wish, you can add **10ml** (2 teaspoons) of wintergreen, lemon, or other oil at this stage for perfume. Pour into a mold box, let stand **48** hours, and follow the procedure below.

Empty the soap from the box and cut it into bars with a string or **wire** (see Figure 2). Place the bars in an open stack so that air can circulate around and through them (see Figure 3). Leave them in a warm, dry place for 2 to 4 weeks.

References:


Donkor, Peter, *Small-Scale Soapmaking.* London: Intermediate Technology Development Group, **1986**


**SOFT SOAP WITH LYE LEACHED FROM ASHES**

This method, patterned after one used by the early settlers of North America, produces soft soap by combining fat and potash (lye obtained by leaching wood or plant ashes.) The recipe has been tried successfully with waste cooking grease, olive oil, peanut oil, and cocoa butter.

**Leaching the Lye**

**Tools and Ingredients**

Several medium sized rocks
A flat stone with a groove and a run-off lip chipped into it.
**19-liter** (5-gallon) wooden bucket with several small holes in the bottom. A hollowed log with the same capacity can be used.
Collection vessels for the lye. These should be made of iron, steel, enamel, or clay. An **aluminum** vessel should not be used, since lye would corrode it.
Small twigs, straw
19 liters (5 gallons) of wood ashes. The ashes may be from all types of woods. Ashes from hardwoods yield the best lye, but ashes from the burning of plants and leaves of trees may be used (see Table 1). Ashes of burnt seaweed are particularly useful, because they produce a sodium-based lye from which hard soap can be made. Lye hacked from the ashes of plant life (excepting seaweed) is potash or potassium carbonate (K₂CO₃), an alkali. This alkali reacts with fat to form soft soap. Ashes from other materials such as paper, cloth, or garbage cannot be used.

7.6 liters (2 gallons) of soft or medium-hard water.

Pile the rocks so that the flat, grooved stone rests evenly on top (see Figure 5). Set the wooden bucket on this stone.

In the bottom of the bucket, make a filter to trap the ashes by crisscrossing two layers of small twigs and placing a layer of straw on top (see Figure 6).

Fill the bucket with dry ashes. To keep the lye from being leached accidentally, the ashes must be kept dry before they are used.

Pour warm water into the bucket, making the ashes moist and sticky. To make sure that the water passes through the ashes at the correct rate for leaching the lye, move the ashes up at the sides of the bucket to form a depression in the center.

Add all the remaining water in small amounts in the following manner: Fill the center depression with water; let the water be absorbed, till the depression again. When about two-thirds of the water has been added, the lye or potash, a brown liquid, will start to flow from the bottom of the bucket. Use more water, if necessary, to start this flow. The lye flows over the flat stone into the groove and then into the collection vessel below the run-off lip. It takes about an hour to start the flow of lye.

The yield from the amounts given here is about 1.8 liter (7 3/4 cups) lye. The results vary according to the amount of water loss from evaporation and the kind of ashes used.

If the lye is of the correct strength, an egg or potato should float in it. A chicken feather dipped in the solution should be coated, but not eaten away. If
The solution is weak, pour it through the barrel again, or through a new barrel of ashes, or concentrate it by boiling. Thirty-five liters of ashes is about the right amount for 2 kilograms of fat (a bushel of ashes for 4 pounds of fat). This proportion is cited in soap-making recipes of the colonial period in the United States, but many of the recipes of that era differ on the proportion of ashes to fat.

Here is a list of tropical plants whose leaf ashes yield lye for soap making:

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Prominent location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrocnemum indicum</td>
<td>mangrove</td>
<td>Indian coast</td>
</tr>
<tr>
<td>Atriplex repers</td>
<td>salt bush</td>
<td>Indian coast</td>
</tr>
<tr>
<td>Avicennia nitida</td>
<td>mangrove</td>
<td>Philippino swamps</td>
</tr>
<tr>
<td>Cocos nucifera</td>
<td>coconut palm</td>
<td>Coasts of all tropical regions</td>
</tr>
<tr>
<td>Halocharis violacea</td>
<td>camel food</td>
<td>Indian coast</td>
</tr>
<tr>
<td>Haloxylon recurv</td>
<td></td>
<td>Indian coast</td>
</tr>
<tr>
<td>Haloxylon multiflum</td>
<td></td>
<td>Indian coast</td>
</tr>
<tr>
<td>Haloxylon salicornicum</td>
<td></td>
<td>Indian coast</td>
</tr>
<tr>
<td>Kochia indica</td>
<td></td>
<td>Indian coast</td>
</tr>
<tr>
<td>Salicornia brachiata</td>
<td></td>
<td>Indian coast</td>
</tr>
<tr>
<td>Salsola foetida</td>
<td>Aden balsam</td>
<td>Indian coast</td>
</tr>
<tr>
<td>Suaeda frutcosa</td>
<td></td>
<td>Indian coast</td>
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<tr>
<td>Suaeda monoica</td>
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<td>Indian coast</td>
</tr>
<tr>
<td>Suaeda maritima</td>
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<td>Indian coast</td>
</tr>
<tr>
<td>Suaeda nudiflora</td>
<td></td>
<td>Indian coast</td>
</tr>
</tbody>
</table>

**Making the Soap**

**Equipment and Materials**

- Iron kettle
- Wooden spoon or stick for stirring
- Measuring vessels
- Wooden, steel, iron, glass, or clay vessels for storing the soap
- Clarified fat (see the entry on Soap Making with Commercial Lye for **cleaning process**)
Lye that floats an egg or potato (see Figure 7)

Put 115ml (1/2 cup) of lye in the kettle for every 230ml (1 cup) of fats or oils.

Add the measured amount of fat.

Boil the lye and fat together until the mixture becomes thick, rubbery, and foamy.

Remove the kettle from the stove and let it cool.

The soap is a thick jelly substance that ranges in color from tan to dark brown depending on the fats or oils used and the length of boiling time.

Upon strong mixing in water, the soap will lather up into white suds and serve as an effective cleaning agent. This soap greatly improves with age. Store it in a container for at least a month before using it.

230ml (1 cup) of fat yields 230ml (1 cup) of soft soap.

Sources:

Marietta Ellis, VITA Volunteer, Bedford, Massachusetts
Dr. S. K. Barat, VITA Volunteer, Adyar, Madras, India


**LARGER-SCALE SOAP PRODUCTION**

In many areas in developing countries soap-making can be an important small business, providing a needed product and earning income with minimal investment. The Intermediate Technology Development Group, for example, has worked with the University of Science and Technology in Ghana to develop equipment for small manufacturing operations. One such set up uses specially made tanks heated by wood fires. The diagrams below show the parts for the tank. Soap-making processes are the same as those described above. Recipe quantities change according to the amount of soap produced. For example, one small manufacturer in Brazil supplied the following recipe for 45 kgs (100 lbs):

- 10 kgs tallow
- 2 kgs lye
- 2 kgs rosin
- 36 liters water