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The Art and Science of Soapmaking

Marie Gale

Soapmaking is an age-old process that can be done in many different ways. Just like with great chefs, if you ask twenty different Soapmakers how to make soap, you'll get twenty different and passionate answers. Different answers on processes, ingredients and methods, but the basic fact is that soapmaking is all one simple chemical process, regardless of which process you use.

The Science

Technically, true soap is "the result of a reaction between fatty acids and an alkali". That reaction is called "saponification". Fatty acids are found in animal and vegetable fats and oils; an alkali (for soap purposes) is lye. So basically, when animal or vegetable fats or oils (not petroleum based oils) are mixed with lye, the result is soap.

The most commonly used lye is sodium hydroxide (NaOH), which produces a hard bar of soap. Potassium hydroxide (KOH) can also be used, but is used to create softer or liquid soap. Any animal or vegetable fat will work in the saponification process, but requires a slightly different amount of lye to turn it into soap. That value is known as the "saponification value".

In practical application, there are a few other aspects of the process. The oils and fats need to be melted so they are liquid and the lye needs to be dissolved in water so it can be mixed in. While the mixing is occurring the lye combines with the fatty acids making soap, and the water combines with glycerin (found in the oils and fats). So, in the final analysis a bar of "natural" or "true" soap contains soap, water and glycerin.

In commercial soaps, the glycerin is usually removed, and then refined and sold for use in foods, pharmaceuticals and even explosives. Handcrafted soapmakers don't have the facility to remove the glycerin (and don't want to), so handcrafted soaps retain the glycerin, making them more moisturizing and better for your skin.

The Art of Soapmaking

The true art of soap making is how to create a bar of soap that is tantalizing and pleasing to the senses - and to do it within the constraints of the science and chemistry of the process.

The selection of oils and the amount of each is part of the art. Each oil brings a different quality to the finished soap. For example, olive oil creates a stable lather, coconut oil creates a fluffy lather and palm oil creates a hard bar.

In creating a soap recipe it is important to ensure that the right amount of lye is used for the type and amount of oil - otherwise you could end up with soap that is too alkaline (which will burn when used) or one that has too much unsaponified oil (which will go rancid after time). There are "lye calculators" available on-line which will calculate the amount of lye and water needed for a specific combination of oils. (See www.soapguild.org/calculator).

Color

Colors, both natural pigments and synthetic dyes can be used to change the color of the soap (which is usually pale cream to medium tan). In addition, some other additives such as herbs and spices) will affect the color of the soap. Frequently colors are solid through the whole bar, but beautiful effects can be created with layering, swirls and embeds - or a combination of all three.

Balancing the desired artistic effect with the chemistry of the soap is sometimes a challenge. Because the colorants are added to the soap while a chemical reaction is taking place, sometimes unusual results can occur. Beetroot powder, for example, will turn most things a beautiful pink - but not soap. Added to the soap mixture, it turns brown! Blue dye turns pink. Researching and learning what colors will and won't work is one of the challenges of handcrafted soapmaking.

Scent

Scent, of course, is a major factor in creating a pleasing soap. Almost everyone who buys a bar of

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soap first picks it up to see how it smells! Scents generally come from essential oils (natural, plant-based), fragrance oils (synthetic based) or a combination of the two. There is another category of fragrances coming onto the market which is called “natural sourced” or “botanically based.” Those are fragrances that are blended from chemical parts of essential oils, not the whole thing.

Most essential oils and fragrance oils will work in handcrafted soap. Some essential oils, such as clove and cassia, have constituents that will speed up the soapmaking process making them difficult, but not impossible, to work with. Other essential oils, particularly those with mostly high notes in the fragrance tend to lose some of the scent in the soapmaking process and may require more oil in the recipe. Most essential oils, however, work fine in handcrafted soap and the fragrance and qualities carry through into the finished bar of soap.

Additives

Other ingredients can be added to the soap to create special effects or qualities in the soap.

For exfoliation, cornmeal, oatmeal, pumice powder or various seeds can be used. Clays or some vegetable starches can be added to change the consistency or feel of the soap. Salt or sugar can also be added to the soap, although sometimes they can change the chemistry depending on what kind and how much is used.

The visual aspect of the soap can also be changed with the addition of herbs, spices or other botanicals. They can sometimes change the color overall, but often create pleasant visuals when added to the soap batch or sprinkled on the top of the soap.

The Process

The most common way to make handcrafted soap is called the **cold process** method. It's call “cold” process because no heat is used to cook the soap

once it is mixed. In essence, the lye is dissolved into the water (it gets very hot!), the lye solution is cooled and then added to the melted oils and all are mixed until it is the consistency of thin cake batter – a state called “trace”.

During the process several interesting things happen. First, the reaction that takes place causes heat, so the soap pot will tend to get pretty warm all on its own. Second, the mixture goes from being completely liquid to getting thicker and thicker.

While it's still pourable, the soap needs to be poured into a mold. Individual soap molds are available in a wide variety of shapes and sizes. Alternatively, the entire batch can be poured into a mold that is cut into bars after the soap hardens.

The chemical reaction continues in the soap for a while after it's poured into the mold. It might hotter for a little bit and then will finally cool down, indicating that the process is complete (usually 24 - 48 hours). At that time it will still be a little soft, because it contains extra water (which was needed in the beginning for the chemical process).

After the soap comes out of the mold(s) and is cut to the right size, it needs to be cured for 2 - 8 weeks. During that time the extra water evaporates out and the bars gradually get harder and harder. Actually, the soap will continue to get harder as water evaporates for the next several months, but the bar is useable within about 4 weeks.

The result is a beautiful, hard bar of soap, colored and scented with the unique artistry of the soapmaker. It's like magic, every time!

Marie Gale has been a soapmaker for 10 years, creating unique soaps and body care products. She is the owner of Chandler's Soaps (www.chandlerssoaps.com) and the President of the Handcrafted Soap Makers Guild (www.soapguild.org). For more information, see her personal website www.MarieGale.com.