SOAP AND DETERGENTS PART II

Reference: S.B. Srivastava. Soap Detergent and Perfume Industries. Delhi: Small Industry Research Institute

Solid soap (bars) manufacturing

- There are two basic ways to make solid bar soap; hot process and cold process. The difference include using external heat, the time it takes to saponify, curing time and the finish of the soap.

Cold process

Process and saponification time:

- Cold process soaps uses the exothermic heat reaction that is created from the acid and base reaction of the fatty acids (soap making oils) and the lye (NaOH) solution.

Curing time:

- Soaps made using the cold process method take about three to four weeks to cure.

Cold process

Manufacturing:

- Measure the amount of oils that you want to use.
- Calculate the average molecular weight of fats or oils that you want to use.

  Mwt Fatty acid = 56.1 x 1000 / AV

- Calculate the amount of lye you required.

  NaOH = [Weight fatty acid x 40] / Mwt Fatty acid

- Excess unreacted lye in the soap will result in a very high pH and can burn or irritate skin; not enough lye leaves the soap greasy.
- You can use this recipe (from experience)

  7 parts oil : 2 parts water: 1 part NaOH

Cold process

- Slowly pour the lye into the water. Stir with wooden spoon until lye is dissolved.
- Let the lye solution to cool and reach room temperature.
- Check to make sure lye mixture and oil mixture are within five degrees of each other.
- Combine the sodium hydroxide solution and oils. Stir the mixture until it starts to harden (about 15-20 minutes). At this point (when it starts to harden) you can add any ‘essential oil’ ingredients to scent your soap.

Cold process

- Mix until soap traces. Soap reaches trace when it thickens sufficiently that you can turn off the blender and see ripples across the top of the soap.
- Pour the soap into the mold you have selected. (silicon or wood molds).
- After 24 hrs, take your soap out of the molds.
- Once unmolded and sliced it can take from 4 weeks until the soap has "cured“.

Soap trace

Final product

Cold process

- Different oil blends completely change the properties of the finished soap bar (bubbly vs. creamy lather or gentle versus a more cleansing bar).
- A natural by-product of cold process soap making is glycerin.
- Glycerin molecules are leftover when the fatty acids react and combine to the lye molecules.
- Cold process soap retains all of its natural glycerin, while in hot process glycerin could be removed from soaps and sold out for cosmetics and pharmaceutical products.

Cold process

Recipes:

Recipe I	Recipe II	Recipe II	Recipe III
Lye Water Solution 12.18 oz. Lye 27.39 oz. Water **Oil Mixture** 30 oz. Olive oil 20 oz. Coconut oil 15 oz. Crisco 14 oz. Palm Oil 4 oz. Caster Oil	**Lye Water Solution** 4.02 oz. Lye 9.24 oz. Rosewater **Oil Mixture** 16 oz. Olive oil 5 oz. Palm oil 5 oz. Coconut oil 2 oz. Caster 0il **Essential Oil** 0.5 oz. Rose Essential Oil	**Lye Water Solution** 3.81 oz. Lye 8.91 oz. Water **Oil Mixture** 11 oz. Olive oil 6 oz. Coconut oil 6 oz. Palm oil 2 oz. Jojoba oil 2 oz. Caster oil **Essential Oil** 0.5 oz. Lavender essential oil	**Lye Water Solution** 100 g Lye 200 g Water **Oil Mixture** 700 g Olive oil

1 ounce (oz.) = 28.35 grams

Hot process

Process and saponification time:

- With hot process soap making an external heat source is used to accelerate saponification. The external heat source can be a crock pot, a double boiler or the oven. Saponification will be complete in approximately 2 hours.

Curing time :

- In hot process method one week of cure time is sufficient.

Hot process

Manufacturing

- Melt the oils in the crockpot (water bath).
- Once the fat is nearly all melted, carefully measure the lye.
- Carefully stir the lye into the measured water. ALWAYS add the lye to the water.
- Stir this lye/water mixture until it has dissolved and let it sit for a few minutes. There will be a chemical reaction between the lye and water, and the water will become very hot, so be careful handling the container.

Hot process

- Slowly stir the lye/water mixture with oils in the crockpot (water bath). It is recommend keep your oils and lye solution on *below 65° C*.
- Use the *immersion blender to mix the soap mixture*, and proceed to blend the fat, lye, and water until you reach trace.
- Trace is when the mixture turns to a pudding-like consistency and holds its shape when you drip a bit on top.

Soap trace

Hot process

- Allow it to cook for 45-60 minutes. It will bubble and froth, which is fine.
- Once the 50 minutes has passed, it's time to test the soap to make sure the lye has reacted with the oils completely and no longer remains in the mixture.
- You can test the soap by pH paper.
- If you want to add any fragrance or additives, you will let the soap cool down before adding them. If you add a fragrance to soap that it is too hot, it can vaporize and your soap won't have as much scent

Hot process

- Pour the soap into the mold you have selected. (silicon or wood molds).
- After 24 hrs, take your soap out of the molds.
- Once unmolded and sliced it can take from one weeks until the soap has "cured“.

Hot process

Recipes:

Recipe I	Recipe II
Oil Mixture 36 oz. olive oil 6 oz. coconut oil 3 oz. castor oil **Lye Water Solution** 6 oz. lye 12 oz. water 2-4 oz. essential oil (Optional)	**Oil Mixture** 10 oz olive oil. 20 oz coconut oil. **Lye Water Solution** 9 oz distilled water. 4.78 oz 100% pure lye. Essential oils (optional)

1 ounce (oz.) = 28.35 grams