



Chemical Methods for Cleaning Skin Products Produced from Cattle of the Fergana Valley

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ABSTRACT

Everyone knows about the value of genuine leather. It's costly material resistant to moisture, having an attractive appearance, pleasant to body. Mankind cannot do without such material as leather. But the choice is complicated by a huge range of skins, and a large the method of dressing matters. It affects not only the price of raw materials, but and its performance characteristics.

Keywords:

Leather, goatskin, pigskin, calfskin, sheepskin, macro- and microelements, albumins, globulins

Introduction. The skin of an animal has a rather complex chemical composition. Depending on the type of animal, age, conditions of keeping, the chemical composition of the skin may vary, however, the average values for the content of the main components are as follows: water - 64-68%, dry matter - 32-36%. In turn, the dry matter of the skin consists of organic and inorganic substances of various complexity and properties. The organic substances of the skin include proteins, lipids (fatty substances) and carbohydrates. Protein components are represented by globular (albumins, globulins) and fibrillar (collagen, reticulin, elastin and keratin) compounds, as well as enzymes. The share of protein substances accounts for approximately 90-95% of the mass of dry matter of the skin. Lipids are divided into two groups - fats themselves, as well as waxes and complex compounds of fats with other substances. The amount of lipids in the skins ranges from 3-10%. Carbohydrates are contained in the skin in small quantities - 1.5-2%.

The mineral substances of the skin are mainly represented by sodium and potassium ions, as well as small amounts of ions of

calcium, iron, magnesium, aluminum, zinc, etc. The content of mineral substances does not exceed 0.8% of the dry matter of the skin. All these components of the skin, as well as water, play a significant role in physiological processes, are responsible for the formation of various morphological structures, and also determine the presence of a number of valuable properties of the skin. That is why it is necessary to consider in more detail modern ideas about the chemical composition and properties of the main components of the skin and their importance in the processes of primary processing and further production [1-3].

Lipids - organic substances that are part of the tissues and fluids of the animal body and are fats and fat-like substances. They differ in their structure, composition and properties. A characteristic feature of lipids is their insolubility in water and solubility to varying degrees in organic solvents: benzene, ethyl ether, alcohols, acetone, chloroform, etc. Lipids play an important role in the animal body, being solvents for vitamins. In animal tissues, lipids are found both in the free state and in the form of compounds with proteins, carbohydrates, and other lipids.

The lipid content in the skins of various animals ranges from 3 to 10%, but sometimes it reaches 40% (in the skins of pigs and sheep). Lipids are divided into two main groups - proper fats (glycerides of fatty acids) and lipoids (waxes and complex compounds of fats with other substances - phospholipids and glucolipids). In appearance, lipoids are similar to fats themselves, but differ from them in origin, chemical composition and properties, as well as distribution over the layers of the skin. Lipoids are apparently formed in the cells of the epidermis, which contain in the protoplasm single droplets of a fat-like substance consisting of animal waxes and their complex compounds with other substances. The sebaceous glands contain esters of fatty acids with higher alcohols (cetyl, cholesterol). These compounds come to the surface of the skin, lubricate it and give it hydrophobicity. Lipoids are found in the sebaceous and sweat glands. Simple fats - fatty acid glycerides - are formed from the fat cells of the connective tissue proper and are deposited in the dermis and subcutaneous tissue between the fibers. The content of fats in the tissues of animals is different. The great importance for the life of the body of fats containing unsaturated fatty acids: linoleic, oleic, linolenic, arachidonic. The exclusion from the feed of animal fats containing these acids leads to a serious illness, which is expressed in skin damage, hair loss, tail necrosis, growth arrest. Timely introduction of unsaturated fatty acids into the body eliminates these disorders. The average amount of fat in the dermis of cattle skins varies depending on the age of the animal: calf skins 0.4-0.5, cows 0.1-0.2, bulls - 0.7% or more. In addition, the amount of fat in the skin depends on the type of animal, the conditions of its maintenance and feeding. So, in the dermis of bullocks, on average, it reaches 11, goats 2-2.5, sheep and pigs - up to 30% of the mass of dry matter of the dermis. In the skins of many animals, the fat cells of the subcutaneous tissue form a continuous layer of fat, often growing to the reticular layer of the dermis. Very often in the skins of intensively reared, stalled and grain-fed cattle, a thick layer of subcutaneous fat also forms. Similar

phenomena are observed in the skins of pigs, as well as in the dermis of sheep skins. The fat contained in the skins of sheep differs in composition from the fat of the skins of cattle and approaches the waxes. This layer of fat has to be mechanically removed while still in the raw material or during soaking operations, since it prevents uniform and correct penetration of working solutions into the skin. The natural fat contained in the skin is a weighting agent and, depending on the location in the thickness of the dermis, to a greater or lesser extent worsens its quality and skin yield. Often in the process of solar drying at high temperature, fatty substances are rendered from the subcutaneous tissue and gland ducts of the skins of sheep, pigs, and sometimes goats. They impregnate all layers of the skin, making it extremely difficult to soak and causing the formation of fatty deposits on the surface of the finished skin.

Leather made from heavily oiled sheepskin or goatskin, after intensive degreasing, is characterized by relative friability, delamination and low strength. Cattle skins with a high fat content are also friable and tend to form fat spots, which increase and become dark when heated during drying processes. fat, its distribution over the layers of the dermis and the possibility of timely removal (degreasing) [4-5].

The amount of minerals (ash) in the skin is small. These are mainly potassium and sodium salts (up to 0.4%), as well as a small amount (0.01-0.001%) of salts of iron, copper, phosphorus, calcium, aluminum, etc. The ash content in pair skins, depending on age and animal species ranges from 0.35-0.5% of the mass of the paired dermis. Most of the minerals can be removed by washing and soaking. Despite the fact that minerals are contained in the skin in very small quantities, they are involved in a number of processes. For example, copper plays a significant role in the pigmentation of the skin and hair. Compounds of phosphorus and silicon are more common in the papillary layer of the dermis and epidermis. Arsenic, calcium and magnesium are also found there. It is believed that the epidermal layer removes arsenic from the body, and calcium

causes adhesion between cells and increases their resistance to external influences [3-4].

The steam skin contains a lot of water (moisture), the amount of which varies between 55-75%, depending on the type of animal. The water content in the steam skin is associated with the presence of fatty substances in it: the more fat deposits in the skin, the less water it contains. The water content is not the same in different topographical areas (most of all in the neck and floor) and individual layers of the skin. The more developed the epidermal layer and its appendages, the less water in the skin as a whole. Relatively little water in the subcutaneous tissue. So, for example, the subcutaneous tissue of cattle skins contains about 30% water, and highly fatty skins (sheepskin, pork skins, North American coarse raw materials) contain 20% or less. The average water content in a fresh skin is 67% (this is taken into account in the standards when recalculating from the mass of fresh raw materials to the mass of canned and vice versa), the highest in the calf - 73.3% and in the catfish - 78.6%, the smallest - in unskinned pork skins male - 56.9% and female - 64.2%. The skins of young animals, as well as females, ceteris paribus, contain more moisture than the skins of adult animals and males, respectively. Water is an essential component of collagen fibers, which are usually swollen in their native state. Collagen is highly hydrophilic and contains molecularly and capillary bound water. The presence of water in the dermis has a significant impact on the properties of both the raw material and the skin. In a steam skin, swelling moisture, or free moisture, filling the capillaries and interfiber space, and hydration moisture, or bound moisture, which is associated with skin tissues and makes up to 40% of skin moisture [3-5], are distinguished. These are organic compounds built from amino acid residues and characterized by a number of common features and biological features. Being in a living organism, proteins are associated with a greater or lesser amount of water, the removal of which from the protein-water system very often leads to irreversible changes in the protein. Dried proteins are shapeless

non-crystalline substances, hard and brittle in a completely dry state. Proteins have an affinity for water: some of them dissolve in it, others absorb it, turning into a gelatinous substance - a gel, and, finally, there are proteins that do not mix with water.

The elemental composition of proteins, regardless of their origin, is qualitatively the same. They contain carbon, hydrogen, oxygen, nitrogen and sulfur. These elements are included in various proteins in the following amounts, % in terms of the mass of absolutely dry matter: carbon 48-55; hydrogen 5-7.5; oxygen 20-34; nitrogen 15-19.5; sulfur 0.3-2.5. Many natural proteins also contain phosphorus, calcium, iron and other elements. The structure of proteins and the characteristic properties of their individual groups are mainly determined by the number and type of amino acids from the residues of which polypeptide chains are composed, as well as the sequence of amino acids in the chain [6-7].

Materials and methods. Leather processing technology is a very complex and lengthy process, depending on the size and thickness of the product and other indicators, it can take several days or even weeks. Before treating the leather, put it in clean water to make it elastic. Leather processing consists of the following stages [8-9].

1. The skin in the woolen condition is placed in the drum. During the day, wash with soap and soda. In this case, all areas of the skin should be washed equally. For this, clean water is taken at 200C.

2. At 200°C, caustic and lime are added to the water. Stirred for one day. In this case, the skin becomes more elastic. Then it is removed from the drum.

3. With the help of a special apparatus, the wrong side is smoothed and fat is removed. After cleaning, the skin is washed in a special solution. To prepare this solution, 3 g of soda, 20 g of salt are dissolved in warm water and stirred for 5 minutes, squeezed and put into the solution.

4. Placed in the drum. Ammonium sulfate is then added to the drum. After removing the sulfate, salt, vinegar and chromium tanning agent are added. Chrome tanning agent -

performs the function of tanning the skin. After that, the skin does not burn and does not rot during combustion. After the chrome tanning agent, the dicarbonate is acted upon and remixed. Then it is removed from the drum. Acids and salts loosen the skin fibers, making them elastic and sticky. After this stage, it will be possible to stretch the skin in any direction.

5. This stage goes through 2 machines.

6. After passing through 2 machines, it is put back into the drum. Salt and chrome tanning agent are added to the drum. Each salt is washed off immediately after application. After the chrome tanning agent, sodium formate is added. The dicarbonate after the sodium formate is placed. This stage is called neutralization. At this stage, the skin is constantly agitated. At the end of the stage, pulling and bending the skin is checked.

7. Drain the water and add new water and oil. To do this, you can use fish oil or synthetic oil. This is a very important process, fatty substances penetrate the fabric and prevent the fibers from shrinking during drying. This, in turn, gives elasticity and softness to the skin. In this process, lack of oil or over-lubrication is not allowed. At 800C, the skin is placed in water in a drum, closed with a lid and rotated for 2 hours. Then pour 1% solution of CH₃COOH. Stir for 10-15 minutes. Pour into a drum, stir for half an hour, drain the skin [9-10]. Then it is removed from the drum and the skin is dyed. After painting, dry with an iron. For drying, they are transferred to the floor or dried on a wooden grate with the skin out. The fermentation process ensures the high quality of the leather and the strength of the leather. To do this, add 200 g of oatmeal or rye flour to 1 liter of hot water and mix. 20-30 grams of salt and 0.5 grams of soda are added to it. After the solution has cooled, transfer the skin. The duration of fermentation is 2 days. The solution is stirred from time to time. Dry in an oven at 400C for 5-10 minutes. Pressed, varnished and pressed again. Then they paint. After that, the flower is pressed. After the flower is pressed, it is measured and packed using a machine. After each stage, the edges are cleaned. Various colors are available upon request. Separate drums are used for each stage. Various

equipment is used for skin treatment [11-12]. For example, leather cleaning machines, leather softening equipment, centrifuges, round drums and other equipment are used.

Conclusions. Everyone knows about the value of genuine leather. This is an expensive material, resistant to moisture, having an attractive appearance, pleasant to the body. Mankind cannot do without such material as leather. But the choice is complicated by a huge range of skins, and the dressing method is of great importance. It affects not only the price of raw materials, but also its operational characteristics.

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