The Essentialist

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Real Soap

One of the disgusting, and environmentally harmful things brought to us by the 20th century is detergent. I'm talking laundry detergent, dishwasher detergent, liquid dish detergent, and liquid shampoos. In older times, people used soap, and the cream of the crop is known as Castile soap.

What's the difference you ask?

➡ Soap is actually saponified fatty acids. Saponification is a reaction between a fatty acid from a vegetable or animal fat and a caustic alkali in the presence of distilled water. A soap made of lauric acid (the most common fatty acid in coconut oil) and lye (sodium hydroxide) would be called sodium laurate. The cleaning101-1 website has a good description of the chemistry of soap making, with good illustrations.

Most soaps lather well, are gentle and non-drying if rinsed well. To ensure a good rinsing, mix a little vinegar with water for the rinse.

Castile is a soap made primarily from olive oil, although other oils such as palm, coconut, almond and hemp can be included. The most popular brand of Castile in the US is Dr. Bronners. Animal fats can also be used (tallow or lard), but then it isn't Castile.

You can make Castile soap in your kitchen, either as a bar soap, or a liquid soap (NOTE: a bar soap can be converted to a liquid soap by dissolving the grated bar soap into warm water). See below for recipes.

See KitchenDoctor website for more history and information.

Unfortunately, soaps tend to form a hard-to-clean precipitate (soap ring) when used in hard water. For this reason, detergents were developed that would not precipitate.

➡ Detergents, at least the kind we use with water in our homes, have a sulfate group involved, as in sodium lauryl sulfate. The making of commercial detergents typically involves petrochemicals (substances from petroleum) as the source of the fatty acid, strong acids or oxidies of sulfur, and industrial heat and pressure. The cleaning101-2 website has a good description of the chemistry of detergent making, with good illustrations.

Household detergents can be quite harsh and drying, and can provoke allergic responses (such as dandruff and eczema). For this reason, most have extra oils added to undo the drying effect. And, like most things made from petrochemicals, they are not good for the environment.

Making Liquid Soap from a Solid Bar

Making your own bars of soap can be daunting, and dangerous. But soap making is a popular cottage industry, so likely someone in your community makes bar soaps you can buy, for making a liquid version. This recipe is from AssociatedContent.com. [5]

- 1 cup firmly packed grated Castile or other bar soap soap (about two 4 oz. bars)
- 4 cups water
- 2 tablespoons vegetable glycerin

Before you begin, grate the castile soap with a cheese grater, into a large pot. Try to shred it as fine as possible since it will take less time to melt the soap down if the pieces are small.

Mix water with grated castile soap in pot. Set over low heat, stirring occasionally until soap has dissolved. Add glycerin. Keep your eye on it! Once dissolved, transfer to a jar and cover tightly. This makes a thick liquid soap. For a thinner liquid soap, add more water until desired consistency is reached.

This liquid soap has many uses: [5]

- ✓ laundry detergent
- ✓ shower soap
- ✓ baby soap
- ✓ bubble bath (use as is, with added essential oil, or add up to 2 oz coconut oil)
- ✓ shampoo (use as is, or blend 1/2 cup liquid Castile, 1 egg, and 1 tsp each olive oil and lemon juice in a blender; keeps 1 day in refrigerator. Follow shampooing with a vinegar rinse: 1/4 cup vinegar in 2 quarts warm water to restore hair's acid mantle.)

Making Your Own Bar or Liquid Soap: Notes on Ingredients

All soap requires fats or oils, an alkali, and water. Water provides the medium in which the reaction occurs. The alkali first reacts with the fats/oils to produce fatty acids and glycerin; and then with the fatty acids to form saponified fatty acids (soap) and more water. When the alkali mixes with water, it generates heat (but for liquid soap, you need to provide additional heat), which drives the reaction, and helps to evaporate the water.

Fragrance or essential oils can also be added as optional ingredients, after saponification is complete.

None of my recipes provided here call for soap dye or colorant, but these can certainly be added along with fragrance or essential oils, after the soap has formed.

Fats & Oils:

The choice of fats or oils is the creative part of this process. Your choices determine the fine qualities of the soap. Castile soap is the creme de la creme of soap, made entirely from vegetable oils, with a large portion (purists demand 100%) as olive oil. Animal fats can also be used to make soap, but then it is not castile.

Your choice of specific oils, such as olive vs coconut, as well as the type of alkali used, will make a difference in the amount of alkali needed (This is a chemistry

thing, and depends on the average molecular weight of the specific fat and the alkali). It's important to determine the correct amount of lye, because if you use too much, some lye will remain in your soap, making it caustic (could cause burns on your skin, or holes in your laundry).

Most recipes add at least 5% more fat than needed for the amount of alkali; this is called 'superfatting.' It has two benefits: One, it ensures that ALL the lye will react so that none remains in your soap; and Two, it allows you to express the properties of a particular oil (such as the moisturizing shea butter) in the soap. And you have the choice of:

- adding the extra fat at the beginning, with then expresses the properties of all fats used in the final product; or
- adding the extra fat after the reaction is complete (but before the soap solidifies), to express only the properties of the added fat.

Alkali:

While there are other alkalis that could be used, for home recipes, bar soap requires sodium hydroxide (NaOH, or lye), and liquid soap requires potassium hydroxide (KOH). Because lye is a major ingredient in the manufacture of methamphetamine, commercial drain-cleaning lyes such as Red Devil no longer use real lye in their formulas. These commercial lyes WILL NOT WORK for making soap. Therefore you have to scout around for real lye; several sources are available on the internet; you may also be able to purchase it from a local pharmacy.

Several calculators for determining the amount of alkali are available on the web, if you don't want to go to the trouble of converting ounces to grams (and back again) and doing the reaction math. The Summer Bee Meadow website provides a simple calculator. Check out check out Candle and Soap by David Fisher for other calculators.

Important Note: ***Lye is highly caustic and may cause serious burns***. Please read the **safety precautions** included with each recipe (in the pdf file) very carefully.

Water:

It is important to use distilled water, because certain minerals in tap water (such as calcium or magnesium) can form insoluble salts with the soap, which will then precipitate out (think bath tub ring).

Sources:
1. http://www.cleaning101.com/sdalatest/html/soapchemistry1.htm
2. http://www.cleaning101.com/sdalatest/html/soapchemistry2.htm
3. http://candleandsoap.about.com/od/soaprecipes/a/castrecipe.htm (see recipes 1, 2, 3, and 4)
4. http://millersoap.com/castile.html#FavCastile
5. http://www.associatedcontent.com/article/208664/homemade_skin_care_recipes_liquid_castile.html
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7. http://candleandsoap.about.com/od/liquidsoap/ss/basicliquidsoap.htm