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A STUDY TO DETERMINE THE CHANGE IN POROSITY INDICATORS OF THE SHOE UPPER HINGE IN TECHNOLOGY PROCESSES

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Abstract:

Objective. In the processes of technology in the processing of leather raw materials, the shoe upper hinge is used to confirm the micropore, mesopore, porous radius and porosity indicators, and changes in the physical and chemical properties of shoe upper hinge depending on the technology in the processing of leather raw materials.

Methods. When conducting research on technologic processing processes, large-horned black mole skin, calf skin and goat skin raw material, Leather were obtained as an object of research.The research and testing methods in the study of the properties of experimental samples of tanned leather, finished leather, spilock, crast, calf leather and goat leather obtained in the studies were touched on the Mac-Ben-Bacra vaacum device of measuring adsorption isotherms. The main result was to study the worldwide trend on this issue and compare the results of different authors.

Results. Organoleptic investigations controlled the strength of the leather surface curtain, the separation of the leather surface curtain from the mesh layer, and defects that could form in the leather surface layer. The microgovac, mesogovac, pore radius, saturation volume indicators of the experimental samples were determined, and the properties of chrome-plated semi-finished hinges were analyzed.

Conclusion. The microgovac, mesogovac, pore radius, physico-mechanical properties and appearance of chrome-plated leather samples obtained in the studies were studied and the obtained results were analyzed.

Keywords: skin raw materials, preparation process, tanning picked processes, microgovac, mesogovac, pore radius and porosity indicators, technology, physical properties, chemical properties, leather.

Introduction. In our country, the production and export of ready-made leather-shoe products with a higher added value on the basis of deep processing of leather raw materials is rapidly developing. The decision of the president of the Republic of Uzbekistan on February 26, 2022 PQ-143 “on additional measures for the further development of the leather-shoe and fur-making industries”also assigned great tasks to employees of the industry [1].

In this regard, the issues of improving the quality of leather in the production of leather, expanding its range, transferring production technologies to a digital format through innovations remain relevant. Including leather porosity in solving technical issues such as improving the quality of shoe-top chrome-plated hinges and determining its quality indicators, the insufficient level of information regarding its structure is a problem to this day [2].

The issues of quality control and control of the product are of great importance in the production of shoe-top leathers, and this issue is always in the spotlight of the production management. Quality management issues of leather cover the period from putting it into production to waste processing and exploitation, and require a good knowledge of the quality-determining properties of charmninig, proper measurement and objective assessment of its high-

importance indicators, and a reliable prediction of the quantitative characteristics of leather properties [3].

It is known that large-horned black mole hide raw materials are used to make various types of shoe top hinges, clothing-attaching hinges, furniture hinges, and horsehair hinges, and other types of leather. The technology for the production of the above types of leather consists of a complex of physical and chemical processes, in these processes their structure and porosity are formed according to the type of leather obtained. The processing of leather raw materials begins with preparatory processes, in which the leather raw materials are initially heated, and then in the processes of sangop and wool shedding, the wool layer of the skin is shed. These processes are carried out in an alkaline environment, in most cases lime, sodium sulfide, sodium hydrosulfide, sodium hydroxide and other substances are used. In these preparation processes, soluble albumin, globulin proteins and polysaccharides are washed out of the skin tissue, cavities, pores are formed in the interstices of collagen protein fibers in the skin tissue, and the skin tissue is prepared for the augmentation process. During the tanning process, the structure elements of the leather continue to form, the porosity of the derma, The Shape of the pores and the size of the volume are strengthened at the expense of the increasing effect of the tanning substances. There has been much research on changes in Hinge microstructure that depend on porosity and microstructure changes in Hinge sorption properties. In the technological processes of preparation, tanning and tanning in the technology of leather production, the microstructure of leather, its physical and mechanical properties begin to form [4-8].

When the coagulation and sangop processes in leather production technology are carried out incorrectly, there is a separation of the leather surface curtain, a decrease in the indicator of leather density, extreme porosity of the leather structure and the formation of other defects [9].

In chromic acidification processes, the main focus is on the uniform distribution of the acidic chromium salts by the volume of the skin tissue and their binding to collagen fibers, the main skin protein. In this, the physical and mechanical properties of the removable hinge, the formation of pores are observed. Our research was carried out in order to prevent the above defects, to study the changes in leather microstructure.

Methods. When conducting research on technoligic processing processes, large-horned black mole skin, calf skin and goat skin raw material leathers were obtained as an object of research. The standard norms of large-horned black mole skin, goat skin and calf cow skins leather raw materials used in research GOST 28425-90 Sryo kojevennoe. Technicheskie uslovia. requirements to comply with [10].

Experimental and practical tests were carried out in the conditions of the experimental testing laboratory of “Angren charm invest” LLC in Angren city of Tashkent Region [11].

The preparation carried out, received oozing, and oozing processes the technologies for conducting research, the defects generated in the process and operas were studied and analyzed by most scientific sources.At the same time, the technology of processing large-horned black mole skin, calf skin and goat skin, implemented at the enterprise, was taken as the starting source. Below is the process and operationality of the current technology being used at the enterprise” Angren charm invest " LLC

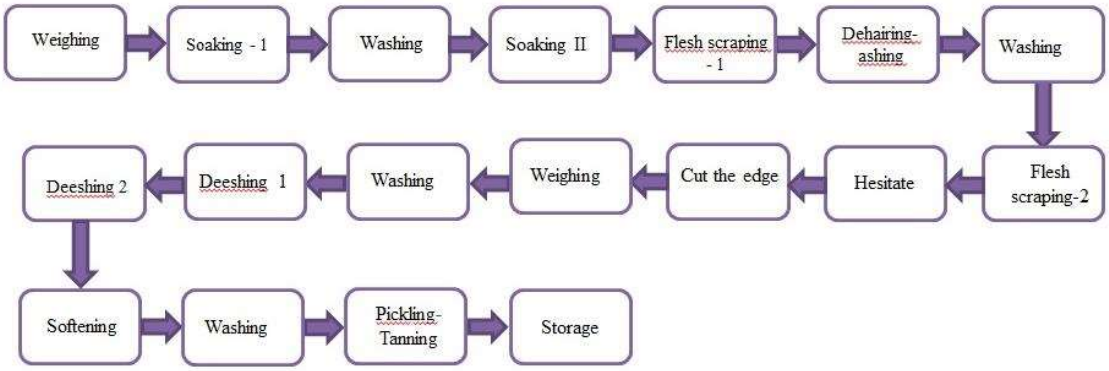

Figure 1. The sequence of operations and processes in the processing of large-horned black mole skins (enterprise methodology)

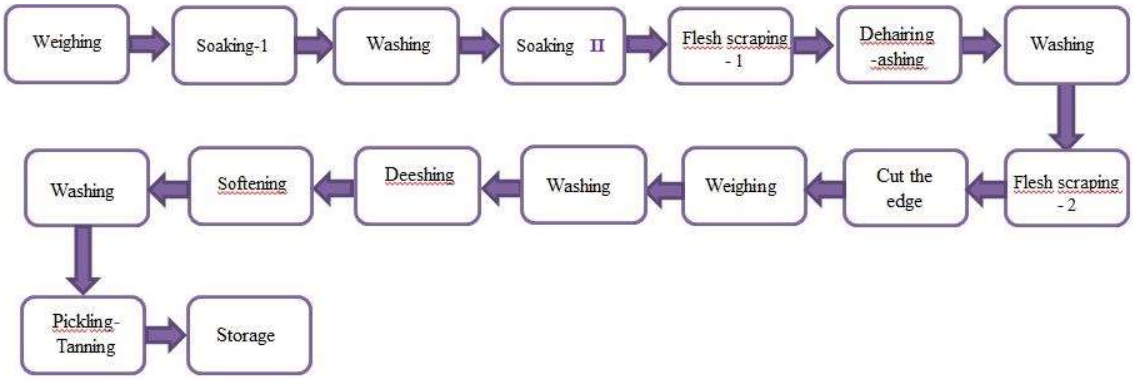

Figure 2. Operation and sequence of processes in calf skin processing (enterprise methodology)

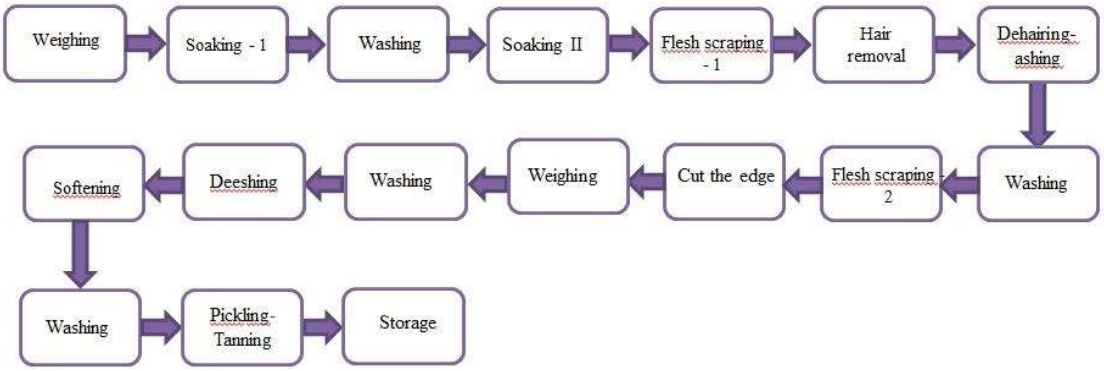

Figure 3. The sequence of operations and processes in the processing of goat skins (enterprise methodology)

On the basis of the improved technology presented above, chrome-plated hinges were obtained. According to this technology, the coagulation process was carried out in two stages, and in order to accelerate the “coagulation-II” process, the surface active substance (SAM) Dragon 3000 and the enzyme preparation Letan SE2 substances were applied. As a result of the application of these substances in the process of coagulation, a reduction in the process time by 8-10 hours were achieved, and uniform coagulation of the skin raw materials by surface and thickness was observed. The moisture indicator on the skin tissue after the” IV " process was 66-68%.Wool layer deposition-in sangop processes, quenched

oxac and sodium sulfide substances were applied, and the skin raw material was transferred to the golyo state. In the proposed technology, wool shedding and sangop processes are carried out in the coagulation solution itself, in which water consumption is also saved. As a result of the use of SAM and enzyme preparations in the process of coagulation, a reduction in sodium sulfide and oxac consumption by 30-40% was achieved, and the duration of the wool layer pouring-sangop processes was reduced to 12-14 hours.

From sources it is known that the most harmful effluents in the production of leather are formed in preparatory processes. When processing 1 ton of leather raw materials in leather production enterprises, harmful effluents are formed at 9-15 M3 volume Effluents in these processes include sulfides, oxac, broken down wool protein keratin, globular proteins, proteins other than collagen, and products that have switched to the soap state of natural oils in skin tissue [12-14].

The condition of the skin in the current and proposed technology was organoleptically controlled. The proposed variation noted the uniform staining of the skin tissue and the absence of defects found in the sangop process in its surface layer.After wool-shedding-sangop processes, mechanical operations of mezzreening and dualization were carried out. Skin tissue with a surface layer surface was processed in subsequent “de – ash” and “De – Ash”, “enzymatic processing (softening)” and “Pikeling-ash” technological processes. The groats (spilok), which did not have a surface layer, were processed according to the current technology.

The research and testing methods in the study of the properties of experimental samples of tanned leather, finished leather, shore , split, calf leather and goat leather obtained in the studies were carried out in cooperation in the laboratory of the scientific center of the “Institute of general and inorganic chemistry of the Academy of Sciences”.Description and principle of operation of the Mac-Ben-Bacra vaacum device of measurement of adsorption isotherms.In various adsorbents, the adsorption isotherms of vapors of gases and liquids are studied in high vacuum Mak-Ben-Bakra scales. The high vacuum Mak-Ben-Bakra device scheme of adsorption research is shown in Figure 1.

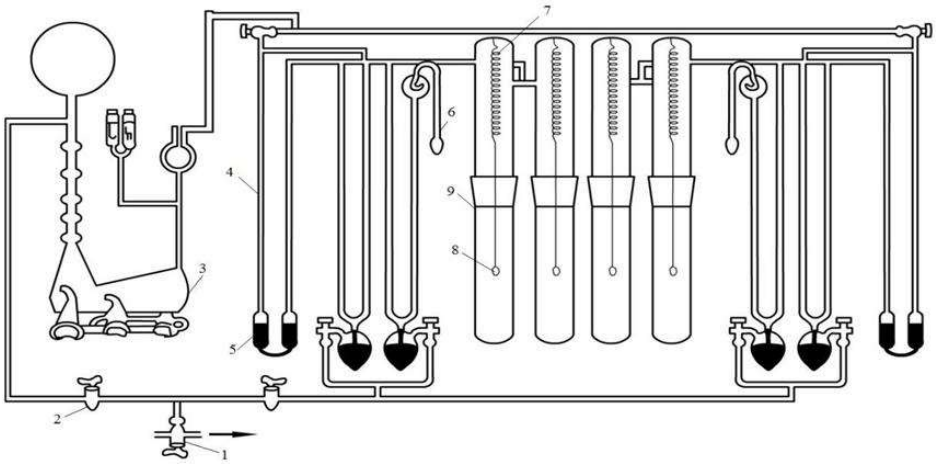

Figure 1. Mac-Ben-Bakra vacuum device scheme of measurement of adsorption isotherms. 1,2-cranes; 3-oil diffusion pump; 4-Mercury u-wire monometer; 5-Mercury; 6-ampoule for liquid adsorbtive; 7-Quartz SPring; 8-adsorbent Cup; 9 - calonna to which adsorption processes go;

The device is powered by a highly sensitive Quartz coil. Its sensitivity level is 1,78-10-3 kg/m. The MC-Benn-Bakra structure featured a glazed Calonne, Quartz spirals, and adsorbent pans (special cups). At the time of the research work, the adsorption Calonne (tube) with adsorbent samples is held in an aqueous thermostat at 20 °C at a kharorat resolution of 0.1 °C. The main working parts of the structure and working system of the device are structured as follows: - kalonnas (provided with cups, from adsorbent samples being studied to cups), which go to the processes of adsorption of quartz spring 1 gr is measured on the analytical scales in accuracy), - forvacuum pump (branded VN-461m), - diffusion pump (residual pressure in the system is 1.33 • 10-3 Pa. until it creates a vacuum) it is supplied with a screw, the pressure in the system is controlled by a thermovacuummeter (Vit-2 brand). - U - shaped manometers,-lovushka (which functions to capture various gases and water vapors in the system with liquid nitrogen), - ampoules where adsorbates are placed and cranes are placed to separate the parts of the device from each other. Forvacuum pump and diffusion pumps are 1-10-5 mm in the adsorption device.s.who. until it becomes vacuum dressing. The pressure difference in U-shaped monometers is measured using a Type V - 630 cathetometer. The cathetometer has a resolution of 0.05 mm. The samples prepared for study are ground in an agate mortar to a powder state and, after mixing well, pulled out in 1 gr microns, scales and placed in a cup. The pressure in the system is stabilized by vacuuming for 6-8 hours [15].

Results. Organoleptic investigations controlled the strength of the leather surface curtain, the separation of the leather surface curtain from the mesh layer, and defects that could form in the leather surface layer. The microgovac, mesogovac, pore radius, saturation volume indicators of the experimental samples were determined, and the properties of chrome-plated semi-finished hinges were analyzed.

Table 2.

The results recorded in laboratory analyses

	Shore	Ready leather	Split	Goat leather	Tanned leather	Calf
Monocavate capacity mol / kg	3,426	2,701	2,801	2,950	0,792	2,704
Specific surface, m2 / g	222,73	175,62	182,09	191,82	51,47	175,79
Saturation volume	0,2592	0,2186	0,1969	0,2155	0,1257	0,2092
Micropore	0,1787	0,1400	0,1453	0,1485	0,0882	0,1306
Mesoporous	0,08	0,08	0,05	0,07	0,04	0,08
Hollow radius, nm	2,33	2,48	2,16	2,25	4,88	2,38

Table 2 Comparison of the physical and mechanical properties and appearance of experimental and control leathers.According to the data in Table 2 presented above, the physical and mechanical property indicators of experimental samples were found to be some good.

Discussions. Among the physical mechanical properties of natural leather, the role of its porosity is inherent in separate since this magnitude is not only

the density of leather, but also the range of hygienic properties. Moreover, due to the lack of accurate data on the density of the skin in determining the quality of leather raw materials prepared in Uzbekistan, the research on the density and porosity of local leather has scientific and practical relevance. In the research carried out, we have identified the characteristics of semi-finished products from leather with chrome plating from shoes, from goat, calf, sheepskin and from ULR, and we have estimated the results obtained.In characterizing hinge porosity, we have identified the presence of monolayer, effective radii, meso and micro porosity as amorphous bodies, and the relationship between them. Experiments have shown that charms from different skinninig pores , their quality and number are different, and there are some laws.

Conclusion. In the research carried out, it was achieved to accelerate the preparatory processes in the technology of manufacturing shoe top leather and to reduce the consumption of water and chemicals in the wool layer-sangop processes in leather production, to reduce the amount of environmentally harmful sodium sulfide and oxac in industrial effluent. The micropore, mesopore, pore radius, physico-mechanical properties and appearance of chrome-plated leather samples obtained in the studies were studied and the results obtained were analyzed.

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