

INVESTIGATION OF THE INFLUENCE OF VARIOUS FACTORS AND PARAMETERS FOR THE PRODUCTION OF COLLAGEN FROM NON-STANDARD LEATHER RAW MATERIALS

Rustamov Bobir Ismatovich

Bukhara Institute of Engineering and Technology

bobir_rustamov@bk.ru

Annotation: *This article describes the study and influence of various factors and parameters for the production of collagen from non-standard leather raw materials.*

Keywords: *dermis, skin, hide, fur, protein, collagen, concentration.*

INTRODUCTION

Collagen is an integral part of connective tissue. In addition to the fibrous material, cells and the basic substance were also found in the connective tissue. In this regard, of course, special comprehensive studies were carried out. The main part of the leather fur raw materials are proteins. These proteins are read by natural polymers. During the processing of leather raw materials, some waste is generated.

Waste from tanneries in the form of peripheral sections of hides, mezdra, minnow trimmings, substandard sawn-off can be used for the manufacture of gelatin, feed flour and protein hydrolysis.

Materials and methods. Currently, a significant part of the leather and fur raw materials supplied to the processing enterprises of the Republic of Uzbekistan is non-standard raw materials.

We have conducted research on the production of collagen from non-standard raw materials and other non-tanned waste. Unlike the known ones, the treatment process was carried out in two phases with the additional introduction of sodium chloride. The concentration of sodium chloride was regulated from 40 to 60 g/l at LC = 3.5-4.0. The introduction of NaCl makes it possible to reduce the destruction of protein. Collagen partially passes into an alkaline environment. The yield of dissolved collagen in an aqueous-alkaline medium increases. The yield of dissolved collagen increases and the quality of the final product increases.

Results. The processing of leather waste was carried out in an alkaline-salt medium in the presence of NaCl in two phases:

The first phase: an alkaline salt solution contains Na₂S – 5.0 g / l, Ca(OH)₂ -25.0 g / l and NaCl – 40.0 g / l at a temperature of 300C for 24 hours with a liquid coefficient of 3.5 pH – 11.5.

Then the working solution was drained and the second phase of the filling solution was immediately poured.

The second phase: the content of Ca(OH)₂ is 28.0 g/l and NaCl is 45.0 g/l when cut and slippery and elastic to the touch. The resulting minnow is washed in clean running

water to a neutral medium. Then the minnow was disinfected in the presence of 3.5% HCl – 2% of the minnow mass with a liquid coefficient of 4.0 for 7 hours to a neutral medium for a minnow slice (phenolphthalein test). After that, the golie was dissolved in a mixture of 6% acetic acid with ethyl alcohol in a ratio of 9:1. The dissolution was carried out for 24 hours at room temperature. After that, collagen was precipitated from the solution using acetone. Table 1 shows the conditions for processing non-standard raw materials and non-tanned raw waste.

Table 1.
Conditions for processing raw waste at a temperature of 300C for
24 hours, pH 11.5

Variants	Quantity in phase I, g/l			Quantity in phase II, g/l		fatty acids	Product Output, %
	NaCl	Ca(OH) ₂	Na ₂ S	NaCl	Ca(OH) ₂		
1	40	25	5	45	28	3,5	97,8
2	50	25	5	50	28	3,5	98,5
3	60	25	5	60	28	4,0	99,0
Control	-	25	5	-	-	3,5	81,2

Discussion. The conducted studies show that with an increase in the concentration of sodium chloride, the yield of the product increases, at more than 60 g / l, the yield decreases sharply, where the proof of this is in Table 1.

From the resulting product, if it is subjected to heat treatment under certain conditions, a mezdra glue is obtained, which is used in various sectors of the economy. Its properties are shown in Table 2.

Table 2.

Properties of mezdra glue of various treatment options

Variants	Adhesive capacity, N/m	The mass fraction of fat in terms of absolutely dry matter, %
1	1590	0,20
2	1610	0,21
3	1640	0,22
Control	1578	0,28
Mezdra glue	at least 1570	not more than 0.3

The collagen product obtained by two-phase soldering in the presence of sodium chloride, in addition to the production of glue, can be successfully used in the production of gelatin, collagen coating

In the production of leather according to the standard method, golie is obtained for up to 3 days. We conducted research on the production of minnow from raw waste and from non-standard raw materials by long-term gilding from 3 to 30 days in order to obtain finished products with improved physical and mechanical properties. The resulting minnow

was disinfected (neutralized) for 10 hours with ammonium sulfate at a rate of 3.0% by weight of the minnow. The golie was then subjected to hydrolysis.

The collagen isolated by us after alkaline hydrolysis and subsequent precipitation with acetone is a white powdery substance, completely (99.5%) soluble in water, as well as in aqueous-acetic acid solutions with the formation of sufficiently pure, homogeneous solutions, with the ability to film formation. The solutions used for the formation had a viscosity of 3.8-4.1 Pa. with a collagen concentration of 3.5-3.8% and a pH of 3.0. The dissolution of dry collagen preparations was carried out at a temperature of 18-200C, and then after four times filtration of the solution

Conclusion. Based on the data obtained, it can be assumed that the structure of the minnow as a result of such processing becomes looser due to the extraction of non-collagenic proteins, fats and carbohydrates, which contributes to a more uniform penetration of alkaline bath reagents throughout the volume and thereby contributes to better formation and formation of collagen preparations.

Thus, collagen was obtained from non-standard raw materials and leather production waste by a two-phase method with the introduction of sodium chloride salt. An increase in the concentration of sodium chloride leads to an increase in the yield of collagen. In addition, an increase in the duration of gilding from 3 to 30 days improves the physico-chemical properties of collagen.

LIST OF LITERATURE:

1. Kodirov T.J. "Means and methods of collagen research", Publishing House "Fan" of the Academy of Sciences Rep. Uzbekistan, Tashkent, 2014. 375 p.
2. Khaitov A.A. "Creation of new effective collagen - polymer compositions from leather waste for filling leather and development of their technologies". Dissertation. T. 2001.
3. Kodirov T.Zh. "Collagen nanostructure", Publishing House "Fan" of the Academy of Sciences of the Republic of Uzbekistan, Tashkent, 2015. 535 p.
4. Хайитов А. А., Отамуродов Ж. О. ЭФФЕКТИВНОЕ ПРОВЕДЕНИЮ ПРОЦЕССА ДУБЛЕНИЯ И ЖИРОВАНИЯ КАРАКУЛЕВЫХ ШКУР В ПРОИЗВОДСТВЕННЫХ УСЛОВИЯХ //Вестник науки. – 2021. – Т. 3. – №. 9 (42). – С. 45-50.
5. Хайитов А. А., Рустамов Б. И. Разработка технологии получения коллагеновых препаратов и мездровых клеев из отходов кож в производственных условиях //Вестник науки. – 2022. – Т. 3. – №. 4 (49). – С. 86-93.
6. Хайитов А. А., Тошпулатова М. Б. Исследование гидролиза дубленых кожевенных отходов и условия получения и свойства реакционно-активных белковых гидролизатов //Вестник магистратуры. – 2021. – №. 3. – С. 114.

7. Хайитов А. А., Рустамов Б. И. Разработка технологии получения коллагеновых препаратов и мездровых клеев из отходов кож в производственных условиях //Вестник науки. – 2022. – Т. 3. – №. 4 (49). – С. 86-93.
8. Рустамов Б. И., Шамсиева М. Б. Ресурсосберегающая жирующая вещества для жирования каракуля //E Conference Zone. – 2022. – С. 35-39.
9. Хаитов А. А., Рустамов Б. И., Якубов М. Э. Исследование и разработка коллаген полимерных композиций на основе отходов кожевенного сырья Research and development of collagen of polymeric compositions based on waste of rawleather //современные инженерные проблемы в производстве товаров народного потребления. – 2019. – Т. 29. – С. 70.
10. Шамсиева М. Б., Рустамов Б. И. ҚОРАҚҰЛ МҰЙНА ЯРИМАҲСУЛОТИНИ ИҚТИСОДИЙ ВА ЭКОЛОГИК САМАРАДОР ЁҒЛАНТИРИШ ТЕХНОЛОГИЯСИ //GOLDEN BRAIN. – 2023. – Т. 1. – №. 21. – С. 38-45.
11. Хаитов А. А., Рустамов Б. И., Якубов М. Э. RESEARCH AND DEVELOPMENT OF COLLAGEN OF POLYMERIC COMPOSITIONS BASED ON WASTE OF RAWLEATHER //Современные инженерные проблемы в производстве товаров народного потребления. – 2019. – С. 70-75.
12. Отамуродов Ж. О. СОСТАВ КОСТЕЙ КРУПНОРОГАТОГО СКОТА ДЛЯ ПРОИЗВДОДСТВА ОРГАНИЧЕСКОГО КЛЕЯ //GOLDEN BRAIN. – 2023. – Т. 1. – №. 15. – С. 171-176.
13. Урозов М. К., Отамуродов Ж. О. Получение технического прочного костного клея //Вестник науки. – 2022. – Т. 2. – №. 10 (55). – С. 144-151.
- Otamurodov J. O. TECHNICAL CLASSIFICATION OF RAW MATERIALS FOR THE PRODUCTION OF BONE GLUE //INTERNATIONAL CONFERENCES. – 2022. – Т. 1. – №. 18. – С. 46-4