

Traditional Vaketa Leather Production in the Perspective of Ecological Sustainability

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Abstract

In leather production, the adoption of environmentally friendly production methods and protection of natural resources are highly important. Production of leather goods which are more sensitive to human and environmental health gradually increases its position on the agenda. With this basis, leather production by tanning especially with vegetable-based substances stands out. The production of vaketa leather is carried out by using valonea tannin which is an edible organic raw material and is a kind of leather that has an organic character, tightly and plump structured. By providing continuity of this leather production, it will have a positive impact on raising and protecting of valonea resources with its ecological and traditional character. Also, in Bazaar the demand on leather that has an organic character, tightly and plump structured can be supplied by the ecological and traditional vaketa leather production.

In this research, the information has been given about grinding, storing and reaping processes of valoneas obtained from valonea tree (oak-tree) that grow in Karacasu, Aydın region. The processing steps of vaketa leather production including beamhouse, tanning, post tanning and mechanical processes have been explained. Additionally, marketing opportunities of these leather products for the sustainable organic vaketa leather production have been considered.

Keywords: Valonea Tannin, Vaketa Leather, Ecology, Sustainability

1. Introduction

Human's relation with plant polyphenols is based upon past. These are component of plant materials and therefore it reserves an important place in our traditional nutrition. Nowadays, in modern life, interest is focused on more anti-oxidant feature substances that have capturing feature for free oxygen radicals in carcinogenic and mutagenic effects. Besides, being propounded polyphenols has blood coagulation accelerator, anti-hypertensive and lowering blood lipids effects, makes them important. Technologically, the oldest use of plant polyphenols is to prevent corrosion by stabilising leather collagen.

It is not difficult to understand how vegetable tanning occurs. Ancient people have observed what kinds of changes happened when they lay leather into a water accumulation / hole

includes plant materials. Plant polyphenols percolated from plant materials or plant pieces are the materials can give reaction with collagen, make it resist against bio- chemical degradation and also the most important thing, bring features to stay smooth after wetting -processes (Covington 2009).

In Anatolia, one of the regions where made leather production is Karacasu in Aydın. Karacasu is a highly ancient settlement. It is estimated that history of the district dates back to 5-6 thousand years ago, thanks to the historical artifacts near around the antique city Aphrodisias. The relationship of Karacasu with leather trade is so immemorial. A conspicuous structuring is observed in Ottoman economy. For instance, if plenty of sesame grows in a settlement, at that time, tehina managership should be placed there.

When the province annuals are analysed, plenty of acorns is grew in district. Acorn is raw-material for leather dealers, so this occupation should be improved, raw material should be evaluated its own location, public should earn money from this occupation (Öncü 1949).

Prof. Doc.Tuncay BAYKARA writes in the 24th line of his book the 18th century duties and on duties in Ottoman provincial organisation that in Yenişehir, Aydın, in Karacasu, foreman of tanner-craftsman Hacı İsmail, Hacı Ömer Fırağındar and İbrahim Osman are dutied. In 1800s, state had helped to improve leather occupation. Until 1980s, this activity had continued by transferring from father to son. In 1985s, leather dealers placed near Dandalaz started to build modern facilities. In Karacasu, 15 families deal with this occupation and more than 100 people work as a worker (Anonymous 2009).

Today's leather dealers' place becomes an industrial region high technology purification unit is there where facilities are located. Karacasu in Aydın, with its leather trade history about 300 years, is a centrum that leather producing based upon traditional vaketa and sahtiyan kinds is occurred there. These two products are two biological materials that are not analysed as an animal material till todays. Production of vaketa leather is occurred by tanning of raw hide with vegetable tanning material called as valex and got from the cup part of acorn-seed. Vaketa leathers produced in Karacasu leather fabrics are highly used in manufacturing sandals, briefcase, portfol bag, and wallet and ornament production. Sahtiyan leathers are used in baggage, bag, wallet and ornaments and saddle production (Ömür 2009).

2. Material And Methods

2.1. Material

Raw hide: Cattles are mammals which are raised to benefit from their meat, milk and leather. Generally, while many features of calf, cow and bull leathers resemble each other, they also have privilege sides. Cattle raw hides show so important structural alterations according to animal race, size, age and caring and nutrition conditions. A raw cattle hide is about 15-25 kg. Animal race caring and nutrition conditions, age and slaughtering season effect raw hide size and weight .Leather thickness range from 2.8mm to 5,7 mm. Dermis used layer of a leather forms 93 % and 97 % of total leather thickness. Papillary layer forms 8-35 % of total leather

thickness. Collagen fibres of this layer are thin. But they form a quite dense mesh network. Likewise, their elastin content is much more than calf hides (Harmancıoğlu and Dikmelik 1993).

Reticular layer forms 62 % and 85 % of total leather thickness. Most of corium collagen fiber bundle are in reticular layer of leather. These are close texture and large-structured bundles. Fiber bundles lengthen by making a certain angle on leather surface. These angles show an alteration in various body parts.

Acorn: Vegetable tanning is one of the first tanning materials for modifying collagen. Although there are commonly vegetable modifying materials or tanning in nature, about 40 plants are used in technical and economic sense. Among these, tannin in acorn cup and prongs that is especially indigenous to the Western Anatolia in our country is essential for our country's leather industry in technical and economic sense (Özgünay 2000). Acorn cup that is fruit of valonea oak tree is used for tanning cattle and goat hides by vegetable tanning technique. In the cup surfaces of this fruit, here are compounds called as tanning that has tanning featured. In this made of production, firstly, acorn ensured by harvesting oak trees in the region is operationalized for vegetable tanning process by grinding in leather fabrics (Ömür 2009).

Pulverised acorn cup that is grinded and non-chemical treatment is used in vegetable tanning of research material calfskin leathers.

2.2. Method

Wetting: Wetting process is made to revise the moisture content (65-70) at the time of striping, to clean dirtiness as blood, dirt, soil, urine and to remove some proteins dissolved in salt (globular) and water (albumin) of hide structure. Softening process is generally made by using water in the ratio of 250-500 % in propeller basins and drums. Before this process, leathers are hard and fragile. Fractures and injuries in leather fibres can be seen in the event of giving extreme mechanical action to leathers at that case. This situation manifests itself as a cavernously structure in the downstream processing and processed leather. Descent is observed in physical properties.

Therefore, at the beginning of the process extreme mechanical action should be avoided or implemented slightly. After leathers are softened by getting some water into their textures, mechanical action can be given controlledly.

On the first day, leathers are steeped in 200 % water that is 25 C°. On the second day, leathers are made into wing – leather by dividing from their back to tail. Later, leathers are soaked in fresh water, steeped 24 hours.

Hair Removal and Liming: In hair removing process, hair and weal are got removed from leather by being applied slurry prepared by sodium sulfide with alkaline feature and lime to the subcutis. At the same time, this process is a kind of preparation phrase for lime pit. Leathers stripped from hair and wool are put into lime defecation process. This process is made to remote the hair and hair root by permeating leather epidermic structure that is being used sodium sulfide and lime in propeller basins, to make collagen fiber ends reveal by soaking up water into the leather-texture and to make saponification into fat. Because of these features, lime defecation process is very important process and “*leather is fired with lime*” is used in leather trade.

In propeller-basin (on the scale of wet leather weight)

- | | | |
|--------------------|---|---------------------------------------|
| 200 % water 25 C | } | 1. Running during 4 hours |
| 4% lime | | 2. Keep waiting 72 hours |
| 2 % sodium sulfide | | 3. Later fleshing process is applied. |

Fleshing : Ligament course of leathers are removed in fleshing machines. Weighing process is applied.

Lime Removal and Bating: Leather pH is conveyed by lime removal to pH of bating enzyme work 8-8,2. Current distension on leather is decreased. Hardness is removed by clearing lime on the leather. At the same time, it can result in occurring lime spots. For this reason, lime should be removed from leather texture absolutely.

Bating process is made by enzymes that are organic catalysers. Every enzyme has a specific work-pH. The enzymes used in bating process for pelt are the proteolytic enzymes and work as the worth of 8-8,2. At the same time, ambient temperature should be 35-36 C° for enzyme operability. The aim of this process is to decompose the proteins fibrous and globular structured on leather texture and if unremoved that can cause problems as hardness, smell, impermeating to chemicals and to remote hair-roots and epidermic remnants from leather texture.

In drum (drum speed 6 (1 \min) On the scale of purified leather weight

200 % water (washing is done and percolated)

200 % water

1 % ammonium sulfate (pH control is done during an hour, pH =8)

+80 water 50 C° inter drum temperature 38 C°

0,8 % bating enzyme 45 min.

Drum is percolated and washing is required.

Vegetable tanning with acorn: The event is tanning that tanning materials in various type and feature permeated to leather by the use of mechanical effect in an aqueous media and irreversibly connected to the natural collagen in a certain content as a result of causing to reaction in physical and chemical senses with the ligament places in collagen and transformed leather to an stable and usable form. Tanning makes leather collagen that is deformable and

putrefy by means of tanning proof against the external influences. Tanning agents used in tanning process compose crosslinks between collagen molecules and so the chain-formed structure of collagen comes in steady. The shrinkage temperature of leather rises in terms of the degree of crosslink got in tanning process and stability of bonding shape. Polyaromatic tannins that have tanning effect are got from crust, woody –stem, steed, leaf and root parts of various plants by being applied the extract acquiring methods. Vegetable tanning matters are the compounds that have high-molecular weight and include polyphenolic hydroxyl group. They have hygroscopic feature and they do not melt when heated, they become carbonized. All vegetable tanning matters are in the corrugator, astringent feature. They give impurity with gelatine, metal salt precipitated with zinc, cadmium powder and aluminum salt.

Hydrolyzed tanning matters: Tannins as oak, chestnut, myrobalan, acorn-seed (valonea) and sumac are in this group. Hydrolyzed tannins can be dispersed and separated when boiled in acid-solution. Their probabilities of turning into reddish tints with additional alkaline are low. They can be decomposed to the light-coloured, simple-structured tannic acid. They make blue –tinting when came into contact by iron salt. Spot called blooming or blume can occur on leather product.

In drum (speed 6 (1 \ min) on the scale of fleshed leather weight)

200 % water 40 C°

10 % ground acorn is run during 3 hours. Bath is percolated. Leathers are taken out of the drum.

In drum – Drum Speed 6 (1 \ min) On the scale of fleshed leather weight)

200% water 40 C°

25 % ground acorn is run continuously during 5 hours. It is soaked for 24 hours. In the morning, it is run for an hour, the bath is percolated, and leathers are taken out of drum (Ömür 2009).

Trimming: Trimming process is applied to make leather thickness 2 mm into the machine.

Tanning with acorn

In drum – Drum Speed 6 (1 \ min) On the scale of trimmed leather weight)

200% water 40 C°

40 % ground acorn is run continuously during 5 hours.

It is soaked for 24 hours. In the morning, it is flipped for an hour. The bath is percolated; leathers are taken out of drum.

Lubrication and Colouration

Lubrication: It is observed that being covered leather fibres by lubrications and being wrapped fibres as a film by lubrication are a lubrication effect. This also prevents fibres rubbing each other and makes leather endurance rise. After the other sub-function steps and tanning process, lubrication-process is applied more or less to all leather varieties except certain leather types. The aims of lubrication-process can be indicated that;

- To make leather intended thrift-features and softness treating with lubricators to fibre-ranges of leather and fibres.
- To revise and control physical-property of leather such as stitching tear, tearing, water-proofing, air and water permeability, water absorption, moisture holding capacity, thermal transmittance.

Colouration: It is made leathers to get intended colour on leathers and reduce finishing-load of leather. Anionic, cationic, direct and metal complex colours are used to dye leathers. Commonly, anionic colours are used in the course of leather production. Anionic colours have less molecular structure than the other colour types.

In drum – Drum Speed 9 (1\ min) On the scale of wet leather weight)

200% water 40 C°

1% colour is run during 45 minutes.

5 % sulphited oil is run during 60 minutes.

1% formic acid is run during 30 minutes. pH = 4. Bath is percolated, leathers are taken out of drum and flattened with a platform.

Marbleising: After leather are got percolation, leathers are laid on flat marbles before becoming desiccation. During this process, leather is lubricated by smearing a sum of olive oil on its surface. In this way, leather is got elasticate and soften by olive oil. At the same time, leather is laid and made flatten.

Hanger-desiccation: After ending up the wet treatment steps, leathers are made ready for finishing process applied later by being took leathers to desiccation process. Desiccation methods that will be applied are determined according to tanning type and leather type. On the purpose of unchanging the leather features and qualities, the temperature should not be more than 30 -35 C° for leathers that tanned with vegetable and synthetic tanning matters. This is a commonly used method. The leathers are hung by fixed suspension brads or mobile conveyors in an airy ambiance in a directly sunlight proof way. Hanging process is made downwardly that chuck will be hung down from the paws.

Conditioning: It is made to turn leathers desiccated differently into the same moisture ratio and reduce hardness by giving moisture. The moisture content is about 20-28 % in leather. At the same time of desiccation, leather fibres can be bonded each other. The most common moisturising method that is applied in the small managements is to use moisturised wood flour. But soft wood flour is not used because of including resinous materials in it. By this way, leathers are put in it for some hours or the whole night in terms of the leather type. Today, spray conveyor system or water steam is newly used most commonly. Water is pulverised to leathers, they are moisturised and tempered by waiting 3 hours.

Stretching: After tempering and polish processes, leathers given softness are ready for tenter process. With this tenter process, it is aimed to increase leather surface. At the same time, it is ensured a flat surface without wrinkle for later processes. The spill over effect of mechanical

tenter on leather is a bit more than automatic tenter. Tenter process is applied to leather in a certain temperature in both mechanical and automatic tenter processes. Tenter process is applied to leathers that are chucked to a carrier band system with tenter pins while passing through temperature controllable drums. A flat surface is got by putting leathers into an automatic tenter machine. Wrickness is removed, the leather surface is widened.

Cylinder: By this process, leather becomes a firm and live form by applying smooth leather skin. At the time of this process, leather is got ready for also finishing process by passing through cylinder that its heavy surface is flat and covered with chrome nickel.

Finishing: After tanning, the leathers are not appropriate for sale in terms of handle, softness and surface appearance. It is related with finding customer in the market. By applying finishing process, the leather surface is widened and it becomes more attractive for the market. Just tanning, colouring, lubricating and retannage are not enough in this respect. This leather is sensitive to water, dust, sweat, dirt. Also the defects on leather surface should be increased. Colour is applied to leather surface according to intended tint, leather polish is applied.

Press: It is applied with 150 bars and 70 C° on the purpose of sticking the colour in finishing process and the polish on leather surface.

2.3. Conclusion

The Effects Of Subject To Sustainable Recovery Of The Region

There are 10 leather fabrics in Karacasu that produce vaketa leathers with traditional methods. In these fabrics, about 100 people can be employed. In terms of the multiplier effect, the income got from vaketa production is subsisted about 500 people. Acorn that is used in leather production is harvested from acorn trees in the region in the time of year. Especially, acorns that matured in August and September are harvested and bought by fabrics in Karacasu. On a yearly basis, about 250 tonnes acorn harvest is made. The price of acorn is determined as 0,40 TL by fabrics. This means that totally 100,000 TL. income is got. Yearly average 170 tonnes leather production that is ready for tanning is turned into vaketa leather by using 250 tonnes acorns in leather fabrics that are produced vaketa leather.

Totally 2,125,000 dm² vaketa leather is produced in the fabrics in Karacasu considering that vaketa producing about 250 dm area from 20 kg cattle raw hide. Vaketa leather is a kind of processed leather that is recognised the sales with respect of area. The sale price of vaketa leather is 0,65 TL\dm. Consequently, yearly average 1,381,250 TL financial turnover is supplied to Karacasu by the sale vaketa leather. Coming across the acorn frequently and largely in Aydın, as refered above and including a natural catalyser material that can be used in leather sector make the product an important source of income for the region. But carrying

out primitively harvest and later processes and uneducated country people limit the contribution of product to the sector and region economy.

Acorn is one of natural material that can be used in leather sector. For this reason, remaining a sustainable natural environment for the future is very important in terms of allowing region economy to recover with natural resources completely. Also, it is thought that this recovery model is an example for the other regions that have acorn in our country. Because of some toxicological effects of chrome salts to the environments such as soil and water and human health indirectly, today's leather production trends make progress through controlled and limited use of chrome salts. In this sense, the use of tanning materials that are organic, highly bio-degradable and unthreatening human health become important. Vegetable tanning materials are highly used to produce firm, thrifty and durable processed leather types because of its both natural and tight and plump features. From these leather types that have these features, eco-friendly processed leather is produced such as bag, leather craft, belt, sandals and ornaments in daily life.

The importance of this subject is supplying a natural sustainable environment as a living space and protecting for the future. Another importance of this subject is maximum benefiting from the natural resources in terms of sustainable recovery of the region and therefore the people there should be educated. For that purpose, the agents that are represented university in this region are needed so much. Especially, leather trade and traditional handicrafts department is carried on a business in Karacasu Memnune İnci MYO. It is thought that this department will be effective for employing qualified staff to the leather trade and educating the sector representers and region people. To protect available forest land and improve is very important in terms of sustainable recovery of the region.

Being afforested the region meaningly and providing to protect these values as a resource that give both a natural environment and an economic contribution and being educated the region people is in good taste with this aspect.

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