INTERACTIONS OF ETHER-BASED FATS ON LEATHER PROPERTIES FOR UPPER

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Abstract: The article describes the possibility of using an ester as a fatty component in the process of fattening leather for the upper of a shoe. It was determined that the use of an ester leads to a deeper and more even distribution of fat in the dermis, increasing the strength indicators of the leather.

Key words: Fatliquoring Process, Fatliquoring Composition, Leather For Shoe Uppers, Ester, Dermis.

Аннотация: В статье приводиться возможность применения сложного эфира как жирующего компонента в процессе жирования кожи для верха обуви. Определено что, применение сложного эфира приводит к более глубокому и равномерному распределению жира в дерме, повышая прочностные показатели кож.

Ключевые слова: Процесс Жирования, Жирующий Состав, Кожа Для Верха Обуви, Сложный Эфир, Дерма.

Universal possibilities of application of leather materials are confirmed by the fact that they are suitable both for making footwear, clothes and haberdashery products of everyday use. It is known that consumer properties of leathers, being a set of physical-mechanical, hygienic and aesthetic indicators, are formed mainly in the greasing process. That is why the choice of materials used for greasing is a decisive factor influencing the quality of finished leather.

Long-term practice of leather production convinces of the fact that obtaining especially valuable types of leather is achieved through the use of fat compositions containing various additives obtained from natural fats of vegetable and animal origin [1-2]. Natural fats and oils are mostly expensive foodstuffs and, in addition, have a number of negative properties, so the efforts of scientists in all countries are aimed at finding artificial and synthetic fatty substances to replace them. In order to produce fatty materials, it became necessary to replace it with available products and semi-products of petrochemical, chemical and other industries.

Emulsifier composition [3], which contains (%) 20-60 alkanol with C_{6-14}. alkoxylated 4-12 units alkoxy, or a mixture of many such alkanols, 20-70 mixture of fatty alcohols with C_{6-14}, alkoxylated 15-30 units alkoxy, and 10-50 mixture of fatty alcohols with C_{12-24} alkoxylated 40-100 units alkoxy, and used for fatty leather has been developed.

The fatty agent used as an emulsion contains the product of interaction of an organic polyisocyanate with a fatty alcohol or fatty amine with C_{6-30}, a simple polyester alcohol with 2-70 units of polyalkylene oxide and a blocking agent. The fatty agent includes an ionic or non-ionic emulsifier. The fatty isocyanates released in the oily leather bind to it and other substances in its composition covalently and give it new and diverse properties [4].

However, the use of such imported fats nowadays leads to increased production costs of finished products, production disruptions due to untimely under-supply from outside and other financial complications.

The binding strength and distribution of fatty substances in the leather is important for the effect of fatting. Fatty acid esters bind best to the leather [5]. They form not true, but micellar, colloidal solutions in water, which provides deeper penetration of fatty substances inside leather fibers.

In this connection, technologies of leather greasing process based on ester obtained from secondary and by-products of local productions, such as oil and hydrolysis productions, were improved.

On this basis the composition for leather greasing with the use of ester in combination with other greasing materials under condition of replacement of fat bunches, imported, expensive greasing substances was developed (Table 1).

Table 1
Compositions of experimental and control fatty leather mixtures for footwear upper, fatty mixtures consumption in %

№	Options	Components					
		Fish oil	Synthetic fat	Ester	Technical fat	Paraffin	Spindle oil
1.	Control	30	70	-	-	-	-
2.	Experienced	-	-	40	35	10	15

Experimental and control batches of bovine semi-finished products were taken for the study. Fatting of leathers was carried out in hanging drums. In liquid remaining after dyeing with temperature 55-60°C, duration 1-1,5 hour, with liquid factor LCD=2,0-3,0 on running of a drum through a hollow axis the calculated quantity of greasing composition was poured.

The process of greasing of control and experimental batches of leathers was normal. All processes before and after gelling were carried out according to the traditional methods. No difficulties were observed during their performance.

The leathers of experimental and control batches, according to organoleptic evaluation, did not differ appreciably. They were clean, even and with significant gloss on the front surface. The quality of finished experimental leathers was the same as that of control leathers.

Characteristics of control and experimental leathers by chemical and physical-mechanical parameters are given in Table 2.

The indicators given in the table show that there is no noticeable difference between experimental batches of leather greased on the basis of ester and control batches greased by the traditional method. Consequently, experimental batches of leather greased on the basis of ester meet the requirements of the state standard, and have no negative impact on the chemical and physical-mechanical parameters of leather.

Table 2
Chemical and physical-mechanical properties of experimental and control leathers for footwear upper

Options	Indicators					
	Content, %			Thickness, mm:	Tensile strength in leather, 10 MPa:	Elongation at a voltage of 10 MPa, %:
	moisture	chromium oxide	substances extractable with organic solvents			
Control	12,15	2,85	4,85	1,25	2,13	30,9
Control	12,24	2,75	4,52	1,22	2,02	32,3

GOST 939-94	10-16	no more 3,7	3,7-10	1,2-1,4	not less 1,5	20-40

It should be noted that in the process of greasing - the composition based on the ester penetrates into the empty cells of the dermis. This process changes the chemical and physical-mechanical characteristics of the leather, making it softer, more elastic, stronger, more flexible and giving a smooth textured surface.

Thus, based on laboratory and production tests, it was found that the use of ester is possible as a fatty ingredient for the production of natural leathers. Also, the use of ester leads to a deeper and more uniform distribution of fat in the dermis, increasing the strength properties of leathers. In addition, making fatty materials cheaper, due to the ester obtained from by-products and secondary products (the production cost is 3-5 times lower than the cost of natural fats).

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