

Impacts of Conventional Collection and Preservation Practices of Raw Materials in Leather Processing Industry of Khulna Region in Bangladesh

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Abstract

In Bangladesh, the leather industry is the second-largest export industry, which plays a significant role in the national economy by exporting processed and semi-processed leather, and different types of footwear and leather products. This industry involves extensive human labor and has some severe environmental concerns. There are some conventional collection methods all over the country to maintain the regular supply of the raw material of the leather processing industry (hides and skins) which has impacts on the product quality and the total supply chain. The conducted study region was Khulna, the southern part of Bangladesh. A thorough study has been done to address and analyze the critical issues of the supply chain system of Khulna using data interpretation and graphical presentation. Multi-stage sampling to collect data. Two districts of the Khulna division were selected for data collection. About 12% of raw hides and skins are damaged due to poor collection and preservation practices at the root level.

Keywords

Raw hides and skins; leather industry; tannery management; supply chain of leather collection; preservation

1. Introduction

Leather sector is one of the prospective sectors in Bangladesh. It has plenty of scope for both vertical and horizontal expansion in terms of economic return and social benefits. The leather industry is ranked as the 2nd highest export earning industry in terms of growth and investment potential. Available and cheap raw materials and labor cost, transportation facility etc. have helped to boom the industry for the past few years (Moktadir et al. 2018). According to the figures made by the Export Promotion Bureau of Bangladesh, the leather industry (Harmonized System codes 41, 42, 43) has set records for its exports and ascended to 747 million US dollars in the period between July 2013 and June 2014. The leather industry has crossed the record \$1 billion mark in exports in the first ten months of the fiscal year 2014-2015 on the back of competitive pricing and quality improvement. According to the Export Promotion Bureau (EPB), leather exports totaled USD 116.73 million in the last fiscal year (July 1, 2016-June 30, 2017); the amount was USD 92.50 million the previous fiscal year (July 1, 2015-June 30, 2016) (Hong et al. 2018). According to an investigation in 2017, about 113 tanneries produce 300 million square feet of finished leather every year, 64.82% of which is cowhide, 2.25% buffalo hide and 1.2% sheepskin. The export value is estimated at 1.1 billion USD and roughly covers 0.05% of the global market (Ahaduzzaman et al. 2017). More than half of it is procured from animals sacrificed during the Eid-ul-Azha festival. Leather was declared as the product of the year in 2017. The whole leather processing industry has been shifted from Hazaribag to Savar.

Leather is a durable and flexible material created by tanning animal hides and skins, often cattle hide. It can be produced at manufacturing scales ranging from cottage industry to heavy industry (Thanikaivelan et al. 2005). Leather is used to make various goods- including clothing (e.g., shoes, hats, jackets, skirts, trousers and belts), bookbinding, leather wallpaper and as a furniture covering. Tanners produce leather in a wide variety of types and styles, decorated by a wide range of techniques. Every leather manufacturer aims to make leather of consistently high quality. But the harsh reality is that in most cases, the initial quality maintenance is not at their hand. It is dependent on the supply chain of leather collection. The supply chain comprises of numerous stakeholders like the butchers, primary collectors, seasonal collectors etc. The process of making the best quality leather depends on every single stakeholder. Animal farming, pre and post slaughtering factors, flaying, initial preservation methods, short time preservation techniques, stacking of preserved raw hides and skins (RHS), transport facilities

of the goods etc. have a significant impact on the leather quality. In Bangladesh, the common practice is that the local collectors store the rawhide and skin for month-long and supply by lots to the tanneries or big markets. They preserve more than a month by merely using salt in the season of “Eid-ul-Adha”. The quality of raw materials is compromised sometimes due to ignorance and lack of experience about the proper scientific approach. As a result, a huge volume of salted raw hides and skins are damaged and rejected every year. Sustainable management of the supply chain encompasses management of environmental, economic and social impacts and facilitates successful manufacturing over the product life cycle. It helps to connect sustainability and environmental concerns and to promote local, national and global political and economic change. The small-scale domestic animal farming culture has created difficulties to establish a well-structured supply chain for the raw materials of the leather industry. However, Bangladesh holds 11th position in the world ranking for livestock population (Strasser et al. 2015).

The study is inspired to draw a clear map of the collection process of the RHS from the very rural area. Further scientific analysis of the quality assessment of finished leather-based on the collection process of RHS can be easily done using this study. The data was collected from the two districts of Khulna division: Khulna and Bagerhat. The conventional collection processes, initial preservation methods in the rural end has been briefly studied. The short assessment of the impacts of collection and preservation practices on the leather industry has also been done based on the collected data.

2. Materials and Methods

2.1 Description of The Survey Area

Khulna is one of the eight districts of Bangladesh which is located 132 km away from the capital. The division is in the south-western corner of Bangladesh. The subjected districts have a total area of 5163.21 km². The population of the subjected districts is about 3,794,617, according to the 2011 census (Bangladesh Bureau of Statistics 2011). The average annual temperature of Khulna division is 26.37°C and is increasing at a rate of 0.005°C/year. The average annual total rainfall is 1630 mm. The weather is humid by nature in the subjected study areas (Mondal et al. 2017).

2.2 Sample Selection

Pilot study on RHS collection and preservation methods were done to understand and update existing knowledge on the selected areas. The survey included offices, RHS collectors, professional slaughtering houses, informal RHS merchants (beparis). For all sampling processes, multi-stage work was employed. Among 19 Upzilas of Khulna and Bagerhat, 11 were selected to do the survey. Over 100 professional slaughtering houses, 8 professional RHS collectors, 5 seasonal merchants, 2 zonal sourcing offices and 1 tannery (SAF Tannery, Jessore) were subjected to conduct the study.

2.3 Data Collection

Prior to using, standardized questionnaires have been developed and pre-tested for various subjected sampling groups. Before the actual survey, appropriate modifications were made. The principal methods of data collection included structured surveys by questionnaires, interviews with vital individual informants and focus groups, evaluation and physical participation in the collection process. A brief inspection was undertaken over 1588 piece of RHS in SAF tannery to identify the defects due to the steps from slaughtering to entering the factory warehouse.

2.4 Questionnaires

There are four sets of questionnaires for the four different sampling groups. The sampling groups are as follows: professional slaughtering houses, professional and occasional RHS collectors, regional sourcing offices and tannery.

Table 1: Set of questionnaires for the field survey

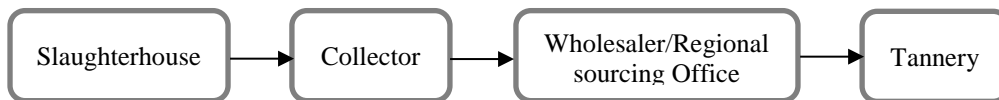
Set A (slaughtering house)	Set B (RHS collectors)	Set C (sourcing office)	Set D (tannery)
Number of the daily slaughtered animals	Frequency of regular or seasonal collection	Frequency of RHS collection and supply	Frequency of RHS collection from suppliers
Any preservation methods after slaughtering	The initial quality of the collected RHS	Quality analysis and categorization of RHS	The grading process according to quality
Slaughtering cut marks on the RHS	The initial preservation method	The preservation system and time duration	The percentage of the defects due to

		between collection and supply	slaughtering, preservation and transportation
Who is the primary collector	Duration of preserved RHS before supply	Transportation system to the tannery	
The duration between slaughtering and collection	The transportation system of RHS collection and delivery	How the RHS quality can be improved	
	How the quality can be improved		

3. Results and Discussions

3.1 Outline of RHS flow

According to the survey, the initial outline of the RHS flowchart up to tannery is as following



Except for the season of Eid-ul-Adha, Fig. 1 describes the RHS flow. Eid-ul-Adha is considered as the prime collection time of the RHS. More than 70% of the annual collection is done in the Eid-ul-Adha season. Fig. 1 indicates the maximum consumed the time of every step of the process flow.

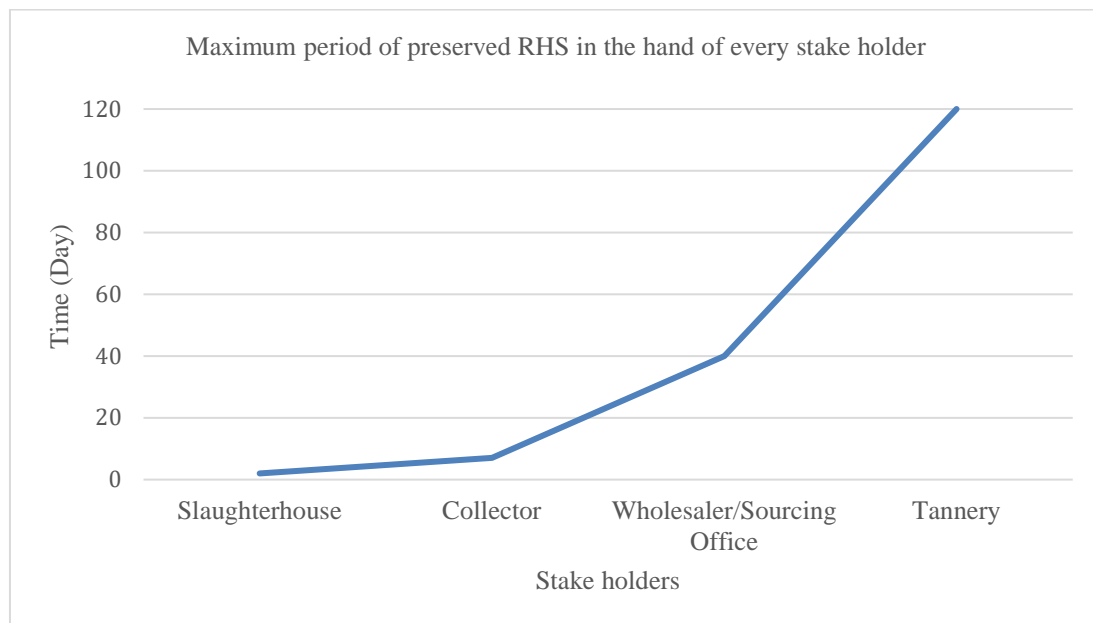


Figure 1. The maximum period of preserved RHS in the hand of every stake holder

3.2 Method of Preservation and grading

The primary preservation plays a pivotal role in RHS quality. There is a standard method of preservation for RHS. The general approach of preserving RHS is applying salt on the flesh side. The technique is termed as curing. 25-30% of the hide weight and 40-50% of the skin weight vacuum, granular, rock or khari salt is used for curing after cleaning the RHS (Covington 2015). It is easy and cost-efficient among the preserving techniques. In the slaughterhouse, RHS is kept for a maximum of two days. The survey, which includes over 100 slaughterhouses shows a similar practice of RHS preservation. If the RHS is delivered to the primary collectors at the first day, they apply no curing method. If the collectors take it on the second day, the butchers apply a little amount of fresh salt on the flesh part. They do not follow any preset methods. The salt amount is arbitrary according to their experience, which can keep the RHS okay for 2-3 days. The primary collectors apply salt again without any measurement to preserve the RHS for a short period. There are no grading systems maintained until this step. The initial implementors of the grading system are the wholesaler and the regional sourcing offices. The RHS collected from the subjected region are sold to SAF tannery, Jessore and the market at Postogola, Dhaka. RHS are sold

according to their quality in the SAF tannery and Postogola. So, the wholesalers categorize according to the quality and apply salt maintain the standard method of curing. Fresh and used salt are applied to skins and hides, respectively

3.3 Storage and transportation of RHS

RHS are stacked in the open air in the slaughterhouse. The collectors, wholesalers, sourcing agents and tannery use warehouse for RHS storage. Generally, the collectors and wholesalers use a separate room to store the preserved raw materials. RHS are vulnerable to heat and increased temperature. The collectors and wholesalers do not use any cooling method for the storage room. But they try to build the storage room in such manner so that naturally the storage room does not expose to excessive heat.



Figure 2. Storage room of wholesalers, collectors and salt application on RHS

3.4 Quality assessment of RHS

A detailed investigation was done on 1588 pieces of RHS (720 goat skins and 868 cowhides) in the warehouse of SAF Leather to analyze the impacts of collection and preservation process of RHS on the raw material quality. There are five significant defects identified during the study. The list is given in table 2.

Table 2: List of defects and degrading RHS quality

Defects	Responsible Stakeholders	Causes
Slaughtering Defects (cuts, bleeding, manure)	Slaughterhouse	Inexperience of slaughterers
Autolysis	Slaughterhouse, collectors	Late curing
Brine draw	Slaughterhouse, collectors	Inadequate curing
Hair slip	Slaughterhouse, collectors, wholesalers	Not preserved to the fullest degree
Red heat damage	Slaughterhouse, collectors, wholesalers	Salt reuse, exposure to heat

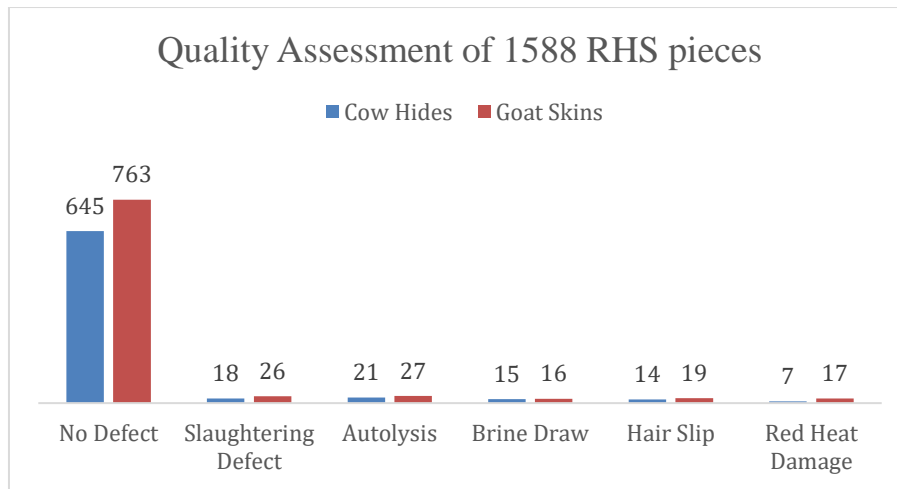


Figure. 3. Analysis of the quality assessment of 1588 RHS pieces

Fig 3. describes the impact of the defects on the studied RHS samples. The data clearly visualize that in root level the slaughterers, collectors face problems to deal with cowhides. 88.66% of RHS has no defects. The defects caused due to slaughtering, autolysis, brine draw, hair slip and red heat damage are 2.77%, 3.02%, 1.95%, 2.08% and 1.51% respectively.

3.5 Recommendations

The conventional preservation practices create damage to the finished goods in terms of quality and value. The primary and root level stakeholders also affected for the conventional practices. Some recommendations are suggested to minimize these loses, which can improve the supply chain and leather quality as well.

Improvement and up-gradation of the slaughterhouse facilities are important. The basic training on slaughtering, flaying, cleaning and preservation will reduce the initial damage. Emphasis should be given on building a proper storage facility in collector and wholesalers level. Temperature and moisture controlling, basic knowledge of stacking the RHS are essential to maintain the RHS quality. Transportation is another crucial factor in leather quality. Maintaining a standard process for RHS transportation should be ensured.

4. Conclusion

Though the production of leather goods has been boomed recently for government and private investment, the leather processing sector has not been flourished accordingly. Footwear and leather goods industry tend to import the raw materials whereas we have plenty and cheap raw materials. Maintaining the supply chain properly will enhance the value addition of this promising sector. The study reveals that inexperience and inadequate practical knowledge are responsible for quality damage which can easily be controlled by taking necessary measures.

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