

AN OVERVIEW OF THE PRODUCTION OF NIGERIAN NON-WOVEN FELT FABRICS BY DOMESTICATED METHOD

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Abstract

This study focused on the production of non-woven felt fabrics by domesticated method. It covers processes ranging from the animal fibre shearing to felt fabric production. The hair fibres was expertly sheared out from the sheep and pre-treatment carried out to remove the unwanted impurities and constituents. Fibre processing involving fibre blending, separation and carding were also done to make the fibre amenable for felting. The fibre in the web form was laid on top each other to form a compact mass and to allow for easy entanglement of the fibres. Moisturization technique was also carried out to increase the felting propensity of the fibres which was then pressed to remove the excess moisture and to give shape to the fabric. Continuous rolling and drying finally gives the felt fabric. The result of this processes are shown in the discussion of results

Keywords: Non-woven, Felt Fabric, Hair Fibres, Pre-Treatment, Rolling, Drying.

1.0 INTRODUCTION

Non-woven felt fabrics are mainly obtained from animal fibres such as wool gotten from sheep. The Sheep (*Ovisaries*) were first domesticated about 10,000 years ago. A male sheep is called a ram, the female sheep is called ewe and a young sheep is called lamb.

Today wool is still the world's leading animal natural fibre. The Food and Agriculture Organization (FAO), 2010 estimates annual wool production at around 2.1 million tonnes per year. Non-woven fabric is a fabric that can be produced by a variety of processes other than weaving and knitting. Its classic example is felt (Bateup, *et al*, 1996).

Most fabrics are either woven or knitted but not felted. The first well documented discovery of felt dates back 3000-3500 BC. (Makinson, 2001). Felt is a material that requires neither the weaving technology, nor the sophisticated knitting technology (Schlink, 2002).

Felting is a unique property of many animal fibres. It can be highly desirable (Blankenburg, 2002) particularly in manufacturing felted products, which account for about 5% of the wool market in Australia (Schlink *et al*, 2002).

In Nigeria, the hair from the sheep are mainly considered as waste and often roasted out or thrown away. With the knowledge of felt fabric production domestically, there will be awareness of the usefulness of these hair fibres from the rearers to the consumers of this animals. This will no doubt re-orientate them on the vast use of these felt fabrics and thereby adding value to the economy as elucidated in this paper.

2.0 MATERIALS AND METHOD

MATERIALS

Wool fibres (Raw material)

Caustic Soda

Acetic acid

Buckets and bowls

Nose mask

Improvised carder

Improvised comber

Roller

Table

Presser

dryer

Vat dyes (optional)

Hand gloves

Moulds

2.1 METHOD

2.1.1 Raw material Pre-treatment:

The raw hair fibres are composed of impurities which affect or impede the usefulness of the fibres. The impurities present in the hair fibres are of two types - natural and acquired impurities. Natural impurities are the glandular secretions that adhere to the fleece such as sweat, grease, blood and oils. The acquired impurities include soil, dust, dirt, straw, manure, and vegetable matter. It is therefore necessary to carry out preparatory process on the fibres to remove these impurities before further processing. The following raw material pre-treatments were employed; namely:

2.1.2 Shearing: Here, the fibre is removed from the sheep by expertly scrapping off the hair from the animal skin.



Raw hair fibres

2.1.3 Soaking: The fibres were soaked in warm water for about 12 hours to cause swelling of the fibre and aid the easy removal of impurities and inherent constituents before washing and cleaning.

2.1.4 Washing: The fibres were further washed in water with detergent to remove the water soluble impurities and thoroughly rinsed before scouring.

2.1.5 Scouring: Scouring process was carried out in which the fibre will be immersed in 1% concentration of caustic soda for about 15 minutes followed by thorough washing in water, rinsing and drying.

This process helps in removing the remaining impurities and constituents that could not be removed by soaking and washing alone. It further softens the wool and makes it amenable to further processing.

2.2 Processed Fibres (separated and carded fibres):

2.2.1 Fibre Separation: After the fibre pre-treatment, the fibres are usually entangled together and as such are separated to disentangle and loosening up the fibres. This makes the fibres ready for carding operation.

2.2.2 Carding/Combing: An improvised method of carding was used. This results in a thin web of aligned fibres and converts the separated scoured wool fibres into a nice even soft and smooth fibre to be used for felting.

2.3 Felting process

2.3.1 Web laying: The fibre was laid at 90 degree to each other to form a compact mass of fibrous web according to the required thickness desired and end use.

2.3.2 Moisturizing: the fibre was moisturized using warm soapy water, and continuous agitation was carried out to allow for easy penetration of the moisture inside the fibres and for easy entanglements of the fibre scales.

2.3.4 Pressing: The web was pressed together by applying pressure on the mass of fibrous web. This allows the fibres to perfectly interlock with each other to form a fabric and also to drain out the excess moisture. This process goes on till the fibres are fully matted together.

2.3.5 Rolling: The fabric was rolled over and over again to further remove the moisture and to finally compress the fibre to its finished stage.

2.3.6 Rinsing/ Drying: The fabric was thoroughly rinsed in water and dried

3. RESULTS AND DISCUSSION

3.1 Result of the hair fibre pre-treatment;

Pre-treatment gave the fibres a smoother, cleaner and brighter appearance attributed to the removal of both constituents and impurities.



RAW MATERIALS



SOAKING , WASHING AND SCOURING



OBTAINED HAIR FIBRES

3.2 Result of the fibre processing;

3.2.1 Fibre separation; the separated fibres resulted to a well regularized and disentangled fibres. This makes the fibre clusters formed by the pre-treatment to be disentangled for further processing. This is shown below;



FIBRE SEPERATION



SEPERATED FIBRES

3.2.2 Carding processing: This process gave a fine, smooth and shiny fibre with soft handle in a web form. The fibrous web is now in a form for felting to be easily carried out. This is shown below;



IMPROVISED CARDING

3.3 Result of Felting:

The felting process as explained in the methodology resulted to a compacted mass of fabric materials that have both industrial and domestic applications.



DYED FELT FABRIC

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Conclusion

The production of Nigerian non-woven felt fabric by domesticated method has been studied; the domesticated process involving fibre shearing, pre-treatment, processing and the resultant felt fabric has also been expatiated. The results showed that the sophisticated method of felt fabric production in the industries can be domesticated by specially improvised techniques giving rise to felt fabric of competitive value to be harnessed both at homes and industries.

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