



Goat Milk

Soap Making

Manual



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The farm



Creekside Farm is 125 acres of wooded hillsides, rolling meadows and fertile creek bottoms in Athens, Ohio. The bulk of the farm is situated on a broad clearing bordered by multiple creeks. The southern part of the property opens to the wide creek bottom that gives the farm its name- Creekside.

Creekside Farm is an Animal Welfare Approved farm run by a husband and wife team. They milk a small herd of dairy goats and use the milk to make farmstead cheeses, yogurt, and goat milk soap in their on-farm facility. For the health of the animals and the land, their goats are rotationally grazed and seasonally milked.

All of Creekside Farm's soaps are handmade in small batches using the traditional cold press method. They use goat milk fresh from their farm, and only the purest and most sustainably harvested additives. Additionally, their products are made using electricity from solar power. These practices make for a natural, moisturizing soap that is gentle on skin and the environment.

Why Goat Milk Soap?



Goat milk soap is known for being mild and gentle which makes it suitable for all skin types. The fats in the milk and the natural glycerin in handmade soap make a very moisturizing bar, and the natural sugars from the milk give the lather an extra boost.

One of the benefits of making your own soap is being able to adjust recipes to create just the right bar for your desired purpose. You can change the base oils to get a different type of lather, alter the superfat percentage to make it more moisturizing, blend essential oils to give it a special smell, or add exfoliants to better remove dirt. Additionally, you're in control of what ingredients go into your product and ultimately onto your skin-the largest organ of the body.



History

Cold process soap is made by mixing lye with a liquid, such as water or milk, and oil. Combining these three ingredients causes a chemical reaction called saponification in which the initial ingredients are changed into soap.

Early soaps were used for cleaning materials rather than people, since it wasn't until the 18th century that bathing came into fashion. Ancient Babylonians are credited with being the first to make soap almost 5000 years ago. Since then, there have been many variations in ingredients based on available resources in a given region. Ancient Egyptians used animal and vegetable oils combined with alkaline salts. In Spain and Italy, soap was made with goat fat and Beech tree ashes. People in Syria made soap using olive oil (known as castile soap). In parts of West Africa, plantain skins and cocoa pod ash were used to saponify the fats.



There is much debate over the origins of the word “soap.” According to Roman legend, soap was named after Mount Sapo, an ancient site of animal sacrifices. The women washing their clothes along the Tiber River below the ceremonial alters noted that it was easier to get them clean after heavy rains washed the fat and ash down to the bank. Other people say the word “soap” derived from the Celtic word “saipo” which was the name of their combination of animal fat and plant ashes.

In colonial times in the United States, people would save ashes from their fires and the fat from butchering animals to make soap. An ash-water mixture was placed in a barrel and filtered through straw, twigs, and rocks to obtain a lye liquid to use in soap making. The strength of the “lye water” was tested by floating an egg or small potato in the solution. It was considered the proper strength to make soap when the egg or small potato floated about halfway beneath the surface of the solution. The recipes and techniques in this manual incorporate longstanding traditions of homemade soap making with the precision of modern scales and calculations to ensure a safe, consistent, natural product.

Terminology

Alkali (also known as a base) has a pH greater than 7. Lye is an alkali.

Base Oils make up the bulk of the soap (ex.coconut, olive, palm)

Cold Process soap making only requires heat to melt oils. No cooking involved.

Cure, refers to the time period between making the soap and its use. Soap should cure 4 - 6 weeks before it is used. During this time the soap becomes mild and the saponification process completes.

Essential Oils are volatile oils that have been obtained from a plant for its scent, flavor or therapeutic properties.

Fragrance Oils are synthetic imitations of essential oils and other scents.

Gel Stage begins once soap has been mixed to trace and poured into the mold where it will begin to heat up. If the soap is properly wrapped and allowed to heat up enough, it will undergo a change. It will become translucent and take on the look of Vaseline. Most soap makers want their soaps to gel, but some prefer soap that hasn't. Either way is fine.

Lye is an ingredient of soap, also known as sodium hydroxide.

pH is the measure of the acidity or alkalinity of a solution. Substances with pH values greater than 7.0 (alkaline) are bases; less than 7.0 (acidic) are acids with 7.0 being neutral.

Render animal fat by melting it down to remove all of its impurities.

Saponification is the chemical reaction between an alkali (lye) and a fat or oil to form soap.

Seizing occurs when the mixture of lye, liquid and oils goes from liquid to semi-solid unexpectedly quickly before being poured into the mold.

Soap is the result of a chemical reaction between a lye solution (sodium hydroxide for bar soap or potassium hydroxide for liquid soap) and fats/oils. If it isn't made with lye, it isn't soap.

Super-fatted refers to excess oils left unsaponified in the finished soap. This excess oil contributes to the moisturizing qualities of soap.

Trace is the point in soap making where the mixed lye and oils have combined to a thick pudding-like substance. When drizzled on to itself, a trail is left.

Equipment + Safety Considerations

Bowls: Heat-resistant, non-reactive containers such as Pyrex, stainless steel, or polypropylene plastics are safe containers for mixing the soap making ingredients.

Heat Source: Base oils can be melted in a double boiler, crockpot, or microwave.

Stick Blender: Using a stick blender instead of hand stirring decreases the stirring time from hours to minutes when making a batch of soap.

Spatula: Use for scraping the soap out of your container into the mold.

Scale: Soap recipes are measured by weight instead of volume. I recommend a digital kitchen scale that measures in ounces to two decimal places.

Soap Molds: Common materials are wood (lined with nonstick material), silicone or plastic. For an inexpensive start to soaping, use plastic containers such as yogurt cups. To calculate the mold's volume measure your mold in inches and plug the dimensions into the following equation: $\text{length} \times \text{width} \times \text{depth} \times 0.38 = \text{total ounces of base oils to use in your recipe}$

Cutting Tools: You can buy specific soap cutting tools for ease and consistency, but a simple cutting board and butcher knife will work also.

Thermometer: A basic kitchen thermometer with a temperature range between 60-140 F.

Lye is an alkali which means it is very basic (has a high pH) and is highly corrosive. Lye and the soap mixture prior to setting up can cause severe burns to skin in the same way that materials that are very acidic (have a very low pH- like battery acid) cause severe burns. Also, when lye is mixed with water or milk, it will let off fumes, so always work in a well ventilated area.

Eye protection: Wear safety goggles at all times when working with lye and soap that has not completely set up yet. Your safety goggles should protect the eye from all sides. Eye glasses are not sufficient protection.

Skin protection: Use rubber dish gloves or nitrile examination gloves at all times when working with lye and soap that has not yet completely set. Additionally, wear long sleeves, pants, and closed-toed shoes to protect your skin from unexpected spills and splashes.

Base Oils: Hard, Soft + Brittle

Soft Oils are liquid at room temperature and can be poured easily for measurement. Soap made from a high percentage of these oils will be softer and stickier when un-molding. If this is a problem, leave them in the mold a day or two longer before un-molding and cutting. If they still stick, you can try freezing them before removing them from the mold. The exception to this rule is olive oil. Soap made with a high percentage olive oil is soft upon un-molding but after curing becomes very hard. If you are trying to do intricate designs with multiple colors, try using a recipe with more soft oils (especially olive oil) because they are slower to trace. This allows time to complete the design before the soap sets up.

Hard Oils are oils, fats, and butters that are solid but scoopable at room temperature such as lard, coconut oil, and shea butter. Hard oils make a hard bar of soap.

Brittle Oils are oils that are solid and hard at room temperature such as cocoa butter. Brittle oils also make a hard bar of soap. I use a butcher knife and cutting board or chisel and hammer to break these oils into small pieces.



Base Oils: Soft Oils

Oil	Firmness	Properties
Almond Oil (Sweet)	Soft	Medium lather, mild cleansing
Apricot Kernel Oil	Soft	Medium lather, mild cleansing
Avocado Oil	Soft	Medium lather, mild cleansing
Castor Oil	Soft	Boosts lather by making a soap more easily dissolvable
Grapeseed Oil	Soft	Medium lather, mild cleansing
Joboba Oil	Soft	Stabilizes and suspends lather, gives soap a sheen making it look less dull
Olive Oil	Soft	Low slippery lather, almost no bubbles, low cleansing; does not make a white bar
Rice Bran Oil	Soft	Medium lather, mild cleansing
Safflower Oil	Soft	Medium lather, mild cleansing
Sunflower Oil	Soft	Medium lather, mild cleansing

Usage

Notes

5-12%

Can be substituted for some of the olive oil in a recipe.

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Can be substituted for some of the olive oil in a recipe. It is high in vitamin E and other vitamins and minerals making it a great addition to facial bars or bars for sensitive skin.

5-10%

Some soap makers like to use 15-20% castor oil in their shampoo bars or shaving bars. Allow for additional time before cutting or using when using castor oil.

5-12%

Can be substituted for some of the olive oil in a recipe.

5-8%

Jojoba oil, a liquid wax, diminishes lather when used in high amounts. Keep below 8%.

25-80%

The low cleansing properties of olive oil make it mild and nourishing. Soap for sensitive skin or baby skin should include high amounts of olive oil (60%). Castile soap is made with 100% olive oil. Soaps over 50% olive oil will need to cure longer before unmolding and using.

5-12%

Can be substituted for some of the olive oil in a recipe.

5-12%

Can be substituted for some of the olive oil in a recipe.

5-12%

Can be substituted for some of the olive oil in a recipe. Use high oleic (a naturally occurring fatty acid) sunflower for a longer shelf life.

Base Oils: Hard + Brittle Oils

Oil	Firmness	Properties
Coconut Oil	Hard	Abundant lather, large fluffy bubbles, high cleansing, hard bar, white color
Lard	Hard	Mild stabilizing creamy lather, hard, white bar
Mango Butter	Hard	Increases hardness of the soap, and it adds conditioning and moisturizing properties as well
Palm Oil	Hard	Mild stabilizing lather, hard, long lasting bar
Shea Butter	Hard	Mild stabilizing lotion-like lather, medium hard, long lasting bar
Tallow	Hard	Mild stabilizing lotion-like lather, medium hard, long lasting bar
Palm Kernel Oil	Brittle	Similar to coconut oil, large fluffy bubbles, high cleansing but a bit milder than coconut oil
Cocoa Butter	Brittle	Mild stabilizing lotion-like lather, hard, long lasting bar

<i>Usage</i>	<i>Notes</i>
15-50%	High amounts of coconut oil can be drying; however, you can always use a higher superfat to counteract the drying effect. Experiment with a 100% coconut oil soap with a 20% superfat.
25-50%	100% lard soap with no superfat makes great laundry soap but has low lather.
5-20%	
25-50%	Palm oil is commonly used to add hardness to homemade soap recipes. For environmental reasons, I do not use palm oil since even “environmentally friendly” brands cause deforestation and loss of fragile habitat.
5-20%	You can experiment with butters in high amounts – up to 80%. Try a bar made from 60% shea butter and 40% coconut oil.
25-50%	100% tallow soap with no superfat makes great laundry soap but has low lather.
15-30%	This is also used to add hardness to soap. Again, I do not use it due to environmental reasons.
5-15%	You can experiment with using cocoa butter and other butters in high amounts – up to 80%. Try a bar made from 60% cocoa butter and 40% coconut oil

Essential Oil vs fragrance Oil

Essential oils are highly concentrated and can be dangerous. Never apply essential oils directly to skin without using a carrier oil to dilute them.

Essential oils are natural oils typically obtained by a distillation process that extracts the fragrance and botanical benefits of a plant.

Fragrance oils are synthetic chemicals created for use in perfumes or cosmetics. They are not derived from plants. They are used to create a wide array of scents that cannot be created by essential oil combinations.

Typical Volumes

Fragrance oil and Essential Oil: 0.5-1 oz per pound of oil.

Rates vary depending on the strength of the oils and the type of oil you are using. Citrus essential oils tend to require amounts on the higher side, whereas strong essential oils like peppermint or clove will require smaller amounts.



Perfumery Notes

The perfumery note of an oil refers to the rate at which the oil evaporates. Top notes evaporate more quickly and base notes more slowly. As a result, top note scents are the smell that you pick up first and are the first to dissipate.

Top Notes are the lightest of all the notes. This is because they have the smallest molecules. They are often derived from flowers, leaves, citrus and flowering herbs.

Examples: basil, bergamot, cajuput, cinnamon, clary sage, coriander, eucalyptus, grapefruit, lemon, lemongrass, lime, orange, peppermint, sage, spearmint, tea tree

Middle notes bind other essential oils together and create balance between the top notes and the base notes. The aroma of middle notes lasts longer than top notes, but not as long as base notes. They are often derived from whole herbs and spices.

Examples: bay, black pepper, cardamom, chamomile, cypress, geranium, lavender, pine, rosemary, yarrow

Base notes are deep, heavy, and often earthy in scent. These are the oils that ground your blend and help its aroma last longer. Base notes are often derived from trees, roots, and barks.

Examples: balsam peru, cassia, cedar, cinnamon, clove, frankincense, jasmine, oakmoss, patchouli, sandalwood, vanilla, vetiver, ylang ylang



Essential Oil Blending Methods

The 30-50-20 Method

Use 30% of your top note oil, 50% of your middle note oil, and 20% of your base note oil in your blend.

Equal Parts Method

When combining essential oils from the same category (all citrus oils, all floral oils, etc.), try using equal parts of each of the essential oil.

Blend as you Go Method

- Choose one base note oil, one middle note oil, and one top note oil.
- Combine one part of each base and middle note oil, swirl and smell your blend. Add another part of whichever oil (base or middle note) you like best.
- Add in one part of your top note oil, swirl and smell your blend again. Continue adding oil one part at a time until you have a ratio you like.
- Keep track of how many parts of each you combined, so you can recreate the same blend again in the future.



Sample Essential Oil Combinations

Citrus

Citrus essential oils lose their scent quickly in soap. Consider buying 5x or 10x strengths. Some citrus essential oils will alter the soap color to make it more yellow, orange, or brownish. Look for “decolorized” versions if this is a concern for you.

- 1 part lemon essential oil
- 2 parts orange essential oil
- 1 part lime essential oil
- 1 part grapefruit essential oil

Earthy

Patchouli is the quintessential example of an earthy essential oil. Vetiver, clary sage, and sandalwood are other common essential oils in this category.

- 2 parts patchouli essential oil
- 1 part bergamot essential oil
- 1 part ylang ylang essential oil

Floral

Floral essential oils blend well with other floral essential oils, or consider combining them with citrus essential oils.

- 1 part geranium essential oil
- 2 parts lavender essential oil
- 2 parts chamomile essential oil

Woodsy

Common essential oils that are considered woody are cedar, fir, cypress, pine, and sage. They generally pair well with citrus or mint essential oils.

- 2 parts white fir essential oil
- 2 parts cypress essential oil
- 2 parts wintergreen essential oil

Spicy

Ginger, cinnamon, clove, cardamom, and other spicy essential oils can be irritating to some with delicate skin. If you have sensitive skin, consider adding a small amount of spicy essential oils to other blends first to see if you tolerate it before using it as the sole essential oil in your soap.

- 3 parts cardamom essential oil
- 2 parts clove essential oil
- 1 part ginger essential oil



Other Additives

Beeswax can be used to add some hardness to soap. The melting point of beeswax is about 145° F, so you will have to bring your oils to a higher temperature than normal then add the beeswax and allow the mixture to cool back down. The wax will cause it to reach trace faster, so be prepared to pour it into the mold quickly. Use it at rate of 1-3% of your total oils. Remember to calculate it as one of the oils in your recipe.

Botanicals can be added to the soap in multiple ways. You can infuse the dried herbs and other plants in the base oils ahead of time; add it to the soap mixture at trace, or sprinkle some on top of the loaf immediately after pouring into the mold. Many plant materials turn brown as a result of the high pH and temperatures associated with the saponification process, so you may want to try a small batch before committing to a large amount.



Natural colorants tend to create more muted earth-tone soaps. These colorants are derived from plants, minerals, and clays. They are more prone to fading over time, and there may be more variation from batch to batch. Synthetic colorants are used by those who prefer more vibrant colors or more color options. They also do not bleed into each other like natural colorants do, so they allow for more crisp demarcation between colors and swirls.

Exfoliants can be added to cold process soap. Consider using cornmeal, coffee grounds, pumice, walnut hulls, or pumpkin seeds as natural exfoliants. Rates of use vary depending on the material used and desired texture of the soap. As a general guideline, consider starting with about 1 tsp per pound of oil.

Salt adds cleansing and exfoliating properties to the soap. Salt bars are very hard, long lasting and produce a creamy, low lather. At trace, add salt at a rate of 50-100% of the weight of oils.

Sugar adds lather and bubbles to the soap. Use $\frac{1}{2}$ to 1 tsp of sugar per pound of oil in your recipe, and dissolve it in the liquid before adding lye.

Lining Soap Molds

1 Measure the length of the inside of the soap mold. Make sure the measurements are exact.

2 Cut heavy duty freezer paper that is the length of the mold plus another 10 inches.

3 Fold only the left side of the freezer paper so that the flap is 5 inches long.

4 Place the freezer paper on top of the mold with the left folded side lined-up with the left inside end of the soap mold.

5 Fold the right side so it fits lengthwise.

6 Place the paper into the mold.

7 Cut the freezer paper to reduce its width so that it will fold over each long side by about 2 inches.

8 Crease the freezer paper at the bottom of the mold against the corners.

9 Take out the freezer paper and make the crease more defined.

10 Cut out small squares in each corner leaving about 1 inch of paper on each side.

11 Place the wax paper back into the mold and pull up the long tabs in the middle so that the wax paper takes on the wooden soap mold's form.

12 Cut a sliver in the paper to the top of the mold at each corner. This will allow the wax paper to fold over the sides without tearing during the next steps.

13 Tape the wax paper in place on the long sides.

14 Tape the wax paper in place on the short ends.

15 Make sure that all the corners are well defined and that there's no loose wax paper within the mold.

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Cold Process Steps

1 Put on your safety gear (goggles, gloves, long sleeves, etc.) and make sure kids and pets are not in the general area.

2 If you are using any colorants, essential oils or fragrances, measure them into small bowls or jars and set aside.

3 Measure out the lye and water* in separate containers. Slowly add the lye to the water little by little, stirring between additions. Never add water to lye. Stir until it is mixed in completely. If the mixture becomes too warm (above 125°F), set it aside or place the bowl in a cold water bath to cool before continuing to add more lye. Do not breath in fumes.

4 In one large bowl big enough to hold the entire volume of soap ingredients, measure and combine your base oils. Heat them to 110°F. Stir to break up and solid pieces.

5 Once the oils and the lye-water have cooled to 100-110°F, carefully pour the lye-water into the base oils. Use hot or cold baths to adjust the temperatures as needed before combining.

6 Use the stick blender to mix the oils and lye-water, being careful not to introduce air bubbles. Make sure your stick blender is fully submerged in the soap before turning it on so you do not accidentally splash soap batter out of the bowl. Blend until you have reached trace.

7 If you are adding color or fragrance, add it once you have reached trace. Carefully mix them in with a spatula or the stick blender until dispersed evenly. Work quickly because the soap batter will begin to set up in your bowl as soon as you stop stirring.

8 Pour the soap into your mold. Tap the mold on your work surface to release any air bubbles. Cover the mold.

9 Allow the soap to stay in the mold for 24-48 hours.

10 Unmold, cut, and cure for 4-6 weeks.

11 If storing, keep the soap in a cool, dry, dark place for up to 6 months. Since it is a natural product, the color or scent may degrade over time. If not stored in proper conditions, the soap can develop mold.

*The word “water” can be used interchangeably with milk if you are using milk in your recipe. If you are using milk you will need to be very careful not to allow the lye-milk mixture to overheat as it will cook the milk and cause problems with your soap. For this reason, many people who make goat milk soap use frozen milk in their recipes.

Sample Recipes

	Basic Bar	facial Bar
Lye	2.80 oz	2.80 oz
Liquid	6.60 oz	6.60 oz
<i>Oils + fats</i>		
	Castor Oil	Avocado Butter
	2.00 oz	5.00 oz
	Olive Oil	Castor Oil
	10.00 oz	1.60 oz
	Safflower Oil	Grapeseed Oil
	2.00 oz	5.00 oz
	Coconut Oil	Olive Oil
	6.00 oz	1.60 oz
		Rice Bran Oil
		5.00 oz
		Shea Butter
		1.80 oz
<i>Additives</i>		
		Lavender
		Essential Oil
		1.50 oz
<i>Total Yield</i>		
Oz.	29.40 oz	30.90 oz
Superfat %	5%	6%

Exfoliating Bar

Your Recipe

2.81 oz

6.60 oz

Castor Oil

1.20 oz

Olive Oil

10.00 oz

Coconut Oil

6.00 oz

Grapefruit

Essential Oil

1.50 oz

Coffee Grounds

1.5tsp

29.41 oz

3%

Resources: Retailers

Brambleberry

colorants, essential oils, fragrance oils,
molds, soap making books

301 W Holly St
Bellingham WA 98225
(360) 734-8278
www.brambleberry.com

Essential Depot

base oils, lye

2029 U.S. 27
Sebring, FL 33870
(866) 840-2495
www.essentialdepot.com

From Nature with Love

colorants, essential oils, molds

341 Christian Street
Oxford, CT 06478
(800) 520-2060
www.fromnaturewithlove.com

Mountain Rose Herbs

essential oils

152 W 5th Ave #3
Eugene, OR 97401
(541) 741-7307
www.mountainroseherbs.com



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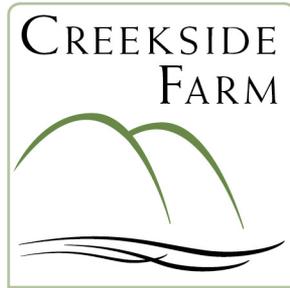
It is part of a Research and Education proposal titled--
"Creating an Educational and Economic Value Chain for
Specialty Dairy Products in Appalachian Ohio."

This project works with women in the specialty dairy sector to develop tools to share their knowledge in an effort to both strengthen their farms and give current or perspective women farmers tools to increase the specialty dairy sector."

Rural Action is a membership based development organization started in 1991 with a focus on asset based sustainable development, and a mission of assisting the region in transitioning from dependence on an extractive economy. Rural Action works at the community level with a high degree of local organizing and membership involvement to build shared prosperity through practices grounded in community engagement and sustainable practices. Primary program areas include sustainable agriculture and food systems, sustainable forestry, watershed restoration, recycling and materials management (Zero Waste), environmental education, and green energy.
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