Making soap

With practice, making your own soap with locally available materials is not difficult, although there are some hazards that you must take care to avoid. Washing hands with soap and water is a very healthy practice (See Action Sheet 27), so making sure that soap is available for your institution or community is an important service. If you can sell the soap you make, this could also turn into a business opportunity.

How do you make soap?

Basic ingredients. To make 4 kilos of soap you will need:

- Oil or fat — 3 litres (13 cups) of oil or 2.75 kilos (6 pounds) of hard fat. Different oils and fats will give different results. The best way to know what fat or oil to use is to experiment with what is available.
- Lye — 370 grams (13 ounces). Lye is also called caustic soda or sodium hydroxide. It can be bought from pharmacies in larger towns or made (see below).
- Water — 1.2 litres (5 cups). It must be “soft” water, such as rain or spring water. To “soften” hard water (well or river water), add ? teaspoon of lye for each liter of water. Stir and let sit for a few days. Solids will sink to the bottom. Pour off the softened water for use.

Using dirty or rancid fat

Fresh oil or fat is costly. Dirty oil or rancid fat (tallow) can be used to make soap, but must be cleaned first. To clean, melt oil or fat in an equal amount of water and bring to a boil. Let it cool, and skim off the oil or fat. If it still smells bad, do it again with new water. If the oil or fat has dirt in it, melt it and pour it through a fine cloth until it is clean.

Perfume

Perfume or essential oils give soap an attractive scent. For 4 kilos of soap, use one of the following: 4 teaspoons of sassafras oil, 2 teaspoons of citronella or lavender oil, or 1 teaspoon of clove or lemon oil. For soap that promotes healthy skin, add 1 or 2 teaspoons of oil of neem, moringa, jatropha, or baobab.

Equipment

- 2 large pots, bowls, or buckets made of stainless steel, fired clay, or cast iron. Do not use equipment
  made from aluminum because the lye will damage it.
- A bowl or other clean container big enough to hold all the fat.
- Wooden spoons or stirring sticks.
- Measuring cups.
- An accurate weighing scale (lye is measured by weight).
- Molds: the best molds are shallow wooden boxes that have no openings on the bottom or sides but are open on the top and can be pulled apart gently. Molds can also be made from small gourds or coconut shells.
- Use cloth or waxed paper to line the molds so that soap can be easily removed.

Caution!
Lyes are extremely caustic. They cause burns if splashed on the skin and can cause blindness if splashed in the eye. If drunk, they can be fatal.

Care is needed when handling lyes and 'green' (uncured) soap. Details of the precautions that should be taken are given below.

Because of these dangers, keep small children away from the processing room while soap is being made.

Recipe

1. Add lye to water – never the other way around. The mixture will heat up. Let it cool to body temperature. Do not put fingers in the solution or it will burn. To test the temperature, feel the outside of the container.
2. Melt any solid fat in the oil/fat mixture.
3. Pour the lye water slowly into the oil/fat mixture, stirring it constantly in one direction. Then add perfume or essential oil. The mixture must be stirred for at least half an hour after all the lye has been added. The mixture should become thicker. When the spoon causes lines to appear on top of the thick solution, it is ready to pour in the molds.
4. Pour the mixture into lined molds and leave to set undisturbed for 2 days. If it has not set or if it has grease on top, leave it longer.
5. When the soap has set, remove it from the molds and cut it into bars using a knife or a wire.
6. Stack the bars on trays and let them sit for 4 to 6 weeks. Do not use the soap too soon – it still burns!
7. When the soap is finished, you can shave it from the bar in curls. Touch the soap to the tip of your tongue to check its quality. If it has a slight bite or burn, it is good. Cover the soap so it does not lose moisture.

Problem solving
If your soap is very sharp and burns, there is too much lye. If it has no bite, there is not enough lye. If the soap you made was not successful, it may have been because:

- The fat or oil was rancid or dirty and not cleaned enough.
- The lye water was too hot or too cold when it was poured into the oil/fat mixture.
- The mixture was stirred too fast or not long enough.

If the soap is not good, try again. Using gloves to touch the soap, cut it into bits. Put it in a pot with 12 cups (2.8 litres) of water. Bring it slowly to a boil. Boil for 10 minutes, stirring at times. If the soap had too little lye (no bite at all), add a small amount of lye. If the soap had too much lye (sharp bite), add some pre-boiled, strained and cooled fat. Stir until the spoon causes lines to appear on top of the thick solution. Pour into molds. Let stand 48 hours. Cut into bars, stack the bars on trays and let them sit for 4 to 6 weeks.

What safety precautions do you need to take when using lye?

- Lye can burn the skin and eyes. To be safe, it must combine with the fat and set for several weeks.
- While making soap, wear safety glasses, long rubber gloves, clothes that cover the arms and legs, and closed shoes.
- Lye is poisonous if drunk

Safety precautions continued.

- Keep small children away from the soap-making room.
- When lye is added to water the chemical reaction quickly heats the water.
- Add lye to water – never the other way round or it may react violently and splash over you.
- Never add lye to hot water because it can boil over a scald your skin.
- Lyes produce harmful fumes, so stand back and avert your head when the lye is dissolving.
- If lye splashes on to the skin or into your eyes, wash it off immediately with plenty of cold water, then put on citrus juice or vinegar to cool and disinfect the burn.

We can't find any lye for sale. Can we make it ourselves?

Yes, you can. If commercial lyes that can be bought in tins from pharmacies in larger towns are not available or affordable, lye can also be made from ashes. Fit a tap near to the bottom of a large (e.g. 250 litre) plastic or wooden barrel/tub. Do not use aluminium because the lye will corrode it and the soap will be contaminated. Make a filter inside, around the tap hole, using several bricks or stones covered with straw. Fill the tub with ashes and pour boiling water over them until water begins to run from the tap. Then shut the tap and let the ashes soak. The ashes will settle to less than one quarter of their original volume, and as they settle, add more ashes until the tub is full again. Ashes from any burned plant material are suitable, but those from banana leaf/stem make the strongest lye, and those from apple wood make the whitest soap.

If a big barrel is not available, or smaller amounts of soap are to be made, a porcelain bowl or plastic bucket can be used. Fill the bucket with ashes and add boiling water, stirring to wet the ashes. Add more ashes to fill the bucket to the top, add more water and stir again. Let them stand for 12 - 24 hours, or until the liquid is clear, then carefully pour off the clear lye.

The longer the water stands before being drawn off, the stronger the lye will be. Usually a few hours will be enough. Lye that is able to cause a fresh egg to float can be used as a standard strength for soap-making. The strength of the lye does not need to always be the same, because it combines with the fat in a fixed proportion. If a weak lye is used, more lye can be added during the process until all the fat has combined with the lye to make soap.

Most commercial lyes are caustic soda, and these can be bought and substituted for homemade lye to save time. They are supplied in tins and the lids should be kept tightly fitted to stop the lye absorbing water from the air and forming a solid lump.

You can also make caustic soda by mixing 1 part quicklime (baked ground limestone) with 3 parts water to make a liquid that has the consistency of cream. Then dissolve 3 parts sal soda (hydrated sodium carbonate) in 5 parts boiling water, and add the lime cream, stirring vigorously. Keep the mixture boiling until the ingredients are thoroughly mixed. Allow it to cool and settle, and pour off the lye. Discard the dregs in the bottom. Caustic soda (which is just soda lye evaporated to a powder) is produced by boiling down the lye until the water is evaporated and a dry, white residue is left in the kettle.

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For more information

Contact = CAWST Centre for Affordable Water and Sanitation Technology www.cawst.org or Practical Action

Resources

Practical Action Technical Brief on Soap-Making www.itdg.org/docs/technical_information_service/soapmaking.pdf for many more recipes and ideas if you plan to go into the soap-making business.

Practical Action Technical Brief on Oil Extraction

Small-scale Soapmaking: A handbook, by Peter Donker, IT Publishing/TCC, 1993.

Soap Production – Technologies Series Guide No 3 , Centre for the Development of Enterprise, Brussels, 1994.

Essentially Soap (2000) by Robert McDaniel

'The Soapmaker's Companion - a comprehensive guide with recipes, techniques and know-how' (1997) by Susan Miller Cavitch

The Handmade Soap Book (1998) by Melinda Coss and Emma Peios,

www.amazon.com has books on soapmaking for sale

www.colebrothers.com/soap has a variety of free information, including recipes, safety considerations, ingredient suppliers, soapmaking methods and the properties of soapmaking oils, with links to many other soapmaking websites.

www.auntieclaras.com/2018/09/lye-calculation-tutorial/ has a tutorial on understanding the soap making process.

www.soapbasics.co.uk contains details of products such as essential oils and plant extracts for use in soaps, soap molds, dyes and packaging.

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