

# Liquid soap essay



**ASSIGN  
BUSTER**

[pic] Soap From Wikipedia, the free encyclopedia Jump to: navigation, search  
For other uses, see Soap (disambiguation). [pic] [pic] A collection of decorative soaps, often found in hotels [pic] [pic] Two equivalent images of the chemical structure of sodium stearate, a typical soap. In chemistry, soap is a salt of a fatty acid. [1] Soaps are mainly used as surfactants for washing, bathing, and cleaning, but they are also used in textile spinning and are important components of lubricants. Soaps for cleansing are obtained by treating vegetable or animal oils and fats with a strongly alkaline solution.

Fats and oils are composed of triglycerides; three molecules of fatty acids are attached to a single molecule of glycerol. [2] The alkaline solution, which is often called lye, (although the term “ lye soap” refers almost exclusively to soaps made with sodium hydroxide) brings about a chemical reaction known as saponification. In saponification, the fats are first hydrolyzed into free fatty acids, which then combine with the alkali to form crude soap. Glycerol (glycerine) is liberated and is either left in or washed out and recovered as a useful byproduct, depending on the process employed. 2] Soaps are key components of most lubricating greases, which are usually emulsions of calcium soap or lithium soaps and mineral oil. These calcium- and lithium-based greases are widely used. Many other metallic soaps are also useful, including those of aluminium, sodium, and mixtures of them. Such soaps are also used as thickeners to increase the viscosity of oils. In ancient times, lubricating greases were made by the addition of lime to olive oil. [3] |  
Contents | | 1 Mechanism of cleansing soaps | 1. 1 Accumulation of dust on fabrics | | 1. 2 Action of soap | | 1. 3 Effect of the alkali | | 1. 4 Effects of fats | | 2 History of cleansing soaps | | 2. 1 Early history | | 2. 2 Roman history | | 2.

Islamic history | | 2. 4 Medieval history | | 2. 5 15th–19th centuries | | 3 Liquid soap | | 4 Soap-making processes | | 4. 1 Cold process | | 4. 1. 1 Hot processes | | 4. 1. 2 Molds | | 4. Purification and finishing | | 5 See also | | 6 References | | 7 Further reading | | 8 External links | Mechanism of cleansing soaps [pic] [pic] Structure of a micelle, a cell-like structure formed by the aggregation of soap subunits (such as sodium stearate): The exterior of the micelle is hydrophilic (attracted to water) and the interior is lipophilic (attracted to oils).

Accumulation of dust on fabrics When we wear clothes and as a result of our physical movement, frictional force is applied to the cloth surface and the cloth fibres become charged. This is so because during the moving process, either electrons from the cloth shift to our body or some electrons get shifted from our body to the clothes. In either case, the clothes become charged and this charge produces an electric field which polarizes dust particles near it and the particles are then attracted to the charged cloth. [4] Action of soap When used for cleaning, soap serves as a surfactant in conjunction (and also a base) with water.

The cleaning action of this mixture is attributed to the action of micelles, tiny spheres coated on the outside with polar hydrophilic (water-loving) groups, encasing a lipophilic (fat-loving) pocket that can surround the grease particles, causing them to disperse in water. The lipophilic portion is made up of the long hydrocarbon chain from the fatty acid. Whereas oil and water normally do not mix, the addition of soap allows oils to disperse in water and be rinsed away. Synthetic detergents operate by similar mechanisms to soap. Effect of the alkali

The type of alkali metal used determines the kind of soap produced. Sodium soaps, prepared from sodium hydroxide, are firm, whereas potassium soaps, derived from potassium hydroxide, are softer or often liquid. Historically, potassium hydroxide was extracted from the ashes of bracken or other plants. Lithium soaps also tend to be hard—these are used exclusively in greases. Effects of fats See also: Total fatty matter Soaps are derivatives of fatty acids. Traditionally they have been made from triglycerides (oils and fats). [5] Triglyceride is the chemical name for the triesters of fatty acids and glycerin.

Tallow, i. e. , rendered beef fat, is the most available triglyceride from animals. Its saponified product is called sodium tallowate. Typical vegetable oils used in soap making are palm oil, coconut oil, olive oil, and laurel oil.

Each species offers quite different fatty acid content and, hence, results in soaps of distinct feel. The seed oils give softer but milder soaps. Soap made from pure olive oil is sometimes called Castile soap or Marseille soap, and is reputed for being extra mild. The term “ Castile” is also sometimes applied

to soaps from a mixture of oils, but a high percentage of olive oil. Fatty acid content of various fats used for soapmaking | | | Lauric acid | Myristic acid| Palmitic acid| Stearic acid | Oleic acid | Linoleic acid | Linolenic acid | | fats | C12 saturated| C14 saturated| C16 saturated| C18 saturated| C18

monounsaturated | C18 diunsaturated | C18 triunsaturated | | Tallow | 0 | 4 | 28 | 23 | 35 | 2 | 1 | | Coconut oil| 48 | 18 | 9 | 3 | 7 | 2 | 0 | | Palm kernel| 46 | 16 | 8 | 3 | 12 | 2 | 0 | | oil | | | | | | | | | Laurel oil | 54 | 0 | 0 | 0 | 15 | 17 | 0 | | Olive oil | 0 | 0 | 11 | 2 | 78 | 10 | 0 | | Canola | 0 | 1 | 3 | 2 | 58 | 9 | 23 |

History of cleansing soaps Early history [pic] [pic]

Box for Amigo de Obrero (Worker's Friend) soap from the 20th century, part of the Museo del Objeto del Objeto collection The earliest recorded evidence of the production of soap-like materials dates back to around 2800 BC in ancient Babylon. [6] A formula for soap consisting of water, alkali, and cassia oil was written on a Babylonian clay tablet around 2200 BC. The Ebers papyrus (Egypt, 1550 BC) indicates the ancient Egyptians bathed regularly and combined animal and vegetable oils with alkaline salts to create a soap-like substance. Egyptian documents mention a soap-like substance was used in the preparation of wool for weaving. [citation needed] In the reign of Nabonidus (556–539 BC), a recipe for soap consisted of uhulu [ashes], cypress [oil] and sesame [seed oil] “ for washing the stones for the servant girls”. [7] Roman history

The word *sapo*, Latin for soap, first appears in Pliny the Elder's *Historia Naturalis*, which discusses the manufacture of soap from tallow and ashes, but the only use he mentions for it is as a pomade for hair; he mentions rather disapprovingly that the men of the Gauls and Germans were more likely to use it than their female counterparts. [8] Aretaeus of Cappadocia, writing in the first century AD, observes among “ Celts, which are men called Gauls, those alkaline substances that are made into balls, called soap”. [9] A popular belief claims soap takes its name from a supposed Mount Sapo, where animal sacrifices were supposed to have taken place; tallow from these sacrifices would then have mixed with ashes from fires associated with these sacrifices and with water to produce soap, but there is no evidence of a Mount Sapo in the Roman world and no evidence for the apocryphal story.

The Latin word *sapo* simply means “ soap”; it was likely borrowed from an early Germanic language and is cognate with Latin *sebum*, “ tallow”, which appears in Pliny the Elder’s account. [10] Roman animal sacrifices usually burned only the bones and inedible entrails of the sacrificed animals; edible meat and fat from the sacrifices were taken by the humans rather than the gods. Zosimos of Panopolis, circa 300 AD, describes soap and soapmaking. [11] Galen describes soap-making using lye and prescribes washing to carry away impurities from the body and clothes. According to Galen, the best soaps were Germanic, and soaps from Gaul were second best. This is a reference to true soap in antiquity. [11] Islamic history A 12th century Islamic document describes the process of soap production. [12]

It mentions the key ingredient, alkali, which later becomes crucial to modern chemistry, derived from *al-qaly* or “ ashes”. By the 13th century, the manufacture of soap in the Islamic world had become virtually industrialized, with sources in Nablus, Fes, Damascus, and Aleppo. [citation needed]

Medieval history Soapmakers in Naples were members of a guild in the late sixth century,[13] and in the eighth century, soap-making was well known in Italy and Spain. [14] The Carolingian capitulary *De Villis*, dating to around 800, representing the royal will of Charlemagne, mentions soap as being one of the products the stewards of royal estates are to tally.

Soapmaking is mentioned both as “ women’s work” and as the produce of “ good workmen” alongside other necessities such as the produce of carpenters, blacksmiths, and bakers. [15] 15th–19th centuries [pic] [pic] Ad for Pear’ Soap, 1889 [pic] [pic] A 1922 magazine advertisement for Palmolive Soap [pic] [pic] Liquid soap [pic] [pic] Manufacturing process of

soaps/detergents In France, by the second half of the 15th century, the semi-industrialized professional manufacture of soap was concentrated in a few centers of Provence— Toulon, Hyeres, and Marseille — which supplied the rest of France. [16] In Marseilles, by 1525, production was concentrated in at least two factories, and soap production at Marseille tended to eclipse the other Provencal centers. [17] English manufacture tended to concentrate in London. [18] Finer soaps were later produced in Europe from the 16th century, using vegetable oils (such as olive oil) as opposed to animal fats. Many of these soaps are still produced, both industrially and by small-scale artisans. Castile soap is a popular example of the vegetable-only soaps derived by the oldest “ white soap” of Italy. In modern times, the use of soap has become universal in industrialized nations due to a better understanding of the role of hygiene in reducing the population size of pathogenic microorganisms.

Industrially manufactured bar soaps first became available in the late 18th century, as advertising campaigns in Europe and the United States promoted popular awareness of the relationship between cleanliness and health. [19] Until the Industrial Revolution, soapmaking was conducted on a small scale and the product was rough. Andrew Pears started making a high-quality, transparent soap in 1789 in London. His son-in-law, Thomas J. Barratt, opened a factory in Isleworth in 1862. William Gossage produced low-priced, good-quality soap from the 1850s. Robert Spear Hudson began manufacturing a soap powder in 1837, initially by grinding the soap with a mortar and pestle. American manufacturer Benjamin T. Babbitt introduced

marketing innovations that included sale of bar soap and distribution of product samples.

William Hesketh Lever and his brother, James, bought a small soap works in Warrington in 1886 and founded what is still one of the largest soap businesses, formerly called Lever Brothers and now called Unilever. These soap businesses were among the first to employ large-scale advertising campaigns. Liquid soap See also: Detergent Liquid soap was not invented until the 1800s. In 1865, William Shepphard patented liquid soap. In 1898, B. J. Johnson developed a soap formula, and his company (the B. J. Johnson Soap Company) introduced Palmolive the same year. This new soap was made of palm and olive oils and became popular in a short amount of time; Palmolive became so popular that B. J. Johnson Soap Company changed its name to Palmolive. At the turn of the century, Palmolive was the world's best-selling soap. 20] In the early 1900s, other companies began to develop their own liquid soap. Products such as Pine-Sol and Tide appeared on the market, making the process of cleaning clothing, counters and bathrooms easier. As a detergent, liquid soap tends to be more effective than flake soap, and there is a smaller chance of residue being left on clothing with liquid soap. Liquid soap also works better for more traditional washing methods, such as using a washboard. [21] Soap-making processes The industrial production of soap involves continuous processes, such as continuous addition of fat and removal of product. Smaller-scale production involves the traditional batch processes.

The three variations are: the ' cold process', wherein the reaction takes place substantially at room temperature, the ' semiboiled' or ' hot process',



wherein the reaction takes place near the boiling point, and the ‘fully boiled process’, wherein the reactants are boiled at least once and the glycerol is recovered. There are two types of ‘semiboiled’ hot process methods. The first is the ITMHP (in the mold hot process) and the second is the CPHP (crockpot hot process). Typically soapmakers choose the hot process methods if they wish to remove the cure time to a three day air dry process. Most soapmakers, however, continue to prefer the cold process method. The cold process and hot process (semiboiled) are the simplest and typically used by small artisans and hobbyists producing handmade decorative soaps. The glycerine remains in the soap and the reaction continues for many days after the soap is poured into moulds.

The glycerine is left during the hot-process method, but at the high temperature employed, the reaction is practically completed in the kettle, before the soap is poured into moulds. This simple and quick process is employed in small factories all over the world. Handmade soap from the cold process also differs from industrially made soap in that an excess of fat is used, beyond that needed to consume the alkali (in a cold-pour process, this excess fat is called “superfatting”), and the glycerine left in acts as a moisturizing agent. However, the glycerine also makes the soap softer and less resistant to becoming “mushy” if left wet. Since it is better to add too much oil and have left-over fat, than to add too much lye and have left-over lye, soap produced from the hot process also contains left-over glycerine and its concomitant pros and cons. Further addition of glycerine and processing of this soap produces glycerin soap. Superfatted soap is more skin-friendly than one without extra fat. However, if too much fat is added, it can leave a “

greasy” feel to the skin. Sometimes, an emollient additive such as jojoba oil or shea butter is added “ at trace” (i. e. , the point at which the saponification process is sufficiently advanced that the soap has begun to thicken in the cold process method) in the belief that nearly all the lye will be spent and it will escape saponification and remain intact.

In the case of hot-process soap, an emollient may be added after the initial oils have saponified so they remain unreacted in the finished soap.

Superfatting can also be accomplished through a process known as “ lye discount” in which the soap maker uses less alkali than required instead of adding extra fats. Cold process Even in the cold soapmaking process, some heat is usually required; the temperature is usually raised to a point sufficient to ensure complete melting of the fat being used. The batch may also be kept warm for some time after mixing to ensure the alkali (hydroxide) is completely used up. This soap is safe to use after about 12-48 hours, but is not at its peak quality for use for several weeks.

Cold-process soapmaking requires exact measurements of lye and fat amounts and computing their ratio, using saponification charts to ensure the finished product does not contain any excess hydroxide or too much free unreacted fat. Saponification charts should also be used in hot processes, but are not necessary for the “ fully boiled hot-process” soaping. A cold-process soapmaker first looks up the saponification value of the fats being used on a saponification chart. This value is used to calculate the appropriate amount of lye. 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.

Most soap makers formulate their recipes with a 4–10% deficit of lye, so all of the lye is converted and excess fat is left for skin-conditioning benefits. The lye is dissolved in water. Then oils are heated, or melted if they are solid at room temperature. Once the oils are liquefied and the lye is fully dissolved in water, they are combined. This lye-fat mixture is mixed until the two phases (oils and water) are fully emulsified. Emulsification is most easily identified visually when the soap exhibits some level of “trace”, which is the thickening of the mixture. (Modern-day amateur soapmakers often use a stick blender to speed this process). There are varying levels of trace.

Depending on how additives will affect trace, they may be added at light trace, medium trace, or heavy trace. After much stirring, the mixture turns to the consistency of a thin pudding. “Trace” corresponds roughly to viscosity. Essential oils and fragrance oils can be added with the initial soaping oils, but solid additives such as botanicals, herbs, oatmeal, or other additives are most commonly added at light trace, just as the mixture starts to thicken.

[pic] [pic] Handmade soaps sold at a shop in Hyeres, France [pic] [pic]

Traditional Marseille soap The batch is then poured into moulds, kept warm with towels or blankets, and left to continue saponification for 12 to 48 hours. Milk soaps or other soaps with sugars added are the exception. They typically do not require insulation, as the presence of sugar increases the speed of the reaction and thus the production of heat. ) During this time, it is normal for the soap to go through a “gel phase”, wherein the opaque soap will turn somewhat transparent for several hours, before once again turning opaque. After the insulation period, the soap is firm enough to be removed from the mould and cut into bars. At this time, it is safe to use the soap,

since saponification is in essence complete. However, cold-process soaps are typically cured and hardened on a drying rack for 2–6 weeks before use.

During this cure period, trace amounts of residual lye are consumed by saponification and excess water evaporates. During the curing process, some molecules in the outer layer of the solid soap react with the carbon dioxide of the air and produce a dusty sheet of sodium carbonate. This reaction is more intense if the mass is exposed to wind or low temperatures.

Hot processes Hot-processed soaps are created by encouraging the saponification reaction by adding heat to speed up the reaction. Unlike cold-processed soap, in hot-process soaping, the oils are completely saponified by the end of the handling period, whereas with cold-pour soap, the bulk of the saponification happens after the oils and lye solution emulsification is poured into moulds.

In the hot process, the hydroxide and the fat are heated and mixed together at 80–100°C, a little below boiling point, until saponification is complete, which, before modern scientific equipment, the soapmaker determined by taste (the sharp, distinctive taste of the hydroxide disappears after it is saponified) or by eye; the experienced eye can tell when gel stage and full saponification has occurred. Beginners can find this information through research and classes. Tasting soap for readiness is not recommended, as sodium and potassium hydroxides, when not saponified, are highly caustic. An advantage of the fully boiled hot process in soapmaking is the exact amount of hydroxide required need not be known with great accuracy. They originated when the purity of the alkali hydroxides were unreliable, as these

processes can use even naturally found alkalis, such as wood ashes and potash deposits.

In the fully boiled process, the mix is actually boiled (100 °C+), and, after saponification has occurred, the “neat soap” is precipitated from the solution by adding common salt, and the excess liquid is drained off. This excess liquid carries away with it much of the impurities and color compounds in the fat, to leave a purer, whiter soap, and with practically all the glycerine removed. The hot, soft soap is then pumped into a mould. The spent hydroxide solution is processed for recovery of glycerine. Molds Many commercially available soap moulds are made of silicone or various types of plastic, although many soapmaking hobbyists may use cardboard boxes lined with a plastic film. Soaps can be made in long bars that are cut into individual portions, or cast into individual moulds. Purification and finishing [pic] [pic]

A generic bar of soap, after purification and finishing In the fully boiled process on factory scale, the soap is further purified to remove any excess sodium hydroxide, glycerol, and other impurities, colour compounds, etc. These components are removed by boiling the crude soap curds in water and then precipitating the soap with salt. At this stage, the soap still contains too much water, which has to be removed. This was traditionally done on chill rolls, which produced the soap flakes commonly used in the 1940s and 1950s. This process was superseded by spray dryers and then by vacuum dryers. The dry soap (about 6–12% moisture) is then compacted into small pellets or noodles.

These pellets or noodles are then ready for soap finishing, the process of converting raw soap pellets into a saleable product, usually bars. Soap pellets are combined with fragrances and other materials and blended to homogeneity in an amalgamator (mixer). The mass is then discharged from the mixer into a refiner, which, by means of an auger, forces the soap through a fine wire screen. From the refiner, the soap passes over a roller mill (French milling or hard milling) in a manner similar to calendering paper or plastic or to making chocolate liquor. The soap is then passed through one or more additional refiners to further plasticize the soap mass.

Immediately before extrusion, the mass is passed through a vacuum chamber to remove any trapped air. It is then extruded into a long log or blank, cut to convenient lengths, passed through a metal detector, and then stamped into shape in refrigerated tools. The pressed bars are packaged in many ways. [pic] [pic] (Azul e branco soap) – A bar of blue-white soap Sand or pumice may be added to produce a scouring soap. The scouring agents serve to remove dead cells from the skin surface being cleaned. This process is called exfoliation. Many newer materials that are effective, yet do not have the sharp edges and poor particle size distribution of pumice, are used for exfoliating soaps.

Nanoscopic metals are commonly added to certain soaps specifically for both colouration and antibacterial properties. Titanium dioxide powder is commonly used in extreme “white” soaps for these purposes; nickel, aluminium, and silver compounds are less commonly used. These metals exhibit an electron-robbing behaviour when in contact with bacteria, stripping electrons from the organism’s surface, thereby disrupting their

functioning and killing them. Since some of the metal is left behind on the skin and in the pores, the benefit can also extend beyond the actual time of washing, helping reduce bacterial contamination and reducing potential odours from bacteria on the skin surface. [citation needed]