

TANNING GOAT HIDES

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Introduction

Many people are interested in tanning goat or other hides such as deer. Learning the art of tanning hides can be very rewarding, through acquisition of new skills and the attractive products resulting from the endeavor. The equipment needed to tan hides can be purchased or much of it can be fashioned from items found around households or farms. Tanning chemicals are readily available from many suppliers and kits can be purchased that will tan one or two hides. While tanning is not difficult, it is a learning process and your skills will improve over time. Although home tanning may not match the quality of a professional tannery, good quality, long-lasting products can be made. However, if you do have a special hide, it is best to send it to a professional rather than attempting it yourself. This is particularly true if you are new to the art of tanning.

Tanning Methods

Many of the tanning methods suitable for home tanning are used in the taxidermy industry to prepare deer capes and other hides for mounting. Tanning agents are available in powder, liquid, or cream form. The powdered forms, and some liquid forms, require mixing the chemical into a water and salt solution and immersing the prepared hide for a specified length of time. Most liquid and cream tanning agents are designed to be applied directly to the prepared hide using a paint brush or by hand wearing gloves. There are advantages and disadvantages to both paint-on and immersion systems.

Paint-on tans require fewer solutions to make and dispose. All areas of the skin must be covered with the paint-on tanning agent but care is needed around hide edges as the solution may stain the fur or hair. The amount to use may be difficult to gauge. Too heavy an application on thin skins may result in the tanning liquid being absorbed through the skin potentially discoloring hair and leaving it feeling greasy or oily. While the greasiness can sometimes be washed out with detergent or solvent, the stains remain. However, paint-on tans are



Tanned goat, deer, and elk hides.

easy to use, result in a well-tanned hide, and are preferred by many tanners and hobbyists. Examples of paint-on tans sold by various distributors include: Liqua-Tan™, Rittel's Kwiz-n-Eze, McKenzie Tan, Tannit Solution™, Bollman's Mammal Tanning Cream, Rinehart Tanning Cream, Curatan®, and Trapper's Hide Tanning Formula™. Other products are also available.

Immersion tanning methods negate problems with discolored or greasy hair sometimes encountered with paint-on tans. However, solutions must be mixed, pH monitored and spent solutions properly disposed. Through soaking, the tanning agent has access to both sides of the hide, although the hide should be stirred occasionally while in the tanning solution to ensure that there are no folds in the hide preventing adequate chemical penetration. Please note that the hair of deer is hollow and deer hides will float so stirring may need to be more frequent. If tanning is done correctly, weighting a deer hide to keep it submerged in the solution is not necessary. Goat hides do not have this problem. There are many kinds of immersion tanning agents. Two examples are EZ-100 from Rittel's and Lutan® FN.

For initial attempts at tanning, it is beneficial to purchase a kit complete with tanning chemicals, instructions, and a list of the needed supplies. Some kits come with instructional videos. Many distributors sell kits using either the immersion or paint-on

tanning methods. Examples of some kits include EZ 1000 Kit that includes EZ-100 powder, Saftee Acid, and tanning oil; Liqua-Tan™ Tanning Kit with Liqua-Tan™, acid, and tanning oil; and McKenzie Tan Tanning Kit with McKenzie Tan, acid, and oil. Kits using other chemicals, e.g., Para Tan, Curatan®, Krowtann 2000, Kwik-Tan, Lutan® FN, etc., are available or one can purchase tanning chemicals individually. Finally, while not covered in this article, chemicals and kits are available for tanning birds and reptiles.

Basic Tanning Steps

Whatever method is chosen to use in tanning a hide - immersion or paint-on, kit, or purchase of separate chemicals - many of the basic steps are the same: skinning the animal; preserving the hide; fleshing the hide; pickling and neutralizing; the actual tanning process; oiling; drying and softening; and finishing. As with any craft there are many variations on the main themes and different texts will provide different tanning recipes, order of steps, chemicals to use and tips on how to successfully follow their method. It is a good idea to read through several methods and speak with someone knowledgeable on tanning hides before selecting a particular one. As each method or tanning recipe is slightly different, it is best to follow the instructions and learn the basics. One can then experiment in the future.

It is not the goal of this article to present all of the tanning variations available. Rather, some pertinent information on each of the basic steps will be given. More detailed information can be found at the end of this article or one of the other information sources previously mentioned. Further, the information presented is designed for the hobbyist tanner and, as such, no use of tanning machinery is required.

Skinning

Most people who want to tan a hide will also use the carcass for meat and will take the animal to a meat locker or abattoir where it will be expertly skinned. If you wish to skin an animal for its hide, be sure the carcass is fresh as putrefaction and decay begin immediately upon death. Bacteria become active breaking down tissue, damaging the hide, and causing hair slippage. Also, ligaments under the skin can shrink as the carcass cools making skinning more difficult. If you do your own butchering ensuring that a carcass is fresh is no problem; however, if an animal is found dead caution is warranted. In addition to possible problems with skinning and hair loss you may be in danger of contracting a disease. *Some animal diseases, such as rabies, tetanus, and anthrax, can be transmitted to humans through contact with infected animals. If an animal is seen to be ill, acting strangely, or found dead for an unknown cause it should be buried or disposed of and not skinned, even wearing gloves (Hobson,1977).*

Caseous lymphadenitis or abscesses is a common disease of goats that can be transmitted to humans. Care must be used when skinning goats as some abscesses not apparent on the live animal will be found when skinning. Abscesses contain greenish, cheesy pus that should be trapped on paper towels and burned or buried. Use gloves when skinning goats suspected of having abscesses. Try to avoid using skins of goats having an abscess.

Many people who hunt or butcher at home have experience skinning and have their own favorite tools and methods. Skinning can be done with the carcass hanging or lying. Initial cuts should be made down the midline of the belly from the anus to neck and from the legs inwards. Cuts on the legs should be done on the side where the hock and knee bend, the rearmost portion of the hind leg and the foremost portion of the front leg. This will result in



Salting a hide.



Salted hides draining on a slanted board.

a more rectangular shaped hide. It is easier to skin a hanging carcass as the skin can be pulled downwards and “fisted” away from the body, thereby lessening the need to use a skinning knife. A skinning knife should be very sharp and used sparingly to decrease the chance of cutting the skin which mars the hide. Hides can also be removed using mechanical means. No matter how the hide is removed, large amounts of fat or meat should not be taken with the skin as this material will have to be removed later and can impede salt penetration when preserving. Any obvious blood spots or dirt should be washed off. A good job in skinning will make tanning easier.

Preserving

If the hide is not to be tanned immediately it must be preserved. The goal of preservation is to stop the putrefaction and decay by bacteria immediately upon death. Never leave fresh hides rolled up or stacked. The heat remaining in them will encourage bacterial growth and increase the possibility of hair slippage. If skinning takes place in a different location than preservation, try to cool the hide as quickly as possible by laying it open. While plastic garbage bags may be useful in handling a wet, bloody hide, do not leave hides in a closed bag. This traps the heat allowing decay to start. Begin your preservation technique as quickly as possible.

The main methods of preservation are salting and freezing. Salt removes moisture from the hide and creates an unfavorable climate for bacterial growth. Use only

non-iodized salt such as table or pickling and curing salt. Rock salt should never be used as it has impurities. A fine grain salt is preferred and penetrates the skin more easily than large grain products.

To salt a skin, lay it flat and pour a generous amount of salt, between one-half to one pound salt per pound hide, down the middle and rub in thoroughly covering every portion. Fold the hide flesh to flesh, roll it up and place on a slanting board to drain. The following day shake off the wet salt and resalt with new salt. After the second day, continue in the tanning process or, if tanning will take place at a later date, resalt and lay the hide flat to dry. Drying may take several days or longer depending upon the weather. Hides should not be dried in direct sunlight or where temperatures are very high. Dried skins can be stored in a dry place until tanning.

When preserving by freezing, the goal is to reduce hide temperature quickly. Immediately after skinning lay the hide flat in a freezer. When it begins to stiffen, fold it flesh to flesh, roll and place inside a plastic bag. A frozen hide can last for months or even years with no damage to the hide. However, it is best to tan the hide within a reasonable time frame.

To begin the tanning process, the preserved skin must be rehydrated in preparation for fleshing. Frozen hides should be soaked in water to thaw. Soak salted hides in a brine solution of one to two pounds salt for each gallon of water needed to completely cover the hide. Hides should be soaked until they are like a wet dishrag. Relaxing agents are available that can assist in preparing the hide for fleshing and tanning.

Dirty hides need to be washed of obvious blood, manure and other dirt after thawing. A more thorough washing is done after fleshing. If slaughtering one of your own animals, you can minimize hide dirt by care prior to slaughter and during the slaughter process. Angora hides can be a problem if excessively dirty and have hay or grass matted in the mohair.

Fleshing

To flesh a hide means to scrape all fat, meat and membranes from the skin in preparation for the actual tanning process. This can be done before the hide is salted to allow easier salt penetration. Fleshing is most easily accomplished through the use of a fleshing beam and a fleshing knife.

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PVC pipe fleshing beam

A fleshing beam is a piece of wood over which the hide is draped for scraping. A common type of fleshing beam can be fashioned out of a 2" x 6" or 2" x 8" board five or six feet long. One end should be cut to a blunt point and all edges rounded and smoothed. Legs are attached near the pointed end so that the fleshing beam slants upward from the ground to waist



Fleshing knife

level. While this is the most common type of beam, others can be fashioned from rounded logs or large PVC pipes.

A fleshing knife is a blade with a handle on both ends allowing even pressure to be exerted as the blade is pushed down the hide. Blades should be dull as the goal is to push and scrape all fat, meat, and membranes off the hide,



Flesh down the hide; scraping off the unwanted tissue.

leaving only the skin. A blade that is too sharp can cut the hide exposing hair roots leading to subsequent hair loss. Fleshing knives are available from many taxidermy supply stores at a reasonable cost. Alternatively, a dull draw knife

or butcher knife driven into a block of wood for a second handle can be used. Churchill (1983) describes methods to make fleshing knives and other knives from used industrial hacksaw blades. Mill planer blades from logging mills can also be fashioned into fleshing knives and these types of knives are available on the Internet.

To flesh a hide, pull the hide from the rehydration bath and drape it over the pointed end of the fleshing beam. Push the fleshing knife down the hide scraping off unwanted material. To make fleshing easier and lessen the chance of cutting the hide, flesh with the lay of the hair. The legs should be fleshed towards the belly and the hide from the tail pushing towards the neck (Rittel, 1994b). Fleshing takes practice and initially can be time consuming but must be done properly, removing even the thin membrane held tightly onto the skin. The hide should be like a wet dishrag when fleshing. If it becomes too dry, soak in water before proceeding. After fleshing, plunge the hide up and down in soapy water using laundry or dish detergent to remove remaining dirt and blood and rinse thoroughly to remove all soap. There are commercial products to remove blood and other stains, if desired.

Electric fleshing machines, found in taxidermy supply catalogs, are available for fleshing and shaving hides. The cost is usually prohibitive for the hobbyist tanner as the least expensive handheld models cost approximately \$200 and bench models cost over \$600. Even with machines, many professionals still do initial fleshing with a traditional fleshing knife and beam. Fleshing machines do have distinct advantages in shaving hides. Shaved hides are thinner, use less tanning chemicals due to reduced weight and result in a softer finished product. This is especially true for hides from thick-skinned species. While shaving can be accomplished using a very sharp knife, it is very difficult to produce a consistent thickness and to avoid cutting through the hide. Generally, goat hides can be tanned and softened without shaving.

Pickling and neutralizing

Pickling, as described by Rittel (1993), is the use of an acid solution to acidify and temporarily preserve a skin while physically and chemically preparing it for tanning. Most tanning

recipes will call for an acid pickle, though it may be included in the tanning process itself and not a separate step. Some paint-on tans, such as Tannit solution and Liqua-Tan, are applied directly to the fleshed hide without the skin undergoing a pickle.

Pickling solutions are mixtures of water, salt, and acid made in a plastic barrel. Enough solution should be made to completely submerge the hide while not resulting in overcrowding if several hides are done together. If in doubt about proper quantity, Rittel (1993) suggests making two quarts of pickling solution for every pound of wet, drained hide. The pH must be carefully checked and proper



Monitor the pH of the pickling solutions

precautions, i.e., use of eye protection, a protective apron, and rubber gloves, should be followed when using acids. Monitoring pH can be done using simple pH paper and adjustments made using acids or alkaline substances such as sodium bicarbonate. Acids should be added slowly to the pickle, pouring them along the side of the container so as to run gently into the solution. Use a wooden stick and mix slowly, but well. There are a number of acids and formulas used in pickling and the tanning recipe followed will have specific instructions. For example, the EZ-100 tanning kit recommends 0.5 fluid ounces Saftee Acid (included in the kit) and 1 pound salt per gallon water.

Skins are usually left in the pickling solution and stirred occasionally for a minimum of three days after which time they must be neutralized. Neutralizing raises the pH of the skin through the use of a solution containing an alkaline substance such as sodium acetate, sodium formate, sodium bicarbonate, or other similar compound. Neutralization is generally brief, 15 to 20 minutes,

after which the skins should be rinsed with clean water, drained, and put into the tanning solution (Rittel, 1993). Again, the tanning recipe or kit should have complete instructions on the neutralization method. After draining and prior to tanning, any holes in the hide should be sewn closed. This will prevent further ripping the hide during softening.

Dispose of pickling and neutralizing solutions properly. Acid pickles should be raised to a pH of 6.5 to 7.0 before dumping. Rittel (1993) states that sulfates are considered hazardous materials and if an acid is used in which sulfates are formed local health authorities should be contacted concerning proper disposal. Do not dump or dispose of solutions where they can contaminate streams or ground water. If no other disposal means is available, neutralized solutions should be dumped in a driveway or other area where vegetation does not grow. Chemical and salt water solutions should never be put into septic systems as these can kill the microflora needed to break down waste. Contact local authorities about proper disposal methods.

Tanning

To describe the varying tanning recipes and methods is beyond the scope of this article and those can be found in various texts, taxidermy supply, or tanning chemical dealer catalogs and in the instructions included with tanning kits or chemicals. The main tanning process may be as simple as one of the paint-on tans mentioned earlier or more complex entailing the application of chemicals in a tanning soak or bath. If making a tanning solution, the pH needs to be monitored and the solution neutralized prior to safe disposal. Hides should be stirred with the blunt end of an old wooden broom or shovel handle while in the solution to ensure proper tanning. Remove hides after the specified time length and drain and rinse prior to oiling. Do not overtan as this can result in a stiffer hide.

Powdered tanning agents are mixed into a salt:water solution at the recommended rates. The skin is drained and weighed after neutralizing and draining. That weight is used to calculate the amount of tanning agent needed. As an example, Rittel's EZ-100 instructions state that for every pound wet, drained



Apply paint-on tans carefully using gloves

hide use 4 ounces salt, 0.5 ounces EZ-100, and 2 quarts lukewarm water. The solution pH should be 4.0 and skins tan in 16 to 20 hours. Alternatively, one could mix enough solution to completely submerge the hide, though this wastes chemicals.

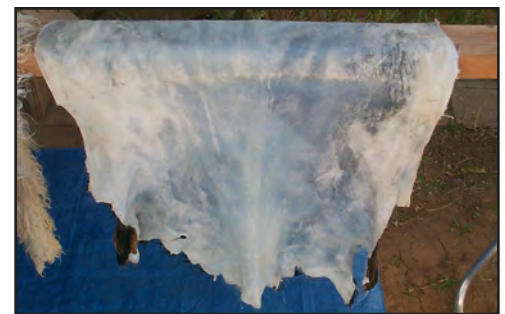
Paint-on tans that call for pickling and neutralizing also require draining before tanning. Others, such as Liqua-Tan that do not require pickling, call for the hide to be washed and drained or wrapped in a towel to remove excess moisture prior to application. The hide is laid flat on plastic tarp and the tanning agent applied. After several hours, the excess is worked into the skin. Oiling may or may not be included in the instructions. Some paint-on tans state that oils are included in the tanning solution; others suggest use of a separate oil for optimum softness. As an example, Knobloch's recommends applying Liqua-Soft tanning oil the day following application of Liqua-Tan if the tanned hide will be used for a flat skin or rug.

Oiling

Oiling is done to increase the softness of the finished product and many oils are available in the marketplace. If a tanning kit is purchased, the recommended oil will be included. To oil the hide, lay it flat with the flesh side up. One part oil is mixed with one to two parts hot water and liberally applied to the skin. The hide is folded in half skin to skin and again hair to hair. The folded hide should then be allowed to "sweat," or absorb oil, for approximately 4 to 6 hours. After that time, the hide is hung to begin drying.

Drying and softening

Drying methods range from simple hanging or laying flat to tacking on wood or tying in a frame. Artificial heat should not be used as it dries the skin too fast making softening difficult. Check the hide as it dries to determine when softening



The white drier areas mean this skin is ready to soften.

should begin. If the hide is stretched and pulled when too wet it can become misshapen. If one waits too long, the hide stiffens and is difficult to soften. As the hide dries, it will become white and less pliable. The thinner edges will dry more quickly than the thicker center line and edges are usually worked first. If a hide starts to become too dry, fold it around damp towels and place overnight in a plastic bag. Plastic bags can be used with partially softened hides to slow down the pace of drying.

Softening involves stretching and bending the hide to break up fibers in the skin. The time and effort spent on this step directly determines the suppleness of your final product. Common methods include staking or cabling. Staking involves use of a staking beam, boards cut and fashioned in the shape of a braced, inverted T with the upright end rounded to a blunt edge. The flesh side of the damp hide is pulled down over the blunt edge to stretch and break up skin



Stake beam

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Trimming a hide.

fibers. Cabling is a more effective method than staking and involves stretching and pulling the hide around a cable. Regular rope can be used but aircraft cable (wire rope) clamped around a pole works very well and results in an extremely soft hide. Often, both methods are used on the same hide, staking to begin breaking up very stiff areas followed by cabling to finish softening and give a soft, supple hide.

Commercial tanneries use equipment for softening such as large, rotating drums that tumble the hide, generally with sawdust, as it dries. In addition to softening the hide, a solvent may be added to the sawdust to help clean hair or fur. Some texts recommend using an old laundry dryer with the holes plugged for tumbling hides. Whereas this will help clean the hair, it will not help significantly in softening the hide. To do this requires a tumbler with at least a six foot drop along with 100 pounds of hardwood sawdust (P. Helms, McKenzie Taxidermy Supply, personal communication).

Finishing

After the hide is softened, the hair should be cleaned and brushed and rough or uneven edges trimmed. Most goat hides will only need combing or brushing. Should deeper cleaning be necessary it can be done by simply rubbing sawdust or corn cob grit into the hair. Rittel (1994a) recommends that local sawdust not be used as it may contain pitch and be unevenly grained. Taxidermy or tanning chemical supply houses sell sawdust and solvents to be used in cleaning. Hobson (1977) explains how to use cleaning substances such as cornmeal, oatmeal,

American Institute for Goat Research Resources

- American Institute for Goat Research at Langston University- <http://www2.luresext.edu/index.htm>.
- Web-based Training and Certification Program for Meat Goat Producers - <http://www2.luresext.edu/goats/training/qa.html>. Modules deal with all aspects of meat goat production from breeds and selection through business and legal issues. These are freely available and are in html (web page) format and in pdf format for downloading and printing. If you decide you wish to become certified, register as a new user and continue. There is no cost to take the course. The only fee is \$25 if you wish a certificate and your name listed on our website as a Quality Producer.
- Institute has published a Meat Goat Production Handbook- <http://www.luresext.edu/goats/mgph.html>. Contains all of the material of the web-based certification program plus a chapter on "Selection, Carcass Evaluation and Fabrication" that is not included on the website. The 2nd Edition will be published in 2015.
- Nutrient Calculator - <http://www2.luresext.edu/goats/research/nutreqgoats.html>. Once there, click on the producer version. It has drop down menus that ask information needed to calculate the nutrient requirements for your goats. Then you can use the ingredient list to formulate a ration or you can enter your own feeds. You will need to have popup windows available to use the calculator. There is a section on using this calculator with some examples in the "Introduction to Goat Nutrition" module of the certification program.
- Free Quarterly Online Newsletter - http://www2.luresext.edu/goats/library/goat_library.htm.
- Mortality Composting of http://www2.luresext.edu/goats/library/fact_sheets/mortality_composting.html
- Body Condition Scoring of Goats- <http://www2.luresext.edu/goats/research/bcshowto.html>.
- Artificial Insemination of Goats <https://www.youtube.com/user/taglu01>.

bran, chalk and plaster of Paris.

Once the hair is clean and brushed, the skin side can be sanded or rasped. This helps to remove rough spots and further soften the hide. Some staking methods can make the hide appear brown and dirty and sanding or rasping will make it look cleaner and more professional. Cabled hides generally will not need rasping or sanding. Hide edges are usually uneven and may be stiffer than inner portions and trimming these results in a more attractive product. Use a box cutter or similar knife and cut from the flesh side making sure not to cut off the hair.

Optional steps

When reading about tanning, additional steps such as dehairing and degreasing will be found. Dehairing is accomplished by soaking the hide in a hydrated lime or caustic lye solution

after which the hair is scraped off. The hide is then tanned for leather using the same or similar methods as those described. Leather making tanning kits are available. Degreasing is done on hides with large amounts of fat in the skin, such as raccoon, bear, and the like. For hair-on tanning, it is unlikely that goat hides would need degreasing.

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