

# Research on the Production of Parchment from Turkey Skin and its Decorative Use

by

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## Abstract

In this study, parchment was made of waste turkey skin and some tests were done. These tests were: Determination of thickness (TS 4117 EN ISO 2589), Determination of tensile strength and elongation (TS EN ISO 3376), Determination of tear load - Part 2: (Double edge tear) (TS 4118-2 EN ISO 3377-2), Leather - of distension and strength of grain (TS 4137 EN ISO 3379), Color fastness to water spotting (TS EN ISO 15700). Due to the low strength properties of turkey skin, a different usage area was tried to be created by making a decorative flower design. In this research, it has been tried to show how a waste material can be transformed into a product with a very high added value.

## Introduction

As the world population grows rapidly, the need for animal protein is also increasing, forcing people to seek solutions to the problem. Turkey meat constitutes an alternative protein source in this context. Considering the number of turkeys in the world, it is seen that 459,369,000 pieces were produced in 2017 and this number is increasing every year.<sup>1</sup> America leads the world in turkey production.

When turkeys reach a certain maturity, they are cut and processed. The skins of slaughtered turkeys are separated and seen as waste. It is

usually rendered as an additive or discarded. The skin that is peeled off the animal's back is seen as a very cheap item or garbage.

Turkey breeds are generally divided into five (white, yellow, bronze, black and hybrid) and the weight and some structural characteristics of the animals may vary according to their breeds. Hybrid breeds can reach around 20 kg when slaughtered. During turkey slaughter, the animal is usually skinned and separated from the carcass. Skin color in turkeys can vary from creamy white to yellowish white, depending on breed.

It has been determined that the fat content of turkey skin is 81.00% in the body part and 32.48% in the foot part.<sup>2</sup> It is known that the fat rate in goat skins is 3-10%, and the fat rate is up to 30% in sheep skins.<sup>3</sup> The fat rate Angora goat skins was determined as 11.54%.<sup>4</sup> In this context, it is understood that turkey skins have an extremely fatty structure, and a very good degreasing process is required.

When turkey raw skins are examined, it is striking that their structural features are similar to ostrich skins. Ostrich leather is included in exotic leathers and is used in the production of luxury consumer goods, and it is transformed into designs with very high added value.<sup>5</sup>

However, it was observed that the skins were cut into pieces and peeled off in turkey slaughterhouses. For this reason, the cut parts



Figure 1. Production of bags from ostrich skin with the collaboration of Eser Eke Bayramoğlu and Cem Varsoy<sup>5</sup>

were used in our research and the leather could not be processed as a whole.

In this study, turkey skins were processed as parchment and various properties were examined. Although parchment is a material developed for writing on leather, it has been used for decorative purposes in recent years. When parchment is used for decorative purposes in the production of yacht upholstery, various souvenirs and ornaments, its added value increases considerably.<sup>6</sup> For this reason, in this study, it has been shown that a raw material that is seen as waste by producing decorative linden flowers from the obtained parchment is transformed into a product with high added value.

## Material and Methods

### Material

Turkey skins were obtained from Pınar meat company. Turkey skins were obtained from Canadian origin white feathered turkeys weighing about 5-6 kg after slaughter. In general, it was observed that the skins were cut into pieces rather than as a whole, and there



Figure 2. Turkey skins preliminary trials

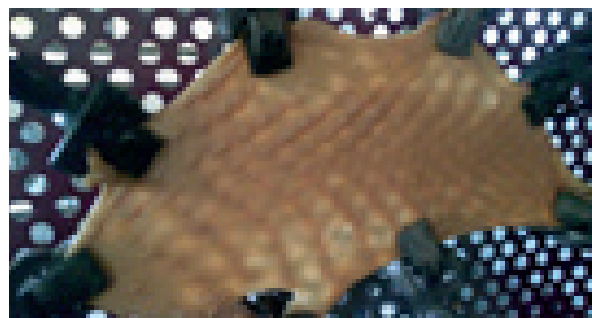


Figure 3. Toggling of parchment

were tendons and bones in the foot parts. Pieces of skin on the body parts of turkey skins were used in the making of parchment.

### Method

#### Physical tests

Some tests were applied to the parchment skins that were produced. These tests were: Determination of thickness,<sup>7</sup> Determination of tensile strength and elongation,<sup>8</sup> Determination of tear load - Part 2: (Double edge tear),<sup>9</sup> Leather - of distension and strength of grain,<sup>10</sup> Color fastness to water spotting.<sup>11</sup>



Figure 4. Determination of tear load

Table I  
Parchment Recipe

Process	Material	%	°C	Time	pH	Notes
Wetting back	Water	200	20			
	Borron SE (TFL)	0.5				
	Borron SAF (TFL)	0.5				
				20'		Over night automation in drum Morning drain-wash
Liming	Water	500	25			
	Lime	6				
	Na <sub>2</sub> OH	0.15			12.5	
	Erhavit SP (TFL)	1		15'		6 days automatic in the paddle
	Water	300				Washing
	Sellatan CF (TFL)	2		60'		Drain-wash Toggling
Flashing by hand						

### Linden Flower Designs from Parchment Leather

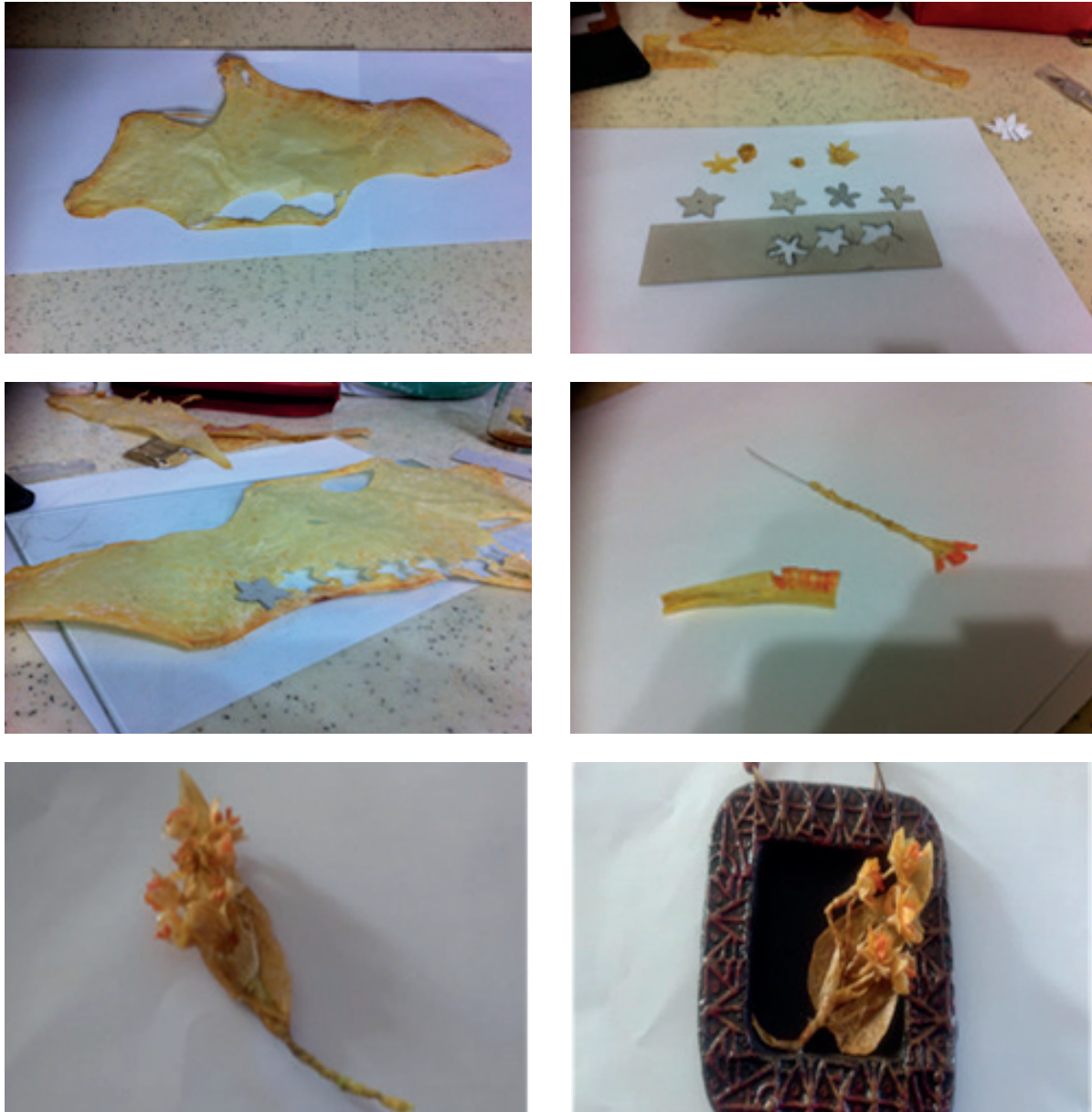


Figure 5. Making parchment linden flowers (by Nilgün Kayahan Kolan)

### Results and Discussion

The amount of fat contained in the skin according to the animal species and the composition of the fat differ in different regions of the skin according to race, age, climate and nutrition. The fat content in bovine hides varies between 2-7% of the dry weight of the leather. High-energy fattening cattle hides have a high fat content, and the hide has a loose structure. The fat ratio in goat skins increases to 3-10% and up to 30% in sheep skins.<sup>3</sup> It has been determined that the fat content of turkey skin is 81.00% in the body part and 32.48% in the foot part.<sup>2</sup> As the fat content in the animal increases, the skin

gains a looser structure. The high fat content in turkey skins is an indication that the skins will be loose.

The physical strength of the leather is not important in the making of some ornaments. For this reason, in this study, a decorative product was developed by making parchment from turkey skin.

In this study it was obtained that average thickness of turkey parchment was 0.42 mm, average elongation at break was 5.63%, average tensile strength was 2.44 N/mm<sup>2</sup>, average double edge tearing was 3.30 N.



Figure 6. Use of decorative linden flower as collar decoration (by Eser Eke Bayramoglu)

Table II  
Results of tensile strength and elongation

Turkey Parchment	Tensile strength (N/mm <sup>2</sup> )	Elongation (%)
Sample 1	1.59	6.61
Sample 2	3.61	5.70
Sample 3	2.35	6.31
Sample 4	3.17	5.02
Sample 5	1.46	4.49
<b>Average</b>	<b>2.44</b>	<b>5.63</b>

Table III  
Results of Distension and Strength of Grain

Turkey Parchment	Cracking		Bursting	
	Kgf	mm	Kgf	mm
Sample 1	0	3.90	0	4.50
Sample 2	0	2.74	0	4.30
Sample 3	0	3.24	0	4.96
Sample 4	0	3.18	0	4.98
Sample 5	0	3.16	0	4.99
<b>Average</b>	<b>0</b>	<b>3.24</b>	<b>0</b>	<b>4.75</b>

Table IV  
Results of Double Edge Tear Load

Turkey Parchment	Thickness (mm)	Tear load (N)
Sample 1	0.48	2.38
Sample 2	0.67	3.45
Sample 3	0.35	3.04
Sample 4	0.42	4.62
Sample 5	0.19	3.03
<b>Average</b>	<b>0.42</b>	<b>3.30</b>

Table V  
Results of Color fastness to water spotting comparing with goat parchment

	Color fastness to water spotting (Grey Scale)	
	Half an hour	16 hours
<b>Goat Parchment (Kolan,2019)</b>	3	3
<b>Turkey Parchment</b>	5	5

Goat parchment thickness was 0.5 mm, tensile strength 79.9 N/mm<sup>2</sup>, elongation at break 18.5%, Double edge tearing 38.7 N, cracking 37 Kgf and bursting 42.6 Kgf.<sup>12</sup>

It was determined that while stains were formed in the water drop test on the goat parchment, there was no stain on the turkey parchment in the water drop test (Table V).

Changes in the strength of the finished leather may vary depending on the structure of the animal, as well as the methods and chemical substances applied in leather processing. Due to the excessive fat content in the turkey skin, a parchment with low strength was obtained.

According to Unido (1994), the lowest tensile strength value recommended for chrome-tanned clothing leather is 10 N/mm<sup>2</sup>. The maximum elongation value specified by Unido (1994) for chrome-tanned clothing leather is 60%. Unido (1994) for single edge tear in leathers stated at least 14.71N/mm<sup>2</sup> for chrome tanned clothing leathers.<sup>13</sup>

When the results obtained in the research are examined, it can be said that the strength values of turkey parchment are very low. For this reason, its use in decorative flower making was designed due to its fine structure and it was tried to obtain products with high added value.

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