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DEPARTMENT OF TECHNOLOGY OF LIGHT INDUSTRY AND DESIGN

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DEVELOPMENT TECHNOLOGY OF USING SECONDARY OILING PRODUCTS DURING THE GREASING PROCESS OF KARAKUL SKINS

Direction of foundation bachelor:
5320900 – Construction and technology products of light industry

FINAL QUALIFICATION WORK

Scientific adviser, d.s.t., prof : Kodirov T.J.

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INTRODUCTION

The order of the Cabinet of the Republic of Uzbekistan №15-F of the Complex of actions for leather expansion of release products approved in January 16, 2008 from genuine leather and high-quality leather substitutes, first of all, of sports leather shoes and stock "O'zbekcharmpoyabzal" association and the Tashkent institute of textile and light industry needed to develop offers on localization production of raw materials and materials for the enterprises of the leather industry.

Application for a greasing skin of natural fats and oils provides high elastic-plastic and operational properties of leather. Now in the leather industry still a significant amount of animal fats and a vegetable oil which along with deficiency, and also need of their direct use as the fattening material for greasing, possess essential shortcomings is applied. These shortcomings consist in convertibility of the chemical composition and physical properties of natural fats and oils that predetermines their tendency to oxidability, revivification and other changes, negatively influencing quality of skin in the conditions of her production and storage [1-2].

However, deficiency of natural fats, high cost, and often and poor quality set a task of replacement with their new fattening materials which aren't conceding on technological properties natural.

The having circumstance leads to aggravation of a creation question for the leather industry of the highly effective fattening materials.

Due to the limitation of natural raw material resources, and also those tasks which are set for the leather industry - increase in production improvement of quality and expansion of the range, the leather industry I have mastered use of the synthetic fattening materials, but still limited in assortment.

For expansion of the range of the synthetic fattening materials and emulsifiers on their basic and their applications instead of scarce and expensive natural or natural fats in processes of production of skin in this work the task - receiving on the basic of collateral and the by-products of the food industry of essential oil having the improved fatty properties, development of ways of their use in combination with other fattening materials on condition of replacement of composition of fats of the natural fattening substances has been set.

Development of a new method of receiving essential oils and technology of its application for a greasing of skin that it is represented very urgent. This phenomenon amplifies the fact that at us in the country and abroad researches in the field of receiving the new fattening compositions for the purpose of receiving a basic of complex essential oils, from collateral and by-products weren't conducted if to consider some works of search character.

I PART. DISCUSSION OF LITERATURES

1.1. Value of greasing process for the fur production

Natural fur is considered one of the most ancient materials for production of clothes since life of primeval people. A special role of a product from natural fur was played in Russia as this material was not only the savior from cold winters, but also the main source of fur for the whole world.

In primitive state people used fur as protection against cold, and also for production of a soft bed. After a while natural fur became an important element, both commodity turnover, and means of payment. Fur was exchanged for jewelry, metal and weapon.

Natural fur materials are expensive because of they have many advantages. Thermal insulation becomes the main goal of fur. The fur perfectly copes with this goal. Besides, natural fur is hygroscopic, which mean that it contains a body in dry heat. The hair structure of fur is air-permeable, so that it allows a body to breathe. Products from the natural fur are elastic, they hold a form and long time keep appearance, therefore they are not rumpled. Also, fur possesses good wear-resistant characteristics. For account of scaly structure of fibers fur has property to remain pure. Also products from fur rather easy, have ability to reduce stress and to normalize blood pressure. Additional properties of natural fur depends on a species of a small animal from which fur is manufactured.

On statistics nowadays a variety of types of fur is quite big now. In total, there are five groups of fur. For fur-bearing concern:

Fur of a mink is a valuable fur which is extracted hunting or cultivation. It is magnificent, density, high and silky fur. Coloring of the minks have got by hunting and cultivation from light-till dark brown and black color with blue fluff. Coloring of color minks are diverse, it can be blue, silver-blue, sapphire, steel, pearl, topaz, pastel, spotty and other shades.

Fur of a fox is magnificent fur with a thick puff. There are several kinds of foxes: fox red, pickleworm, coryza, mud diver, black-brown, silver-black, platinum, platinum white-faced, snow and others.

Fur of a squirrel is a soft silky warm short-haired fur which unstable to friction. Coloring on the ridge from darkly till light blue color, on the floor - from light gray to white.

Fur of a nutria is a soft silky fur with a long dense awn. On coloring nutrias are divides into standard (brown, yellow, orange, gray shades) and colorful.

Besides, Karakul lambskin fur divides:

Fur of karakul is valuable fur depending on purity of sheep breed, colors, gloss, silkiness, density of hair growth. On color karakul fur can be black, gray and colorful.

Broadtail fur is a soft silky brilliant fur with the moister drawing. On color can be black, gray and color. It has enough low wear property features and bad thermal insulation.

Although variety of fur are more, during produce the product we have to pay attention for which fur we are using and for whom. For example, using half-finished goods accouterment for men's is less, they are catfish, muskrat, karakul, pelt, rabbit, beaver and calf. In producing men's product hide of sable, polar fox, marten and fox aren't accepted.

Produce of children fur products often are chosen cheap (rabbit, pelt) half-finished goods.

Produce of women fur products are used the all type of half-finished goods without bear's and wolf's hide [3].

For account of wide scale karakul sheep breeding, karakul fur are taken in Uzbekistan which famous for the world. Karakul sheep are alone breed which recognized with meat, wool and yeanling, also precious karakul pelt in the world. Karakul sheep adjust well on fertile land, on desert plain and on difficult possibility which feed of other animals. These sheep are differ from other sheep with colorful of their skins.

Translation from Turkic Karakul is meaning - "The black lake" – which country is Uzbekistan, the homeland of the lambs giving fur of surprising beauty. Products from karakul fur strike with the refinement, variety of styles and coloring. Karakul fur is a symbol of luxury and a high position. The kings, grandees and notable persons were often represented in karakul clothes. From karakul fur sewed fur coats and headdresses, used it as a decor for camisoles. This refined fur – the natural organic product possessing also medicinal properties. Karakul fur received the name thanks to the area of the same name in Uzbekistan which is considered its homeland. It is fur of newborn lambs of the karakul breed. Their wool is characterized by the dense, elastic and silky hair growth, generating the unique, inimitable drawing from curls of various forms and the sizes.

Modern technologies [4] include a large number of various methods of processing of fur raw materials. Not many know what long way there passes each pelt to become good qualitative stuff for creation of fur production. We will consider step by step treatment methods of karakul pelt. Process of treatment consists of four stages: fermentation, tanning, greasing and final works.

One of the major processes for half –finished product of karakul is greasing. Greasing – means treatment raw materials by various fatty (emulsions) which have various structure depending on a type of raw materials. As a result of this processing of the pelt become elastic and not over dried that will directly affect quality of material [5].

The greasing is in introduction in a term of the fattening substances which, settling down on a surface of structural elements and between them, divide them into that gives to skin flexibility, softness and the increased water resistance. At the same time fattening substances are increased by mutual sliding of structural elements, facilitating orientation them under the influence of the deforming efforts. As a result tanning material gets the increased durability and plasticity [6].

The invention [7] treats ways of receiving the fattening means for the leather and fur industry. The way of receiving structure for greasing leather and fur include an oxidative sulfonation of natural fats or their mixes sodium biosulphite in

the presence of surfactant and the cobalt catalyst, differ in the fact that before an oxidative sulfonation into fat enter plasticizer as grade which use glycols in number of 10 - 40 mass fats, and as the cobalt catalyst use solution of nitrate cobalt.

Today, requirement of softer and more flexible skin grows. It is reached correct elections of the fattening materials for process of a greasing. In the course of a greasing in the fiber of skin it is greased with fat so after drying they will be capable to slip one above another and to make adequate compliance and softness. At a greasing, skin reduces its initial resistance of deformation because of lubricant of fibers. Such conduct is reflected below Jung's module or initial energy of deformation [8].

The way treatment of leather, [9] including neutralization of a half-finished product, dyeing, a greasing, fixing with organic acid and a retannage with organic tannin, distinctive in the fact that before neutralization the semi-finished product is in addition processed the structure containing mass. %: quaternary ammonium salt of triethanolamine - 70-90 and sulfuric acid - 10-30, at an expense of structure of 0,8-1,0% of the mass of a semi-finished product, a retannage is conducted after dyeing, a greasing carry out at a fat consumption 5-6% of the mass of a semi-finished product then in addition make the combined dyeing process - a greasing at a consumption of fat of 2-3% of the mass of a semi-finished product, and fixing is carried out in the presence of a chromic tannin in number of 0,5-1,0% of the mass of a semi-finished product.

Has studied [10] influence alkyl a chloride sulfonal in process of a tanning of a rabbit pelt, a sheepskin and a pig. And also the above-stated skins are studied previously tanned by aldehydes. It is determined temperature of a seal of under tested skin by a tanning method of alkyl-sulfonal-chloride. These results show that the traditional theory of a tanning of skin were obviously limited and that temperature of a seal didn't increase at a tanning the synthetic fattening substance, for example, alkyl sulfonat chloride. Therefore, it is possible to draw a conclusion

that alkyl sulfonat chloride doesn't show property of seal and only performs function of a greasing.

The way of production of velour from a split including retannage a chromic seal, neutralization, the first greasing the fattening emulsion in number of 5-6% of the mass of a semi-finished product counting on 100% fat, drying, sore, staking, soaking, dyeing, the second greasing and treatment by formic or acetic acid differ in the fact from the first greasing is conducted along with filling at liquid coefficient 0,8-1,0 and temperature of 40-45 ° C [11]. Successive processing by water solution of medicine Polynap 105 on the basis of the polymer of acrylic acid with a molecular weight of 30000-32000 neutralized by alkali, in number of 3-4% of the mass of a semi-finished product counting on the dry rest, a synthetic seal in number of 2,5-3% of the mass of a semi-finished product counting on the dry rest fattening an emulsion, water dispersion of medicine Polynap 22 on the basis of copolymer of a butyl acrylate, methacrylate acid and styrene in number of 1,5-2% of the mass of a semi-finished product counting on the dry rest, and further - formic or acetic acid in number of 0,8-1% of the mass of a semi-finished product, the soaking is conducted in water solution of non-isogenic surfactant at 50-60 ° C, and dyeing and a greasing conduct at liquid coefficient 0,8-1,0 and temperature of 50-60 ° C at a consumption of dye of 6-7% of the mass of a semi-finished product and fattening emulsions - 3-4% of the mass of a semi-finished product counting on 100% fat, in the presence of mix of a naphthalensulfonat and high-molecular anion surfactant at their mass ratio 75-99:1-25 in number of 1-2% of the mass of a semi-finished product.

The way of development of hydrophobic skin including a semi-finished product retannage a chromic seal, neutralization, washing, dyeing, a double retannage with organic seal: the first - a polymeric seal, the second - mix of synthetic and vegetable seal, a waterproof greasing, processing by organic acid and a repeated retannage a chromic seal, differing in the fact that before neutralization carry out additional washing, dyeing make after the second retannage, at the same time neutralization, the double retannage and dyeing carry out at liquid coefficient

0,5-0,7 and the waterproof greasing is made in the presence of 20% solution of a product of interaction of amino alcohol with fatty acids of vegetable oils of C12 fraction - C22 and boric acid at their molar ratio 2:1:1 in mineral oil in number of 0,5-1,5% of the mass of a semi-finished product [12].

The materials for greasing leather received from remaking of petroleum products on the chemical composition and especially a structure significantly differ from vegetable and animal fats and products of their modification. However a number of physical properties and the fattening abilities allow widely accept them as components of fatty mixes [13].

The structure for a greasing of skin with the painting effect including the fattening material on the basis of natural fats and synthetic fat substitute and the pigment differing in the fact that as a pigment it contains a fine-grained color pigment with a size of particles less than 25 microns at the following ratio of components, mass %:

The fattening material - 80-95; the pigment - 5-20. [14].

The offered structure allows to receive leather with the improved physic mechanical indicators and to expand the range of the fattening materials. Invention formula: The structure for a greasing of leather including the sulfonated fish oil, the fattening emulsion steady against effect of electrolytes differing in what it in addition contains emulsal at the following ratio of components, mass. The sulfonated fish oil 13 – 20. The fattening emulsion steady against effect of electrolytes 55 – 77 Emulsal 10 - 25 [15].

The experimental parties of the fattening pastes received on the basis of various raw materials used for a greasing of samples of a fur sheepskin. In control option samples were fattened emulsions of industrial I-12A oil or paste lipodermliker-2. Pelts, greasing with pastes, on quality and content of fat are close to the skins processed by the fattening paste lipodermliker-2 [16].

It is established that the fattening VNIIJ pastes can be used for a greasing of different types of fur. It is the most expedient to apply VNIIJ-1 paste instead of the fattening paste lipodermliker-2 for duck greasing of furs [16].

It is studied, [17] the way of treatment of leather including dyeing, greasing, fixing and an additional greasing cationic fat, differ with that fixing is carried out by complex salt of acetic or formic acid and a diethylenetriamine of the general formula $C_4H_{13}N_3(RCOOH)_n$ where R - CH_3,H, n = 1 - 3, in number of 2 - 4% of the mass of skin, and as cationic fat use oxide of oxyethylated octadecylamine.

The best results are received when using in composition of technical fat with extent of ox oxyethylation 40 mol/mol of acid. Leather which greasing with the specified structures, at all other equal indicators has got an organoleptic assessment is 4,5 points. The received results confirmed a basic possibility of replacement of natural fish oils with oxyethylated technical fat [18].

The way of treatment which including animal skins the following the next operations: apply oil, fat or polymer on a skin, process a skin in the compressed gas, and the amount of oil caused on a skin, fat or polymer makes less than 20%, less than 15% are preferable, less than 10%, per the mass of a skin are especially preferable, and the skin is processed by means of the compressed carbon dioxide with a pressure below 70 bars and temperature below 25 °C [19].

1.2. The fattening compositions applied for process of a greasing

One of major factors of release of competitive production is use of the high-quality chemical materials and technologies are being had a complex of the useful technological properties reducing product cost, solving an environmental problem, and also, the qualitative parameters of tanning materials is being raised.

The fattening substances applied in the tanning industry can be divided into three groups: natural fats and oils, products of modification of natural fats and oils, products of oil refining and the synthetic fattening substances.

|Recently terms required of great demands on consumer properties of natural leather and the general deficiency of the fattening materials were a basic for development of the new preparations which have multipurpose properties.

The oil-processing industry has considerably expanded the range of the fattening substances produced synthetic. It is issued: the tanning emulsifying paste,

synthetic fatty acids, synthetic fatty alcohols, jiramol, sulfosol, and etc. All materials are products of processing of hydrocarbons. They with success replace natural fats in production of leather and fur. In standard techniques of production of leather it is recommended to use in fatty mixes from 50 to 100% of the synthetic fattening materials [20].

The way of receiving structure for greasing of fur and leather including an oxidizing sulfonation of natural fat sodium biosulfite in the presence of surfactant and the cobalt catalyst, differing in the fact that as the cobalt catalyst use solution of nitrate cobalt in number of 0,005 - 0,05% in terms of 2% cobalt to the general fat after an oxidizing sulfonation chlorinated paraffin wax with the content of the connected chlorine of 24 - 29% in number of 35 - 72% of reactionary weight enter mix of the anionic and nonionic emulsifiers taken at a ratio 0,6 - 0,8 into reactionary weight: 1, in number of 8 - 20% of reactionary weight and process carry out at pH 6 - 8.

As appears from the given examples, the proposed technical solution in comparison with a prototype has the following advantages: economy of natural fats by 2-3 times; increase in stability of structure at storage; decrease in temperature of process and reduction of time of reaction of a sulfination, reduction of content of impurity in the final product; availability of the used catalyst [21].

It is known [22] work on receiving the fattening components with various functional. It is studied leather – technological properties of the fattening emulsions. A lack of these emulsions is using fats of an animal origin, i.e. fats of marine animals (whales, seals) that become more and more scarce. Besides, these fats possess an unpleasant smell which existence inadmissible in leather – fur products, and elimination is connected with long and labor-consuming processing of production. And also, in connection with acute shortages of the import fattening components and high cost of natural fats have been investigated a possibility using naphthenic acids of a local origin in the process of a grease tanning materials.

The method of receiving compositions for greasing leather which include a sulfination of fats sodium biosulfite in the presence of surfactant, the catalytic

agent and the accelerator of response, differing in what as the accelerator of response is used by C10 row hydrocarbons - C40 or their chlorderivative in number of 5-50% [23].

It is studied composition and properties of technical animal fat, and also a possibility of its modification for application as the fattening component. For modification of technical animal fat used oxyethylation method by fat processing with an ethylene oxide. To define influences a level of oxyethylation on changing composition and properties of the modified fat was carried out a row of experiences with different ratio of an oxide ethylene and the free fatty acids (5 — 60 moles on 1 mole of acid).

It is received the experimental data about properties of emulsions which air of naphthenic acids (NFK) containing in the composition, respond to demands (on value pH, stability, to a charge sign) shown to emulsions, the skin of a chromic tanning applied to a greasing [24].

The research was conducted [25] for check of a possibility of receiving the fattening and emulsifying products on the basic of the tall fatty acids allowing to replace in whole or in part natural fats and products of their treatment.

Ether representing of fatty acids, from tall fatty acids of the PL brand their ethylene-glycol ether which then have been subjected to sulfation. In the ready neutralized sulfoproducts the maintenance of the sulfonate groups connected with an organic part make up 2,6 — 4,6%. The received products had the good emulsifying ability at their content of 20 — 40% in composition with synthetic fat, spendle oil and other fattening substances.

It is studied a possibility of the new fattening substance synthesized at department of technology of leather and fur MITLI on the basic of the aliphatic sulfochlorides which are partially modified by polyatomic alcohols.

It has been established that the sulfochloride fattening substance forms the water emulsions of white color steady against effect of various electrolytes in the range pH 2 — 9 including to the tanning compounds of chrome. The stability of an

emulsion can be changed purposefully. This property of fat allows use it in the process of a phase greasing [26].

The research is conducted [27] opportunities of modifying the waste products of pig's pelt and the killed birds for receiving ether of fatty acids and shortly chain alcohols. The specified waste contains from 2 to 50% of free fatty acids. Transformation of shortly chain alcohols into the corresponding monoester is carried out with the help of both alcoholysis and an etherification of free fatty acids. However, in view of that during an etherification it is necessary to separate and mark out carefully in water equivalent amount of the free fatty acids which are contained in waste as the modifying alcohol strictly n-butanol as this is flammable solvent is required, leads to formation of azeotropy mix which leads a disbalance reactionary the environment.

Until now, it is wide used fatty acids of castor oil in the form of production wastes, for increase in their range. In this regard, there are improved the technology of greasing process on the basic of by-products [28].

And also, in connection with acute shortage of the imported fattening components and high cost of natural fats have been investigated a possibility of using naphthenic acids of a local origin in the greasing process of tanning materials [29].

It is designed [30] composition for an emulsion greasing on the basic of application phosphorus-containing surfactant (triethanol-amine salts of alkylphosphorus acids) in combination with the neutral fattening components - fatty alcohols - efosol, the chlorinated paraffin (rascal-clap-F) or other emulsifiers — the CFA oxyethylated amides, alkylsulfates. The shortage of an efasol is inexpediency application for technical and rigid leather as it is intended only for soft leather.

It is conducted researches [31] on receiving on the basic of petroleum oils of surfactants — water oil-soluble sulfonates, to their characteristic, studying of properties of the emulsions including these surfactant instead of sulfonated cod-liver oil, and a possibility of using such fatty emulsions for a greasing of skin.

Mixes for a greasing of skin contain constant amount of spindle oil and various ratios of synthetic fat, sulfonated cod-liver oil and anion water oil-soluble sulfonate in the structure.

From the point of view ecology, application of waste various oil of processing industries as the fattening materials is especially valuable. It is possible and to carry the fatty acids received by production of rape oil to such waste. In this regard for synthesis of the fattening material production wastes of nizkoeruk oil — fatty acids of colza have been chosen as basic raw materials [32].

The possibility of use derivative esters for a greasing of skin is considered. Ether one - two – triatomic alcohols and one - bibasic fatty acids interacts with polyethylene glycol with the subsequent sulfiration. There are products with the good fattening action which strongly contact leather [33].

Technical requirements to the products used as the fattening materials for skin it is subdivided into the initial requirements allowing to select from a large number of products those, which expediently then to put on further trials on the pro-validity to satiCFAction of the requirement leather - technological character, the products allowing to estimate at compositions from the point of view an opportunity and conditions of their concrete technological use in production of different types of leather.

In the Rostov tanning association studied distilled fatty acid, etherfied products (methyl ether), synthetic fatty alcohols and soaps. It should be noted that the high acid number of DFA isn't a negative indicator as characterizes not decomposition of fat as natural fats, and points to content in its free saturated maximum hydrocarbons. The practice of work proves a possibility of use DFA on an equal basic with synthetic fats (ethers) on condition of emulsification which is reached by saponification of DFA, at the same time they become emulsifiers [34].

It is studied, [35] synthetic fats in comparison with natural a number of advantages: aren't oxidized, have fungicide properties, are fungicidal on the chemical composition and physical properties. High temperature of melting of synthetic fatty materials promotes the best deduction by their skin in use, and

existence in their structure after saponification of free saturated fatty acids gives the chance to receive directly on pelt fibers water insoluble chromic or aluminum soaps. However the synthetic fattening materials can't replace completely natural fats, especially at a greasing leather of a chromic tanning.

It is developed [36] new preparation for an emulsion greasing of chromic leather for footwear top emulton which replaces the mix of fats recommended by techniques and material, ready to application. Due to polipolarity of initial raw materials (multifunctional oxygen-containing connections) emulton has a number of essential advantages before other synthetic fattening materials: it is emulsified well in water, doesn't contain the oxidized and resinous substances, steadily contacts skin show its softness. Greasing its leather has a pure front surface and a light surface, high adhesion of a covered film.

The research is conducted with using of methyl ether of fatty acids of C_{18}-C_{23} fraction which promote hardening of skin fabric, considerably increasing the water resistance of chromic leather, give its rather high rates of sorption - a desorption of vapors of water leather. All this demonstrates positive influence of the studied methyl air on properties of chromic leather and about expediency of their application for a greasing [37].

Authors of works, [38] researches on use of the biofat received on the basic of the purified liquid paraffin in structures for a greasing of chromic leather for footwear top are conducted. The greasing of skin the biofat samples containing various amount of phospholipids, and also his separate fractions was shown that the main role in increases in elasticity of skin we belong to phospholipids. Therefore for tests the biofat containing a significant amount of phospholipids that allowed change their content in the fattening mix in considerable limits has been chosen. However in this work that depending on the required elasticity the content of biofat in the fattening mixes has to be regulated to a certain optimum quantity depending on its structure and purpose of skin.

It is studied, [39] interactions vegetable oil with ethanol amine is taken from acrylamides which reacted with P_2O_5 for receiving alkyl of phosphate. The

fattening composition is developed in which alkyl of phosphate was mixed with the neutralized oil, surfactant chlorinated by paraffin and with emulsifier. The processed leather with these fattening compositions were been soft, full, elastic and colorful.

Introduction the complex mechanism of P_2O_5 phosphates in fatty structure is studied. Phosphates of castor oil and sulfonated phosphates and their use as agents is important [40].

It is reported that the fattening substance Seritol n the basic of phosphoric esters is developed for prevention of a berning a surface of chromic tanning leather after a greasing in vacuum dryers. It is noted that the substance Seritol is recommended to be applied to a greasing of clothes skin [41].

Exist [42] tendencies in a greasing of skin are connected with application of the fattening compositions containing not only synthetic, mineral, vegetable, but also polymeric fillers.

Draft [43] technology of a greasing - filling of shoe juft leather by new compositions of fats in composition the urea-formaldehyde pitches (UFP). Use of technology a greasing – filling with by-products of oil and fat plants in composition of MFS reduces prime cost of leather as they differ in rather low cost.

According to the conducted researches the optimum composition for a greasing of the following structure is offered: oxyfat of 50%, parachlorine of 35%, DFA of 15%. The samples, greasing this composition, by an organoleptic assessment and elasto-plastic indicators correspond to the best samples processed by individual components [44].

In process of increase at the range of the fattening materials and compositions offered for use in production of skin of different function need of development of fast, reliable and correct methods of an assessment of their plasticizing ability increases. In this regard, interest is presented with the research of influence of separate components of the fattening compositions on elasto-plastic characteristics of a semi-finished product and ready leather [45].

In work is used the straight line methods of treatment the upholstery leather which intermediate drying is excluded. It reduces the cost of production and gives saving of time and energy, however complicates a greasing. Perhaps, to carry out a preliminary greasing by materials resistant to low sizes pH during a pickling. It gives a number of advantages: there is no pasting of fibers when drying of the chromed semi-finished product, permeability of skin in the subsequent processes is improved. Fats in skin are distributed evenly, the subsequent extraction is facilitated. In a picking it is necessary to use 1-2% of fats of weight tripe. It is necessary to choose carefully fats for the main greasing. The neglect it can lead to decline in quality of skin [46].

As a result of researches [47] it is established that the nature of formation of volume of a derma at a tanning exerts impact at a greasing of a semi-finished product and considerably influences effect of a greasing. It is obvious that at a complex mineral tanning the effect of a greasing will be influenced by structure and a ratio of components in the tanning solution. Therefore this factor needs to be considered at selection of fats when sharing various by the nature of seal in production of skins.

In works it is shown that low-molecular liquids of the various chemic natural, chemically inactive in relation to a collagen, including the fattening materials on the nature of shine on mechanical properties of a collagen derma can be divided into three groups: the molecular plasticizers, structural plasticizers and substances operating on the admixed mechanism. In particulars, it was suggested that all main fattening materials affect a derma collagen on the mechanism of structural plasticization [48-49].

It is considered [50] the mechanism of influence fattening materials on physic-mechanical properties of a leather. It was received in both a model experiment, and in semi-working conditions, demonstrate that "Parachlor-250" is full-fledged substitute of the main fattening materials, including cod-liver oil, and use of the oxidized petroleum oils as a part of a fatty admixture in number of 30 — 50% is expedient in case the skin needs to give the increased softness.

The theory about interaction of the charged parts of integumentary composition with the functional groups on the surface of skin is developed. The environmentally friendly technology of a fat - wax border of the new range of leather is created and entered. The operational indicator method of determination of a charge a surface of skin is given. It is set regularities and the mechanism of process of formation of a fat - a wax covering taking into account colloid physical properties and anionic and cationic balance of the researched systems. The new technology allows exclude use of harmful organic solvents, to lower expenses and to apply domestic chemical materials, to raise a rating of finished goods [51].

Based on results of a study of process formation and fixing of structure of leather, the technology which gives the chance to receive new types of the leather capable to save the properties after processing by solution of the surfactant (SAS) is developed and entered. It is proved that the fixing of the reacting substances connected to step-by-step corrupting of rings to aminoform, and also with formation of its connections with unsaturated composite the greasing of compositions and dyes on a surface of structural elements terms which provides their resistance to effect of surfactants solutions. The conclusion which the new technology gives the chance to exclude environmental pollution by organic compounds, to apply chemical materials, which production organized in Ukraine is drawn [52].

According to the patent [53] carry out an oxidizing sulfination of natural fat by sodium bisulfite in the presence of surfactant and nitrate cobalt in number of 0,005 - 0,05% in terms of 2% cobalt to the general fat. Further enter chloral paraffins with the content of the connected chlorine of 24 - 29% in number of 35 - 72 mass into reactionary weight. % of reactionary weight, mix of the anionic and nonionic emulsifiers taken in the ratio (0,6 - 0,8): 1 in number of 8 - 20 mass. % of reactionary weight and process carry out at pH 6 - 8. The invention belongs to fur and tanning industries and can be used at the enterprises occupied with production of the fattening structures.

Invention [54] treats the tanning industry and it can be used for a greasing of skin. The structure for a greasing of skin contains the following components, mass %: sulfonated cod-liver oil 13-20; the fattening emulsion steady against effect of electrolytes 55-77; Emultal 10-25. The offered structure allows to receive leather with the improved physic-mechanical indicators and to expand the range of the fattening materials.

The invention belongs to the fur and tanning industry, in particular to structures for greasing leather and fur. According to the patent the structure for greasing and fur contains, mass VNIIJ paste 20-60; emulsifier 8-20; the caustic soda 0,1-0,5; chloral paraffin the rest. The offered structure for a greasing has the following advantages:

1) the structure represents mix of the mutually influencing components which are chemically interconnected with; 2) the amount of impurity in a look the peroxide of connections in the final product is considerably reduced; 3) all components which are a part are available raw materials; 4) stability of structure at storage is increased; 5) when processing leather and fur, despite distinction of technologies, it is possible to achieve a uniform color of products anion dyes; 6) high degree of a fattening of products, without existence of spots is reached [55].

To be brought in the review sulfation agents, methods sulfiration and technological conditions of reaction of a sulfiration. Examples of sulfonated ether with SO_3 and evaporation of H_2SO_4 with use in the fattening structure are a little offered [56].

It is synthesized phosphate for stuffing and her production consists of castor oil – 100; P_2O_5 – 10-25; H_2O_2 – 2-4; NaCl solution (3-5%) - 100; NaOH solution (15-259.), about 50-10 ether. Then it is entered settlement quantity a hydroxylation for washing and neutralization and then salts are entered [57].

It is applied [58] water polyurethane fillers in the fattening compositions. It is studied effect of the fattening compositions on properties the greasing of skin. It is defined that the content of fat in leather can make from 40 to 60%.

The greasing was carried out on sulfitation of oils and fats and in combination with suitable components. The fattening compositions were excellent getting abilities and it is better filled leather pores [59].

It is received [60] composition on the basic of CMST and also, consisting from castor oil, ether of maleic acid and styrene. It is defined that the active component of composition, can improve considerably processes of a retannage and greasing including properties of a semi-finished product at the expense of the best combination from a chromic tanning of skin. The processed leather was better than completeness, perfect softness and flexibility.

The review is devoted the new fattening material for a greasing improved skin. The fattening material was received by interaction of naphthenic acids from diesel fuel and mineral oils. The received complex mixes up with water with formation of 5,0% of an emulsion which is used for a greasing [61].

The thesis is devoted use of new technology leads to reduction of amount of the used materials, lack of sewage after a picking and a tannin greasing, to increase in the area of a ready semi-finished product, improvement of organoleptic and physic-mechanical indicators of sheepskins [62].

It is developed [63] the fattening structure of content alkoxylenated C_{6-14} of an alcanol and alkoxylenated C_{12-24} fat alcohol. As a result of mixing alcanol - 180, ethoxylation C_{16-18} fatty alcohols - 200 and ethoxylation C_{24} fatty alcohols - 140 kg at 60-80 °C steady emulsifier has given to temperature ethoxylation C_{10}. Use of these products in a greasing of skin is a good example.

Invention [64] belongs to the synthetic fattening substances and the upholstery of materials, exactly for the greasing of processes can be used for process. For process of a greasing it is used sulfosuccinate which it is received from propoxylated etoxylated cetyl stearyl alcohol, a maleate and sulfate of sodium.

1.3. Influence of the fattening materials to physic – mechanical properties of a derma

Improvement of technological processes, improvement of quality of leather and expansion of their range are closely bound to creation of new chemical materials or improvement of already available.

The greasing is one of the main processes of tanning technology along with the preparatory, tannic and finishing operations defining operational properties of the ready leather. According to definition of well-known plasticization process in a physicochemical of polymers, the greasing of genuine leather is a plasticization of a collagen of an integument, i.e. introduction to a collagen of the fattening substances giving to skin softness, flexibility and a good signature stamp [65].

In open joint-stock company scientific research institute of fur industry the new highly effective Mexsinol fattening material for an emulsion greasing of fur on the basic of sulfonated natural fats and synthetic components is framed. Mexsinol represents plastic liquid of light-beige color, pH a 10% emulsion 6,0-8,0 forms water emulsions, steady within 2 hours, in the presence of standard electrolyte and without it. Dressed skins with Mexsinol's use had a white, soft and plastic skin tissue, clean hair coat. The pilot batch of Mexsinol is released [66].

The systematic research has shown that sulfonated cod-liver oil gives vent the greatest skin on the ether, than sulfonated lanolin much more in comparison with sulfonated hoofed oil and sulfonated synthetic sperm oil is nearly 10% more. Influence of these fats on physic-mechanical properties of skin is shown [67].

It is noted, [68] that fur sheepskins, the greasing structures received on the basic of not sulfonated ethylene – propylene glycol and sulfonated propylene glycol ether of natural naphthenic and synthetic fatty acids, by complex criterion of quality for 20 and 28% exceed a similar indicator of sheepskins, the greased the control structure including oil industrial I12A that indicates higher and consumer properties. Comparison of levels of quality on the basis of complex criterion for evaluation of the received sheepskins has confirmed expediency of application in

technology of fur production of the fattening structures on a basis ethylene - propylene glycol ether of natural naphthenic and synthetic fatty acids.

The effectiveness of greasing process fur of sheepskin substantially is defined by the natural used substances. Use of the new chemical materials which aren't demanding change of the key parameters of processing have high technological properties and providing stability of operational characteristics of fur sheepskins is in this regard expedient. Earlier structures have been developed for a greasing of fur skins on a basic ethylene and propylene glycol of ether natural naphthenic kerosene fraction and synthetic fatty acids fraction of C_7—C_9 which physical and chemical properties are given in work [69-71].

It is offered the liquid, forming stable emulsion means for carrying out tinctorial-greasing processes in production of leather and fur. Subjected to a sulfonation, phosphate coating, ethoxylation, amidation or interaction from sulfoquinate, it contains (%) 10-90 the fattening fundals, received from nonsaturated fats, oils or vosk of a natural or synthetic origin. After the preliminary oxidizing process by oxygen of ether or other corresponding oxidizers with decrease iodine number to $\geq$ 20 units. 10-90 retannage the fundals, 1-10 substances regulate value pH and 0-30 other additional substances. Fundals is applied in the form of water solution or dispersion [72].

Influence of several combinations of the fattening agents on the angle of wetting leather of a chromic tanning has been compared. It is studied, properties of the fattening Corilene FP, Corilene F 360, Truposol ELF and Lipsol BS components and it is defined that increase in number of the fattening agents at certain cases of an emulsion greasing leads to increase to extremely regional corner [73].

For the purpose of an assessment physical, chemical and stability of properties to an acrylic basic of the polymeric fattening substances, the analysis of skin is carried out. Tests of the polymeric fattening substances have shown excellent fixing of fat on leather vet-blyu [74].

For the purpose of definition of physical, chemical and mechanical properties of leather is carried out a series of analyses of the polymeric fattening substances on an acrylic basis. Research [75] has shown excellent fixings of the fattening substances on skin vet-blyu, and also rather good result, tensile strength.
The new fattening material [76] with use of pork fat are synthesized. Hydroxyl groups have been entered into pork fat by interaction with ethanol of monoamines. The received fat had good lubricant properties, can make good waterproof leather and expands the range of the fattening substances.

The invention [77] belongs to finishing operations of skin, straight a way of a greasing with essential oils. The way includes also perfumery products, receiving fragrances or essential oils.

Authors of works [78], as the fattening composition paraffin - 14.13, wax - 2,56, surfactant - 10,2, fatty acids - 6,50, emulsified oil - 0,94, een-80 - 1,92, a penetrator - 2,47, oil turpentine - 2,00 g. The deionized water is added to the fattening composition by 100 ml. The process leather this structure were bright and soft to touch.

It is studied [79] effect of a greasing and drying on physical properties of skin. An optimum dose of sulphated cod-liver oil and rape oil, and also, castor oil and mineral oil have made 15, 8, 7, and 8% respectively by a technique. Optimum conditions of drying carried out at 45 °C, during 4 h.

Article [80] belongs fattening fundals on the basic of an animal and a phytogenous of oxysulfated oil in the course of a greasing. For oxysulfating used animal fat from 30 up to 31% of masses. h. Process of oxidation was carried out at temperature of 110 °C, within 8 hours and a sulfinisation within 6 hours. The number of the catalyst is made 1,5% of mass of the used products and added 10% of water. By researches it is shown that the received emulsion it is stable within not less than one day at the room temperature. Products get into skin well and the received skin soft, easy, but flunk.

For a greasing pork oil, polyethyleneglycol of maleic anhydride and sodium sulfate in molar ratios 3.5 are used: 3: 3.

The reactions of alcoholysis, eterification and sulfination were carried out at 140 °C, 90 °C and 75 °C of temperature. It has shown use of results that stuffings have excellent softness, the improved effect of stretching and uniformity to the tense leather on all the surface [81].

Subject of the invention [82] has studyed communication of the fattening materials with dermy and enzymatic by method and studying of distribution of all types of solid and liquid hydrocarbons on the surfaces of skin.

II. EXPERIMENTAL PART

2.1. Choice of objects of a research

Traditional raw materials for receiving the grease materials are fats of animal, natural and a phytogenous. Research of new raw sources for their receiving is an important task which has to be solved by use, earlier deeply not investigated and not applied to these purposes. Secondary resources of oil and fat plants, such as the distilled fatty acids (DFA), the crude fatty acids (CFA), soap stock and fusel belongs to such materials.

For receiving, researches of their properties and development of technology of the fattening materials for a greasing of leather have been investigated on various chemical materials and reagents. When performing work various salts, acids, solvents and other chemical materials have been used.

By the known technique various concentration of the fattening materials have been prepared and the chemical analysis is carried out them.

2.2. Physical and chemical constants and characteristics of initial substance researching

As it has been noted above, for creation of more effective fattening substances and development considerably the development of technological processes, it is expedient to use in the course of a greasing of skin of esters which provides uniform distribution of fats to structures of skin. In this regard, on known of literature of techniques [83] various compositions have been prepared and carried out them the chemical analysis.

The obtained data of physical and chemical constants of value, especially, used solvents completely corresponded to literary data [84; page 785].

Cotton soap stock - 17-18-RUz-38-79, color dark brown with grayish shades, a consistence at 20 °C pasty. The mass fraction of the general fat in soap stock not less than 35%, a mass fraction of the general fatty acids and low-fat substances in the mass of soap stock not less than 30%.

The distilled fatty acids were used products of OOO Yangiyulsky oil-fat free from gossypol, are painted in light yellow color. 73% of unsaturated acids from C_{16}-C_{18} soap stock with an average molecular weight of 276 are a part of the installed fatty acids from soap stock. Mix of fatty acids with acid number of 206 mg includes the KOH lauric (0,43%), myristinic (16,7%), palmitic (55,3%), stearin (10,4%) and olein (17) acids.

Fat animal technical - (State standard specification 1045) the mass of dark brown color. Contents in % water - 0,5; insoluble on ether - 0,5. Temperature of setting of fatty acids - 38,0 ° C. Acid number – 10 [85; page 86].

Spindle oil – is transparent liquid, reactions to litmus - neutral (With SSS 20799). It is received in the form of the fraction following heavy solar oil. The density temperature is 15 °C - 0,896 g/cm3. Acid number - 0,12. Flash temperature - 172 °C [85; page 86].

Synthetic fat (Technical requirements 38.30101-80) - the uniform product of light brown color received by an eterification ethyl glycol mixes CFA of technical brands A and B. Temperature of dropplead - 36,5 °C; acid. Number - 15,1; saponification number - 190,5; iodic number - 4,5; contents, %: not saponified - 7, moisture - 0,1 [85; page 86].

Petroleum paraffin — is represents themselves - mix of solid C_nH_{2n+a} saturated hydrocarbons. These are transparent white and yellowish plates. It is received from the high-boiling distillates paraffin and high-paraffin petroleum cooling, crystallization and pressing, also by distillation of brown coal and combustible slates. Depending on melting temperature paraffin subdivides on soft (38 — 42 °C), average (44-46 °C) and firm (50 — 52 °C). Content of oil in the crude paraffin to 5%, in cleared 0,6 — 2,3%. It is applied as a part of fatty mixes at a greasing of leather to a footwear bottom [85; page 384].

Fusel — was used a by-product of spirit fermentation of Biokimyo hydrolytic distillery (Yangiyul city, the Tashkent region), contain as impurity in not rectified ethanol (alcohol raw) received by fermentation and are allocated from

him in the course of rectification. Fusel represents oily liquid with a pungent unpleasant smell, from light yellow till red-brown color and with a density of 0,83 — 0,84 g/cm^3 (at 20 °C). The structure and properties vary depending on raw materials and the modes of fermentation and selection of fractions at rectification, an exit at alcohol rectification a raw — 0,3-0,7%. The main component — one-atomic saturated C_3-C_9 alcohols from which the main component is isoamyl alcohol also are a part isobutyl alcohol propyl alcohol and in insignificant quantities the highest alcohols, and also aliphatic aldehydes, fatty acids and furfural.

Isoamyl alcohol - 3-metil; 1-butanol, isopentyl alcohol, isobutyl carbinol. $C_5H_{12}O$ / $(CH_3)_2CHCH_2CH_2OH$ Molecular weight: 88.2. Colorless liquid with a characteristic smell; we will poorly dissolve in water, it is well dissolved in alcohols, acetone. Has all properties characteristic of alcohols. Temperature of boiling: 132 °C., temperature of melting: - 117 °C., the relative density (water = 1): 0.8., solubility in water, g/100 ml:2.5., pressure of vapors, kPa at 20 °C:0.4., relative density is couple (air = 1): 3.0 [84; page 785].

Oleic acid (State standard specification 7580-91) is a fatty acid which meets as a part of animal and vegetable fats and oils. Oil has no smell and color, but commercial copies can have a yellowish shade. Oleic acid is classified as a monounsaturated omega-9 fatty acid or 18:1 cis-9. Its formula - $CH_3(CH_2)_7CH=CH(CH_2)_7COOH$ [84; Page 785.].

Sulfuric acid H_2SO_4 — is the strong bibasic acid answering to the highest oxidation level of sulfur (+6). Under usual conditions the concentrated sulfuric acid — heavy oily liquid without color and a smell, with sour "copper" taste. In the equipment sulfuric acid is called its mixes both with water, and with sulfuric SO_3 anhydride [84 Page 785.].

SSS 5478-90.It is the vegetable oil and natural fatty acid and method of definite number of saponification.

SSS 5479-64.It is the vegetable oil and natural fatty acid and method definition of not saponified substances.

SSS 5485-50.It is the vegetable oil and natural fatty acid and method definition of mineral acids.

The definition contents of moisture. The method is based on drying of the crushed samples. Drying can be made in the different ways, at various temperature conditions and duration.

In each weighing bottle brought to constant weigh a hinge plate weighing 3-4 g with a margin mistake not higher than 0,0001g. The weighing bottle with hinge plates place in a drying cabinet and dry at a temperature of 170-180 ° C within an hour, then take out from a case, cool in an exsiccator over the calcined calcium chloride up to the temperature of 20 ° C and weigh. The subsequent weighing is carried out after 30 minutes of additional drying.

Samples of sheep pelt and goat pelt dry up on temperature 135-137 °C and weigh in 7 hours of drying, also previously having cooled in the exsiccator. The subsequent weighing is carried out an 1 hour of additional drying. The sample all types of raw materials dry up to the constant weight.

Content (mass fraction) of moisture in raw materials, % is calculated by a formula:

$$X = \frac{a - в}{a} \cdot 100$$

Where x - a mass fraction of moisture, %; a - the raw materials weigh before drying; b - a raw materials weigh after drying, g.

It is experimentally proved that under the specified drying conditions moisture completely is removed from weigh of raw materials.

Take an arithmetic average of two parallel definitions between which allowed divergence shouldn't exceed 0,7% for final result of tests. An absolute error of a method has to make ±0,3%, relative 1,0%.

The determination contents of fat. When determining content of fatty substances in leather and fur raw materials use an extraction method their organic solvents with the subsequent drying and weighing of the rest of fat.

Extraction is carried out most often on Zaychenco device (fig. 2.2.1.).

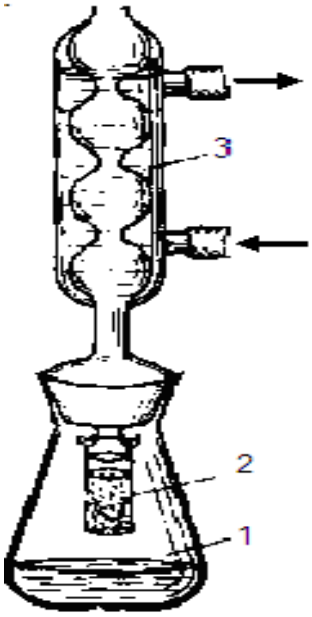

Fig. 2.2.1. Zaychenco device.

1 – flask, 2 – cartridge case, 3 – return refrigerator

The analysis and calculation of content of fatty substances is carried out as well as when determining their content on leather and skin fabric of fur. For extraction take 3 — 4 g of the crushed raw materials. The method of extraction is long and labor-consuming, but also is rather exact.

The definition of fat is carried out on weigh after moisture definition. The button of a skin prevent to paper bush sleeves from filter paper and extract in Zaychenco device a dichloroethane (or other solvent) during 1 hour. Then the nonfat buttons place to advance weighed dry weighing bottle and dry up in the thermostat up to the constant weight at the temperature of 130 ° C within 45-60 minutes. Content of fat in terms of absolutely solid is determined by a formula:

$$X = \frac{в - с}{в} \cdot 100$$

Where *x* - the content of fat in %; *в* - the mass of a weigh after drying (before extraction);

с – the mass of a hinge weigh extraction and drying, g.

Determination is temperatures of welding. Temperature welding at measurement of a semi-finished product without the special device from a semi-finished product or fur skins which are (previously cut) cut out strips of 3x50 mm in size. The strip is fixed on the thermometer by rubber rings so that its end was at the level of the top part of a ball with mercury. The thermometer is strengthened on a support and placed in glass with water (previously boiled and cooled).

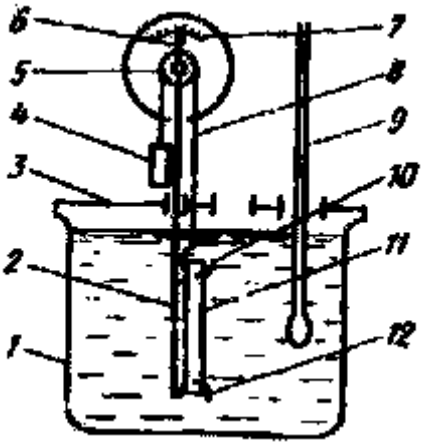

Fig. 2.2.2. Device for determination temperature of welding.

1 glass; 2 metal prop for the maintenance of the tool; 3 cover; 4 freight (3 grams); 5 coil; 6 shooters; 7 scale; 8 thread; 9 thermometer; 10-12 hooks; 11 sample.

Water in a glass is slowly heated and note temperature at which the strip will begin to be bent. This temperature is also taken for semi-finished product welding temperature.

Determination is content of mineral substances. Mineral substances in very small amounts pass into leather and skin fabric of fur from a pelt. Their bulk is entered into a leather and fur semi-finished product in the form of sodium, calcium, magnesium, chromic, aluminum and other salts in the process manufacture of a leather and fur. On the content of mineral substances in skin and fur it is possible to judge correctness of carrying out separate technological processes: deashing, tanning, washings after neutralization, and etc.

Excessive content of mineral substances in skin and fur is undesirable. The soluble mineral substances in water containing in a large number during wear footwear then under the influence of alternate flood and drying act on the surface of skin and worsens appearance of footwear.

The skin tanned with application of mineral tannin usually contains much more mineral substances, than skin of a tannic tanning. This results from the fact that the bulk of mineral substances in skin of a mineral tanning is made by the tanning substances.

The mineral substances which are contained in leather and skin fabric of fur define in the form of sols by a careful combustion of the crushed button. The combustion is carried out in porcelain crucibles. In scientific research apply platinum crucibles in which combustion proceeds quicker and more evenly.

2 - 2,5 g of the granular leather or skin fabric of fur weigh on analytical scales in the calcined up to the constant weight and calibrated crucible. The crucible is placed with a button into the cold muffle furnace and it is included. The initial stage of burning — a carbonization — needs to be carried out very carefully and to end before the muffle furnace is heated. Non-compliance with this requirement can lead to volatilization of a part of mineral substances that will have an adverse effect on results of the analysis. When process of a carbonization ends about what it is possible to judge by the termination of release of gases, heating is gradually strengthened, but not above, than to a weak red heat in the lower part of a crucible (about 500 — 600□C). Burning at more high temperature can also be the reason of volatilization of some part of mineral substances and, besides, lead to porcelain destruction. Burning is considered finished when in a crucible parts of coal absolutely disappear at the same time color of sols has to be light gray with a greenish shade.

After calcinations the crucible with ashes is cooled in an exsiccator and weighed on analytical scales. Calcinations, cooling and weighing of crucibles with sols are repeated before achievement of constant weight when the difference between adjacent weigh which is more than 0,001 g.

Content (mass fraction) of sols, %,

$$x = \frac{a}{H} \times 100$$

Where a — is the mass of limes, g; H — a button of leather or skin fabric.

The allowed divergences for parallel definitions from an arithmetic average not more than ±0,1% at the content of limes to 4% inclusive and no more than ±0,2% at the contents of limes more than 4%.

The cindery rest is received as a result of calcination consists of mix of oxides of various metals. In leather or skin fabric these metals it is presented at a type of salts. Content of salts of some metals can be determined analytically or a settlement way.

If it is required to determine content in leather or skin fabric of fur of soluble and insoluble mineral substances in water, arrive as follows. Determine the content of insoluble limes in button after removal from its the substances which are washed away by water, and count amount of soluble limes on a difference between limes of the general and insoluble.

The is determination of density. Density of the liquid fattening materials are determined at a temperature of 15 or 20 °C, carrying it to water density at a temperature of 4 °C (d_4^{15} or d_4^{20}).

In case density of the fattening substances is determined at other temperature, by each degree enter the amendment ±0.00065. Density of the liquid fattening materials is determined by pyknometer of various constructions: without capillary (fig. 2.2.3.).

For determination of density the pyknometer previously determine his water number, i.e. mass of water in volume of the pyknometer at a definition temperature.

Fig. 2.2.3. The pyknometer without capillary.

Before definition of water number the pyknometer is carefully washed out chromic mix, alcohol and the distilled water then dried and weighed with an absolute error 0,0002g. Then by means of a pipette fill him fresh boiled and the distilled water cooled to room temperature (the pyknometer without capillary tags, and with a capillary — up to the top fill a little above). The filled pyknometer is placed in the thermostat or a water bath with a certain temperature. In a bath the pyknometer is strengthened on a pith float or suspended on the glass stick put across a bath so that the most part of the pyknometer has been shipped in water.

The pyknometer is maintained in the thermostat or on a water bath within 30 min. When water level in it ceases to change, excess of water is selected a pipette

or filter paper, closed a stopper, wiped outside (better a linen rag) and weigh 0,0002g with an absolute mistake.

The water number of the pyknometer is calculated on a formula

$$X = m_2 - m_1$$

Where m_2 — is the mass of the pyknometer with water; m1 — is the mass of the empty pyknometer.

The further dry and pure pyknometer carefully by means of a pipette is filled with the fattening material with some surplus. Previously the examinee the fattening material is filtered via the paper folded filter at a temperature of 50 — 60 °C. The pyknometer is filled with the fattening material is placed in the thermostat or a water bath and maintained until the level of the fattening material doesn't cease to change. Excess of the fattening material is selected the filter paper curtailed into a thin tubule. After that the pyknometer with fat is carefully wiped a rag and weigh 0,0002g with an absolute mistake.

Density of the fattening material

$$d_{15}^{15} \text{ or } d_{20}^{20} = \frac{m_3 - m_1}{x},$$

Where m_3 — is the mass of the pyknometer with the fattening material; m_1 — is the mass of the empty pyknometer; X — is water number of the pyknometer.

Density of d_4^{20} is found on a formula

$$d_4^{20} = d_{20}^{20} \cdot 0{,}9972,$$

Where — d_{20}^{20} is density of the fattening material at a temperature of 20 °C, g/cm^3;

0,9972 — is water density at a temperature of 20 °C, g/cm^3.

For reduction of d_{15}^{15} to d_4^{15} the first density is multiplied to 0,9991, i.e. by water density at a temperature of 15 °C.

Density of the liquid fattening materials can be determined also by the areometer and hydrostatic scales.

III PART. THE RECEIVED RESULTS

3.1 Performance development of leather and fur in greasing process

In spite of producing fur, leather, pelt, and fur products are ancient various, manufacture technology of these products are weak developed. Processing of leather and fur technologies differ from others with their difficult. Method of easy and comfortable processing hasn't been known until the nearly years.

At the first of the when people have born, they have used skin of animals or trees' crust tied with roots, bowel or peace of skin. In this year footwear were very ordinary. The populations wear different shoes up to their climate content and place which have lived in different content and geographical width. After the sometime producing of shoes is increase, so then footwear and material of leather products then technology process of leather and fur were turned into important part of light industry.

Leather and fur producing-g is the most important part of the light and chemical industry. Fur, leather, pelt, and fur products have such characteristics which can't be seen in other synthetic stuffs. For example, leather and fur products are differ from others with their hygienic properties, durability, air permeability, using of ready product in high degree.

To arrange necessity of customers for high quality fur, leather, pelt, and fur products enterprises have to produce modern, quality and beautiful products and also, always change new colorful types. In producing leather and fur materials it's important that it should be done greasing process. It improves properties of durability, hygienic and performance attributes in ready production.

If we look at the history, for processing of pelt were used different oils or product which has properties of oil. This help to decrease leather properties of coarse and solidity. When the process of greasing is used in other processing, it helped to be skin layout.

The process greasing is so useful and ordinary process that it was been method of all nations' processing. In greasing process the Slavs use horse's fat, Asians sheep's fat. But Japanese use vegetable oil in greasing process. And also

often it was used properties of oil. For example, in the Caucasus petroleum, in the north with using liver and yellowish of egg, it was taken interesting suede which famous for the world in processing skin by Eskimo. In this process all hair layer was shaved then brain, yellowish of egg and pancreas were mixed and spread on leather. After that it was packed to paper which was taken from trees' crust and it was used as a pillow when they sleep. If it has been saved during a week it was the fur, if two weeks it was the coarse.

In nineteen-twenties the century leather and fur industry improved, although Bukhara karakul was been famous with its quality and unique in the world market and producing karakul fur technologies are developed.

Greasing process should be done for all that leather is produced in which way because the process gives it softness and viscosity. In processing karakul furs technology is also important process. For greasing process of karakul skins from hair cover with deleting stick property it is formed lightness and plastic properties. These properties create requirement to finishing process smoothly and this increase waterproof properties.

It is known, in the main natural greasing materials are used in foods industry. Natural oils compose from animals and vegetables oil. These matters don't soak well into dermis of skin. Moreover, natural oils have oxidation properties, so that it is very expensive concern economical.

Solve the problem of natural oil which showed at the top of page, increasing of population necessity to leather and fur products, during the process of greasing raw materials it is need to use syntetic oils. Synthetic oils are taken from chlorinate synthetic oils and work up sulfate acids. This modification oils take possession of animal and vegetable oils. It become clear that high achievement can be reached by using synthetic oils with natural oils.

According to practices gained in production and world practices, one of the ways of industry development is solving problems of industry by using local chemical materials in the process of Karakul fur production. Moreover, production of high quality chemical materials and increasing their assortment range with new

scientific-research works are main tasks in this sphere.

Nowadays there is a big demand to create new greasing elements with the aim of increasing assortment of greasing elements, using local chemical materials effectively and creating new technologies without waste. One example of this is utilization of composite ethers by scientists.

It is important to choose oil elements, their amount and technologic aspects of process correctively in producing high quality greased fur.

Different mixtures of oils (composites) are used in greasing process in order to give the fur complex aimed properties. These composites are chosen according to the aim and features. Efficiency of greasing is related to the selection of oils, their amount and the technology of greasing process.

Production of high quality ready greased goods requires choosing oil elements, their quantity and proportion correctly and right technological aspects.

Our main subject in this scientific-research work is creation of greasing composites in the base of composite ethers for the process of greasing Karakul furs.

Utilization of composite ethers in greasing contributes improvement of operating properties of ready production by distribution of oil elements in the leather. Moreover, gained greasing composites are cheap due to the production from secondary and additional industry goods and it enables the cost of ready good to decrease.

3.2 The new fattening material for karakul fur on the basic of fat-containing by-products

The greasing is considered one of important processes of karakul technology. According to definition of well-known plasticization process in a physic-chemic of polymers, the greasing of karakul fur is a plasticization of a collagen of an integument, i.e. introduction to a collagen of the fattening substances giving karakul fur softness, flexibility and a good signature stamp.

From the point of view of a ecology, use of a wastage various oil of processing industries as the fattening materials is especially valuable. It is possible and to carry the fatty acids received by production of rape oil to such wastage.

For expansion the range of the fattening materials it is used emulsal, representing an admixture of esters of oleic, linoleic and linolenic, and also resin acids and a triethanolamine. Emulsal is subjected to oxyethylation. Thus, skins with the improved indicators and a nice on the touch signature stamp were received.

The above-stated structures allow to receive karakul fur of high quality. However in a type of a limited opportunity to buy import materials there was a problem of creation of new structure for greasing of karakul fur on the basic of public domestic materials.

In this regard, we conducted researches on development and use on the basic of an ester for a greasing karakul.

For receiving the new synthetic fattening material the distilled fatty acids of cotton soap stock and fusel subjected reaction of an etherification. The catalyst used concentrated sulfuric acid. The maximum exit of an ester is 73%.

Derived ester oil liquid represents with a specific smell, dark brown color, $t_{кип}$ = 105 °C, density p = 0.878, flying, it is insoluble in liquid water, but easily soluble in the majority of organic dissolvent.

In process increases of the range fattening materials and compositions offered for use in production of karakul is need to develop reliable methods of an assessment of their plasticizing ability.

As a result of researches it is established that at interaction of an ester with functional groups of a collagen hydrogen bonds are generally formed. Therefore it is partially postponed between fibers, and also connects to skin substance. At the same time the surface of fibers is enveloped by fat film which parts them and by that interferes with pasting at evaporation of water in the course of drying.

And also, in comparison with other fattening materials advantage to receiving ester an important point is production cost. On the basic of estimation we believe that it has one many below than the cost of nowadays used synthetic fats.

3.3 A greasing of an karakul semi-finished product on the basis of a semi-finished product

The greasing process — is one of the most important processing of karakul skins. At the same time there is a shielding of structural elements of collagen that leads to the each other decrease in intermolecular interaction between its chains and their best sliding relatively at stretching. As a result plastic properties of skin fabric and efficiency of a semi-finished product at production of products increase. Besides, the greasing performs protective functions, preventing emergence of rigidity of skin fabric of a semi-finished product at storage, and also in finished products gives it resistance to atmospheric actions.

For the purpose of studying process of greasing karakul, and also the fattening structure on the basic of the new synthesized ether from secondary and by-products of local productions, researches were conducted.

For a research were selected experimental and control party of karakul furs by average of weighing out 0.25 kg. All processes saw to a greasing by a traditional technique. Difficulties at their carrying out weren't observed.

Carried out by the combined tanning-greasing method for not colored karakul skins in launches with a temperature of 55 °C at f.a. = 8. Duration of process is 50 min. On structure (tab. 3.3.1.), the consumption of the fattening mixes made in total 5% of mass of the wrung-out skins in terms of 100% fat.

Table 3.3.1.

Consumption of the fattening materials for a greasing of karakul half-finished products

The fattening substances	Composition of fatty mixes, % by options		
	Control	Experimental	
	I	II	III
Fish oil	20	-	-
Synthetic oil	50	-	-
Sulphinated blubber	30	-	-
Scrapings fat	-	25	20
Spindle oil	-	20	15
Ether	-	55	65
In total:	100	100	100

By researches it is established that ether can be used in combination with other fattening components, and they cause uniformity of structure, containing a cyclic structure which give the chance to components strongly to contact fibers terms and allows receive skin fabric of karakul fur with high strength properties.

For definition of strength properties, carried out physical, chemical and mechanical tests of control and skilled options of ready karakul fur (tab. 2).

Table 3.3.2.

Physic - chemic and mechanic indicators of control and experimental options of the karakul skins are developed with using of ether

Performance	Control versions	Experimental versions		SSS 10545-63
	I	II	III	
Mass fraction of moisture in skin fabric, %, no more than	12,4	12,6	12,9	14,0
Mass fraction of untied fatty substances in skin fabric, %	8,2	7,3	7,1	7-12
pH water extract	5,7	6,3	6,3	3,5-7,0
Mass fraction of an oxide of chrome in skin fabric, %, not less than	0,64	0,67	0,69	0,6
Temperature of a welding skin fabric, °C, not below,	65,2	65,4	66,7	65
Loading at a rupture of the cross site, MPa, not less than	5,15	5,37	5,48	5,0

Note. Norms of a mass fraction of an oxide chrome and untied fatty substances are given in terms of absolutely solid.

Data show in tab. 3.3.1.,that in comparison control versions with experimental versions of karakul skins are more quality on strength properties. At the same time perhaps chemical linking of the applied fattening materials with seal and a collagen as the fattening structure on the basic of an ether intensively evenly gets into a skin tissue of karakul fur.

It is necessary to notice what ether is the available fattening substance, it is economic in use, and it can be used in combination with other fattening materials. Use of the ether in the course greasing of karakul fur, finished goods are had excellent softness and an elastic.

IV PART. ECOLOGY

4.1 Biological cleaning waste water of the leather and fur enterprises.

Due to the toughening of requirements for environmental protection the steady tendency to performance movement the most water - and the reagent intensive and ecologically dangerous wet processes of production a semi-finished product of a chromic tanning washing, liming, deashing, picking, tanning to the east was outlined in countries of western Europe in the last decades including to Russia. It means increase in anthropogenic load of the environment in our country and deterioration in its ecological state as extent extraction of substances from solutions doesn't exceed 50%. The majority of these connections aren't removed by physical and chemical methods, widespread for cleaning waste water at leather enterprises and the biological methods applied to clean intalation of the inhabited places.

Fig. 4.1.1. Wastes which emergent during the producing products.

(pieces and slits of leather – fur).

In modern conditions waste water participates not only in natural, but also in anthropogenic circulation. In an anthropogenic cycle water from a natural reservoir is used in power, the industry, agriculture, for drinking water supply, household needs. A considerable part of water after her use comes back in the form of sewage. By definition sewage is the waters used on domestic or production needs and which have received at the same time the additional impurity which have

changed their initial the chemical composition or physical properties, and also the atmospheric waters which are flowing down from territories of the industrial enterprises or agricultural grounds [86].

Fig. 4.1.2. Needless, defective leather and fur wastes which emergent during the producing products.

Sewage of leather and fur productions represents the difficult heterogeneous multicomponent systems relating to group high-concentrated and toxic. Sewage is formed after carrying out the main liquid processes: wetting, liming, picking, degreasing, tanning, dyeing, etc. They contain chemical materials as brought for carrying out technological process, and formed as a result of processing leather and fur raw materials. Owing to a significant amount of organic substances sewage can be exposed to rotting [87].

Fig. 4.1.3. Leather and fur wastes which thought out to mediocre flesh air. (These wastes smell breathing way and have headache)

When processing fur-bearing and sheepskin-coat raw materials at the enterprises of the fur industry a significant amount of sewage which character is defined by specifics of the technological processes which are carried out in concrete production is formed. Sewage of the enterprises of the fur industry contains a large amount of the hardly oxidized organic substances (wool and natural fats, dyes of various chemical nature, surfactant), and also toxic connections (three - and hexavalent chrome) in total with mineral (generally sulfuric) and organic acids. The most rational way of water disposal of drains of such enterprises is the separate scheme of removal of the soaking-washing, chromium containing and tinctorial sewage which allows to carry out their neutralization with the smallest expenses, and also to use the purified sewage in reverse water supply of the enterprise [88].

For sewage of separate processes of fur production pH fluctuates over a wide range: from 3.5 to 8.5, however the general drain represents the neutral environment with pH about 6.5.

Content of pollution in sewage of the leather and fur industry is so big that in case of arrival of the last in native water object, can cause irreversible processes,

including final fracture of the developed ecosystem. For protection of water objects the package of measures including classification of water sources to destination, establishment of standards on water and standards on dumping of sewage is used.

In general, the composition of sewage is caused by a type of the processed raw materials. These waters have high concentration and a large amount of ingredients: pieces of an inner side, raw materials and semi-finished products, wool, the blood clots, dirt, synthetic surfactant preserving substances, sulfides, the dissolved whites, fats, salts of chrome and aluminum and so forth.

At the leather and fur enterprises, except production, household and atmospheric sewage is formed. From the territory of the enterprises they are withdrawn separate chains. Household sewage is dumped in city sewer system, and rain and production sewage is dumped in this system or a reservoir after their preliminary cleaning on local treatment facilities. Otherwise, intake of sewage in a reservoir can lead to a number of heavy violations of the hydrobiological regime.

Sewage of the leather and fur enterprises concerns to the third group as both mineral, and organic substances are a part of these waters. Salts belong to mineral substances: sulfates, chlorides, sulfides, compounds of chrome, etc. To organic – synthetic and vegetable seal, products of disintegration of whites, surfactants, fats.

V PART. ECONOMY

5.1. Calculation of economic efficiency from application the fattening structure on the basic of the ether

For calculation of economic efficiency from use of the fattening structure on the basic of ether in the course of a greasing karakul semi-finished product defined the general expense control – the production and control-experimental fattening structures [89].

Table 5.1.1.

Expense control – the production and control-experimental fattening structures in the greasing process for karakul furs

Components	The quantity components in mass, %.	The expense on 1000 cm^2, kg
Control – production		
Fish oil	20	2,5
Synthetic oil	50	6,25
Sulphinated blubber	30	3,75
In total:	100	12,5
Experimental – production		
Scrapings fat	25	3,125
Spindle oil	20	2,5
Ether	55	6,875
In total:	100	12,5

Table 5.1.2.

Calculation of the prices before and after test of the fattening structure in greasing process for karakul fur

Components	Average fact of control cost	Before test (C_1)		After test (C_2)	
		Expense on 1000 cm^2, kg	Total in sum	Expense on 1000 dm^2, kg	Total in sum
Fish oil	12000	2,5	30 000	-	-
Synthetic oil	4500	6,25	28 125	-	-
Sulphinated blubber	6000	3,75	22 500	-	-

Components	Average fact of control cost	Before test (C_1)		After test (C_2)	
		Expense on 1000 cm^2, kg	Total in sum	Expense on 1000 dm^2, kg	Total in sum
Scrapings fat	3500	-	-	3,125	10 937,5
Spindle oil	3200	-	-	2,5	8 000
Ether	4400	-	-	6,875	30 250
In total:		7	80 625		49 187,5

Economic effect was determined by a formula:

$$E_{ef} = C_1 - C_2$$

Where, E_{ef} - economic effect, sum

C_1 - prime cost of a unit of production before test, sum

C_2 - prime cost of a unit of production after test, sum

E_{ef} = 80 625-49187,5 = 31 437,5 sum for 110 000 cm^2

With use of the fattening structure on the basic of ether in process greasing for karakul in batches number of 1000 pieces with a total area of 110 000 cm^2 under production conditions are released [90].

The actual economic effect was determined by a formula:

$$E_{pr} = E_{ef} \bullet (U_{pr}/10\ 000\ cm^2)$$

U_{pr} – the volume of production party, 150 000cm^2

E_{pr} = 31 437,5 * (110 000 cm^2/10 000 cm^2) = 345 812,5 sums.

The actual economic effect made 345 812.5 sum for only replacement of traditional components.

The expected approximate annual economic effect is determined by a formula:

$$E_g = E_f * M * P$$

Where, M = 12 months, P = quantities party in month.

$$E_g = 345\ 812,5 * 12 * 1 = 4\ 149\ 750 \text{ sums.}$$

The settlement expected approximate annual economic effect of test in the process of greasing for karakul fur can will make 4 149 750 sums.

CONCLUSION

When I have done my final qualification work in the theme of development technology of using secondary oiling products during the greasing process of karakul skins, I examined the different literatures, patents, dissertations which connected with theme and saved information about parameters, importance of process greasing for produce karakul fur, also using compositions and their influence to ready products characteristics.

Nowadays, specialists have to solve many problems such as necessity of population to karakul products, although to develop technology of producing karakul skins. For this reason it can be sample that increase greasing process of karakul skins. Whenever, greasing process improve durability, esthetic and operational properties of ready products, also in this processes using local oiling products can help to take economical good results.

It has been taken ether from secondary products of local raw materials then ether is used to skin fabric that it have an influence plastic and softy properties of karakul fur. Using the ether such as oiling product will be incomed 4 149 750 sums for a year. The results show that our product is very usefull by economic when we will utilize this oiling technology it will be taken profit.

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