers turned to soap making as a way to make use of all of our goat milk and connect with the homesteading tradition that allows folks to control the source and quality of ingredients that go into their products, to opt out of purchasing brand name soaps that use extraneous packaging and are not always produced in a way that supports worker and environmental justice, and also to live more simply. There are, however, many good reasons to make your own soap, if not just for the sheer fun and creativity of it.

Two of Miller Farm’s three goats currently living on the farm: Goatrude, our Saanen doe, and Connor, our Toggenburg/Boer mix buck who is staying with us temporarily. Photo by resident farmer Natalie Reitz.
The Basics of Cold-Process Soap

Fat + base = soap! That formula is the foundation of cold-process soap making, though the chemistry behind the process is more complex. In hard soap the fat is usually oil and the base is sodium hydroxide, while potassium hydroxide is used to produce liquid soaps. Cold-process soap making is one of the oldest methods for creating soap and does not involve boiling the ingredients. Instead, the cold-process method achieves saponification by relying on the heat produced from the conversion of the fatty acids in the oil into soap.

Getting Fanciful

There are dozens of ways to get creative with your soap- creating different molds, adding fragrance, color, or shimmer, changing the recipe and playing with different kinds of oils, layering different mixtures, etc. This document only explains a fairly straightforward and modest methodology and recipe for those looking to make good quality soap for home use and perhaps as occasional gifts. Fancier soaps tend to be more expensive and complicated to make but are a great way to unleash creativity and explore for folks who are familiar with the basics of soap making.

I like the company Bramble Berry, which can be found online, for fragrances, shimmers, colors, molds, etc. and for solid instructions on how to take on more complex recipes.

Safety Using Lye

Making cold-process soaps is empowering and simple, but it should be done with attention to safety. Sodium hydroxide, often called lye, is the alkaline ingredient that spurs the hydrolysis of the fatty ingredients. Lye has a pH of around 12, meaning it is very basic. Below is a list of guidelines for handling lye safely, but this list is not exhaustive and ultimately it is up to you to be responsible for safe handling and use of the substance. You can also make your own lye using water and ash from burning wood, but that process is not described here.

• **Dress up.** I like to wear rubber gloves and the full protection plastic goggles that you can buy at any hardware store. Eye protection is important, and while sunglasses or non-wrap around goggles might suffice, I prefer to err on the side of being safer and investing in the goggles.

• **Have vinegar on hand and sitting out next to you.** Vinegar is acidic and can neutralize sodium hydroxide. You can use vinegar at the end of your project to wipe down your workspace surfaces. Always always always read

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1 Making a soft liquid soap is not as simple as replacing potassium hydroxide for sodium hydroxide in your hard, cold-process soap recipe. A different recipe is required and many can be found online.
the safety instructions, warnings, and suggestions on your bottle of lye and
don’t wait around to consult a physician for emergencies.

• **Be intentional about your workspace.** Pick a location to make your soap
and clear off a specific area you intend to use. If I am making soap in my
kitchen I like to clear away any items I won’t use for the soap making process
and put dishes, frying pans, glasses, etc. away for the time being. Wipe down
the surface of your workshop with vinegar when you finish.

• **Label it!** When you store your bottle of lye in between projects be sure to put
it up out of the way of children and animals, and label it very clearly with the
name of the product, its use, and what to do if someone gets it on their skin,
eyes, etc. (you can usually copy the latter from the lye bottle).

• **Label it x2!** In all soap making processes lye is usually first mixed with water
or a milk. If you are stepping away from your workspace for just a second or
have kids/animals in the house put the lye mixture out of the way and label
it! The substance has been neutralized by the water or milk, but it is still
basic and there are numerous stories out there about unsuspecting partners
sticking their finger in what they thought to be batter or throwing back a
glass of water or milk some kind person left out and burning their esophagus.
Making Soap the Miller Farm Way: What You Need

This is a basic outline and description of the tools and ingredients you will need. The exact quantities of ingredients are listed under the recipe section on the following pages.

Safety Equipment
- Goggles
- Rubber gloves
- Vinegar

Tools + Supplies
- Two large bowls (the size needed for a big salad): the first can be made of any material as it will only be used for ice. The second needs to be a stainless steel bowl and needs to be able to fit into the first bowl. I like my stainless steel bowl to have high sides (decreases splashing) and I recommend that it be one that you are okay with giving over to your soap making projects and not using again for food or cooking.²
- Stainless steel spoon for mixing (big spoons are better).
- An electric hand mixer.
- A pot with a handle that can hold at least 5 cups of liquid.
- A soap mold. Can be a wooden soap mold bought or made by hand, a silicone mold (my personal favorite), or even plastic Solo cups if you aren't particular about the design of the soap.

Ingredients
- Lye (sodium hydroxide). Usually you will have to purchase lye online, as it is a substance used in meth production and has been taken off the shelves at most hardware stores. Lye can be bought on Amazon, Bramble Berry online, or through other online suppliers. If you are not buying from a soap making supplier I suggest looking at reviews and product details to make sure that what you are purchasing is 100% lye (not a drain cleaner with other icky ingredients) or that other buyers have successfully used it for soap. 16 oz. of lye can make, if you are using the recipe provided here, about 48 bars of soap.
- Milk! I obviously prefer goat milk, but just about any kind will do.
- Water.
- Vegetable oil. It is alright if your oil is a vegetable/canola/olive blend. I tend to go with the cheapest brand available as it doesn't seem to have a huge effect on the quality of the soap.
- Ice cubes.
- Fragrance oil as desired. Many people use essential oils in their soap though in my own experience I have found that they sometimes degrade a tad over...

² A well-cleaned bowl (i.e., washed out well with water and then rubbed down with vinegar) is probably just fine to use again for food and cooking, but I like to err on the side of safety and make things easier on myself by just designating one bowl “soap only.” Stainless steel bowls can be bought for less than $10 at many stores.
time. Other fragrance oils can be bought online (again, Bramble Berry has a great selection) - just double check that the oil of your choice is safe to use in soaps.

The Recipe

This is not the recipe used in Miller Farm’s goat milk soap- our recipe uses shea butter, which makes soap creamier and helps lock in moisture. The recipe provided here uses ingredients that are relatively easy to find and inexpensive, and is a great starter recipe that can be built upon through the addition of shea, colorants, fragrance, shimmer, and other kinds of oils.

Ingredients
Prepare two trays of ice cubes
4.5 ounces of lye, measured by weight
3/4 cup of goat milk
1/4 cup of water
4 cups of oil
8 drops of fragrance, if you choose

Recipe

1. Put on your safety equipment.
2. Measure out your lye. Because this is a small batch being close and accurate in measurement is important. I usually use a scale and “weigh boat” like an empty yogurt container. Weigh the weight boat first and adjust accordingly.
3. Fill your big, non-stainless steel bowl with ice cubes.
4. Put the stainless steel bowl inside the other big bowl, sitting on top of the ice cubes.
5. Pour the 4 cups of oil into the pot and put it on the stovetop with the heat on low.
   • Troubleshoot: You don’t want the oil to get too hot, which can happen easily with oil. You just want to heat it up a tad. If the oil is too hot, pause and let it cool until it is just hotter than lukewarm. If the oil is too hot it will contribute to further warming the milk, lye, and water mixture, which is already heating due to chemical process taking place.
6. Pour the ¾ cups of milk and ¼ cups of water into the stainless steel bowl.
7. Add the 4.5 ounces of lye to the milk and water and begin stirring the mixture with the stainless steel spoon. The mixture will turn a pale yellow, which is good.
   • Troubleshoot: If the mixture starts turning dark yellow that means that the mixture is being burned by the heat produced from the reaction. Add more ice cubes underneath the stainless steel bowl.
   • Troubleshoot: Some of the lye might turn a dark orange or amber color and seem to stick to the bottom of the bowl. Carefully so as to avoid splashing chip away at the deposits. Once they are knocked off
the bottom of the bowl, the agitation from stirring the mixture should dissolve the clumps away.

8. Add the oil to the milk, water, and lye mixture.
9. Plug in your electric hand mixer, put it on low, and mix the liquids for 10-15 minutes.
10. After 10-15 minutes add 8 drops of any fragrance you want to include. Mix the liquids again for 1-2 minutes, but not much longer. You don't want the fragrance oil to be broken down too far.
11. Pour the mixture into your molds and put the mold up and away where no children, pets, etc. can get into the liquid.
   • Troubleshoot: Let the mold sit out by itself- putting it on a thick cookie sheet, in another box, etc. or otherwise insulating the mold can make it more difficult for the soap to solidify or cause it to “sweat” out oils.
12. Wait 48 hours. Your soap should be getting hard! You can start using it 3-4 days after making it if it has hardened successfully (no worries if it hasn’t, just give it a tad more time) or you can let it age, which tends to only make soap better. Enjoy!