



Chemical Composition of Skins and its Influence on Changes in Raw Materials during their Storage

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ARTICLE INFO	ABSTRACT
Published Online: 10 September 2022 Corresponding Author: Rasulova Mamurakhon Obidjon qizi	The amount of minerals (ash) in the skin is small. These are mainly potassium and sodium salts (up to 0.4%), as well as small amounts (0.002-0.01%) of iron, copper, phosphorus, calcium, aluminum, etc. Potassium and sodium ions enter the skin with blood and lymph, iron ions - from blood hemoglobin, phosphorus is found in phospholipids, copper in the pigment, silicon, arsenic, calcium and magnesium in the epidermal layer.
KEYWORDS: iron, copper, phosphorus, calcium, aluminum, copper, pigment, silicon, arsenic, calcium, magnesium, epidermal layer.	

The elemental chemical composition of the skin is quite stable. The main chemical elements of the skin are oxygen, carbon, hydrogen, nitrogen and sulfur. From these chemical elements, the main organic compounds of the skin are built - proteins, fats and carbohydrates.

Water. Paired skins contain a lot of water, the amount of which depends on the type of animal and ranges from 55 to 75% of the mass of the dermis. The younger the animal, the more water in its skin. There is more water in the skins of females than in the skins of males. The water content of the skin also depends on the presence of fat in it. The more fat deposits in the skin, the less water it contains. The water content in the topographic areas is different: more in the neck and floor, less in the black-backed part. The moisture content in the individual layers of the skin is not the same: most of all it is contained in the dermis, and less in the subcutaneous tissue and the smallest amount in the epidermis.

According to the physicochemical properties, the water contained in the skins is divided into hydration, chemically associated with other components of the skin (mainly proteins), and capillary, located in the interfiber space.

In a steam skin, capillary moisture makes up about 60% of the mass of the dermis. The bonding strength of capillary water with the skin is low. When removed from the skin, the size of the latter practically does not change. Hydration water remains in the skin when it is in an air-dry state and is strongly associated with the polar groups of the

protein. In skins dried to an air-dry state, the moisture content is 14-18% of their mass.

Squirrels. Protein substances are the main component of the skin. The dry residue of the steam skin is 35% of its mass and consists of 95% of proteins. The composition of skin proteins includes fibrillar proteins-collagen, keratin, elastin and reticulin, globular proteins-globulins and albumins, as well as complex proteins-mucins, mucoids, etc.

The structure of proteins and their characteristic properties are determined mainly by the number, type and arrangement of amino acids, from the residues of which the main polypeptide chains of proteins are composed, formed by amino acid residues interconnected by a peptide bond - CO - NH -.

Collagen is the basis of the collagen fibers that make up the dermis. Its content is equal to 96-98% of the total amount of proteins in the dermis. The structure of collagen is very complex, and it is conventionally divided into four levels of organization. The primary structure of collagen is the arrangement of amino acid residues in polypeptide chains. The secondary structure is helical polypeptide chains. Three such chains coiled together form a collagen molecule, which is a tertiary structure. The quaternary structure of collagen is fibrils, which are a set of ordered molecules stacked interconnected with a complete repeatability of stacking every 64 nm. Fibrils form fibers and bundles of fibers intertwined with each other. This structure allows for high mechanical strength of hides and skins.

Reticulin is a protein from which reticulin fibers are formed. Reticulin is resistant to hot water, acid and alkali solutions. Its amino acid composition is close to that of collagen. Reticulin tissue consists of non-oriented thin fibrils like felt, surrounds and binds bundles of collagen fibers.

Albumins and globulins are globular proteins that are contained in a small amount in the mucous layer of the epidermis, blood, lymph and interfibrillar substance. Albumins are the most common simple proteins, the molecules of which are close to an ellipsoid in shape. Albumins are highly soluble in water and dilute salt solutions.

Globulins are found together with albumins and differ from them in their low solubility in water. These proteins contain a significant amount of sulfur (1.1-1.9%) and are easily putrefied. Globular proteins can be extracted from the hide during the washing and tanning process, as well as during the development of hides.

Carbohydrates. Carbohydrates are contained in small amounts in skin tissues. Skins contain both monosaccharides (glucose, galactose) and polysaccharides (glycogen and mucopolysaccharides). They, together with mucins and mucoids, form the basis of the interfibrillar substance. Carbohydrates are of great importance for a living organism, but they do not play a significant role in the skin taken from an animal, since they make up only about 1-2% of the mass of the dry residue. Due to the good solubility in water, carbohydrates are largely removed during the primary processing of raw materials.

Fats and fat-like substances. Depending on the chemical nature, fats (fatty acid glycerides) and fat-like substances (lipoids) are distinguished under the general name lipids. The skins contain mainly triglycerides of fatty acids. The fat content in the skins ranges from 1.5 to 30%. There is little fat in the skins of cattle, but a lot in sheepskin and the skins of pigs. Fats are deposited in fat cells in an amount reaching 80-90% of the dry cell mass. Fats of various animals differ from each other in physicochemical parameters.

Enzymes. Among the various components of skins, enzymes occupy a special place. These are protein substances that determine the ability of living organisms to carry out chemical transformations necessary for their life activity, being catalysts for these processes. In the skin of animals, proteolytic enzymes-proteases catalyzing the hydrolysis of proteins and polypeptides, and enzymes acting on lipids and carbohydrates were found. Enzymes are very important. An important role in the autolysis of skins is played by cathepsin proteinase, which cleaves protein into peptides and peptide compounds at pH 4-5.

Minerals. The amount of minerals (ash) in the skin is small. These are mainly potassium and sodium salts (up to 0.4%), as well as small amounts (0.002-0.01%) of iron, copper, phosphorus, calcium, aluminum, etc. Potassium and sodium ions enter the skin with blood and lymph, iron ions -

from blood hemoglobin, phosphorus is contained in phospho-lipids, copper in the pigment, silicon, arsenic, calcium and magnesium in the epidermal layer. The composition of the mineral substances of the dermis of the skins of various animals varies depending on age, and their total content ranges from 0.35 to 0.50%. Most of the minerals can be removed from the hides during the washing and soaking process.

The influence of the chemical composition on the change in raw materials during storage. The chemical components of skins have a strong influence on the change of skins removed during storage. Water contributes to the development of putrefactive and autolytic processes occurring in the skin under the action of microorganisms and enzymes.

Fats are susceptible to oxidative damage. In addition, the presence of significant cuts of fat on the skin from the skin side prevents the diffusion of preservative substances in the dermis of the skins and contributes to its deterioration. In this regard, it is necessary to carefully remove fat from the skins during the tanning process.

Enzymes cause chemical processes that lead to the destruction of the native structure of the skins. It is not possible to completely prevent the action of enzymes, however, their action can be significantly reduced if the storage temperature of the skins, their humidity are reduced, and various preservatives are used.

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