I had a chance at the 4-H Western Regional Leader's Forum to try my hand at leathercraft. It is really, really hard, so kudos to all 4-H members who create those impressive leather projects.

Anyone who has leather boots, belts, handbags or saddles knows how alluring leather is. It's smooth, often supple and it smells wonderful. How did it get that way?

The first leather was probably an accident when someone discovered that an animal skin left in water that had tree bark in it did not rot. The term "tanning" often used to describe the process of making leather comes from "tannin," a brown acid substance found in the bark of oak, fir and other trees.

Today, processing leather is an industrial process which involves chemistry from start to finish. If the hide of an animal is left alone, it quickly starts to rot. The leather-making process involves about 15 steps that preserve that hide.

The first several steps involve cleaning up the hides, which are usually cattle or sheep, but could be anything from deer to ostrich. Animal hide is made mostly of collagen, the substance that gives your skin its structure and smoothness.

In a live animal, collagen fibers move around each other in such a way that moisture can go out, but not enter. When the animal dies, these fibers twist up and get stiff. The first part of the leather-making process opens up the structure of the collagen—think of stretching out a net.

Hair is made of a substance called keratin, which is similar to collagen but is easily dissolved by strong alkaline substances—think lye. So part of the process involves putting the hides into a strong basic bath to dissolve all of the hair and flesh out of the spaces in the net.

Everything has to be removed so there is nothing that can rot. The tanning process itself can be done with vegetable tanning agents, usually tree bark, or with mineral agents, usually chromium compounds. Chromium turns the hides blue, and hides at this point in the process are called

“wet blues.”

It takes about three weeks to tan using vegetable agents, but chromium tanning can occur in as little as one to two days. After the tanning chemicals have built a strong lattice with the collagen, the hide is ready for finishing.

Mineral-tanned hides are often split into grain and flesh portions, dyed, and “fatliquored” to replace fats lost in the initial preparation. Vegetable-tanned hides are usually just dried.

Modern leather processing is a chemical industry and, as such, has associated environmental and health concerns. The traditional process uses large amounts of water and discharges hair, fats and flesh, strong acids and bases, and chemicals such as sulfides, which bacteria can convert to sulfuric acid, and chromium salts, which can build up in water and soil.

Research in leather chemistry is important to the industry. “Green” chemists work to reduce the use of hazardous materials in industrial processes. A promising new “green” technology in leather production reverses the order in which chemicals are applied. By applying some of the chemicals normally used at the end of the process first, 54 percent fewer chemicals and 65 percent less water are used to create the same quality product.

Learn more about the chemical details of producing leather at http://nzic.org.nz/ChemProcesses/animal/5C.pdf .

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