



A REVIEW ON ECO-FRIENDLY LEATHERS

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ABSTRACT

The leather manufacturing industry is a significant sector involved in producing various leather goods such as footwear, clothing, bags, belts, and other accessories. This process involves multiple stages, uses toxic chemicals, and consumes significant natural resources, contributing to deforestation, pollution, and a large carbon footprint. Vegan leather is a plant-based material designed to mimic the appearance and texture of animal leather without using any animal products. From handling hazardous chemicals to managing waste and sourcing raw materials, the leather industry confronts significant sustainability hurdles that must be addressed to ensure its long-term viability. Green materials such as vegetation and micro-organisms are utilized to produce leather derived from plants. This approach aids in minimizing the amount of textile waste, as it is decomposable and advantageous for the environment.

Keywords: *Leather, Eco-friendly, Environmental Impact, Sustainable Practices.*

1. INTRODUCTION

The leather manufacturing industry is a significant sector involved in producing such as footwear, clothing, bags, belts, and other accessories. This multi-billion-dollar global industry features major players in countries like Italy, China, India, Brazil, and the United States. Leather manufacturing involves several stages, starting with the procurement of raw hides and skins, followed by tanning and processing, and ending with the production of finished leather products. The raw materials for leather come from animals such as cattle, sheep, goats, and pigs.^[1]

The tanning process uses chemicals and other substances to preserve and strengthen the hides, preparing them for leather products. Tanning methods can vary, with common techniques including chrome tanning, vegetable tanning, and synthetic tanning. After tanning, the hides are processed into finished leather products through cutting, sewing, and other manufacturing steps. These products are then distributed to retailers and consumers around the world.^[1]

2. CONVENTIONAL LEATHER PRODUCTION

Leather production, which impacts the meat industry, is a complex process that converts raw animal hides or skins into a durable material. This process involves multiple stages, uses toxic chemicals, and consumes significant natural resources, contributing to deforestation, pollution, and a large carbon footprint. As a result, traditional

leather production has been criticized for its environmental impact, prompting a growing interest in sustainable alternatives and more eco-friendly tanning methods.^[1]

3. FORMATION OF VEGAN LEATHER

Vegan leather is a plant-based material designed to mimic the appearance and texture of animal leather without using any animal products. It can be created from various synthetic or plant-based sources, providing an option for those who prioritize ethical and environmental concerns and choose to avoid animal-derived materials. However, not all vegan leather is as eco-friendly as it might seem. Vegan leather is frequently made from plastic-based materials such as polyurethane (PU) or polyvinyl chloride (PVC).^[2]

While these synthetics provide a cruelty-free alternative to traditional animal leather, they raise significant environmental concerns. As products of fossil fuels, PU and PVC are essentially plastics that contribute to resource depletion and pollution. For eco-conscious consumers, the plastic nature of vegan leather highlights important considerations: the material's environmental impact, durability, and disposal methods are crucial factors in assessing its overall sustainability.^[2]

4. DILEMMAS IN LEATHER INDUSTRY

The leather industry is estimated to contribute to 18% of global industrial water pollution. It is also the fourth largest emitter of greenhouse gases within the textile sector, responsible for 5% of global emissions. In India, the leather industry is estimated to provide employment to around 4 million people, many of whom face hazardous and exploitative working conditions. In Bangladesh, over 90% of tanneries are situated in residential areas, exposing local residents to harmful chemicals and environmental pollution.

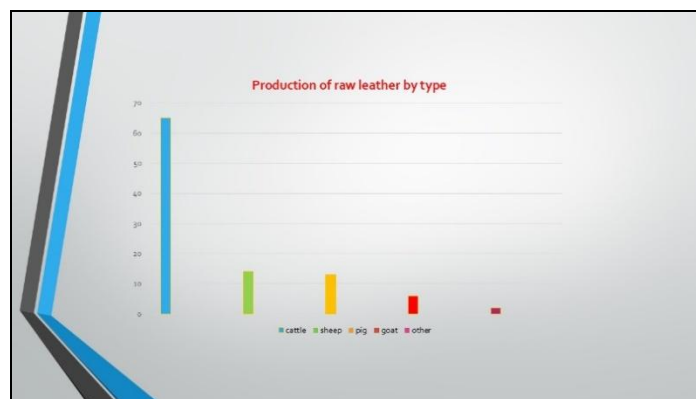


Figure 1: Production of raw leather by type in global level

These figures underscore that the leather production sector has been associated with numerous important issues and obstacles impacting the environment, the well-being of animals, human health and safety, working conditions, and additional areas. From dealing with dangerous substances to handling waste and procuring raw materials, the leather sector faces major environmental challenges that need to be tackled to guarantee its enduring success.

Recently, heightened consumer awareness of these issues has intensified pressure on companies to embrace more responsible practices. Additionally, innovations in materials and production methods are offering new opportunities for the industry to enhance its environmental and social impact.^[3]

4.1 Impacts

The leather industry leads to lots of impacts in environment as well as social. The leather manufacturing industry encounters major environmental challenges due to its intricate production process, which involves substantial water, energy, and chemical usage, each impacting the environment negatively.

- Environmental impact
- Chemicals usage
- Animal welfare
- Health and safety risks
- Cost and competitiveness
- Waste management etc.^[3]

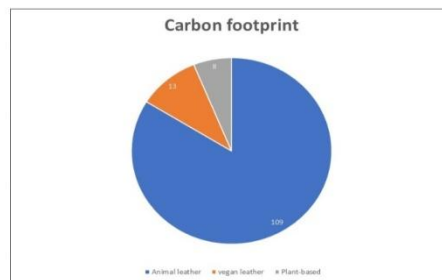


Figure 2:Carbon footprint

5. ECO-FRIENDLY LEATHERS

By-products from fruits such as Mango peels, banana stems, and pineapple scraps, as well as cactus, water hyacinth, corn husks, and waste from rice and other related agricultural materials, can be efficiently utilized to create vegan leather. This advanced method has the potential to substitute approximately 30-50% of the synthetic chemicals currently used in the production of traditional leather products available for purchase. The specific procedures and parameters for each type of agricultural waste are tailored to achieve the best results.^[4]

Green materials such as vegetation and micro-organisms are utilized to produce leather derived from plants. This approach aids in minimizing the amount of textile waste, as it is decomposable and advantageous for the environment. Sources of bio-leather include natural latex, pineapple, fungi, jellyfish, and bacterial cellulose. Additionally, mushroom leather, or mycelium leather, serves as a substitute for leather made from animals.^[4]

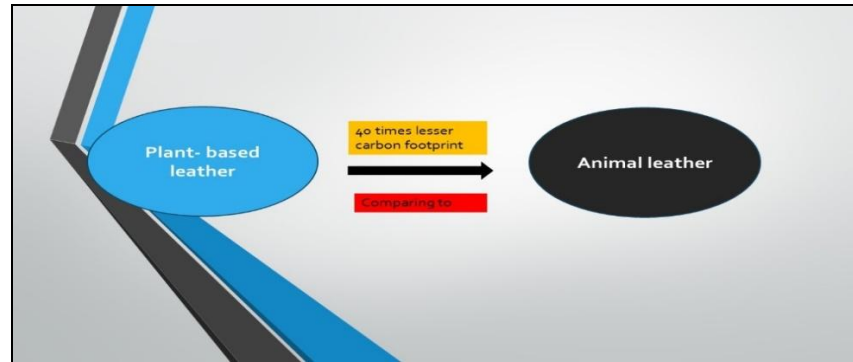


Figure 3: Plant-based leather vs Animal leather

5.1 Vegetable-Based Imitation Leather Fabrics

There are an abundance of vegetable-based imitation leather fabrics available on the market today. Some are

5.1.1 Piñatex Leather

Piñatex, made from pineapple leaf, stands out as a unique leather substitute. It is vegan and cruelty-free, produced without the use of harmful chemicals, and is completely biodegradable.

Leading fashion brands, including Hugo Boss, favor Piñatex as an environmentally friendly alternative to traditional leather, so keep an eye out for it during your shopping.^[5]

5.1.2 Mushroom Leather

Mushroom leather, also known as MuSkin, is another option derived from the *Phellinusellipsoideus* fungus or a mushroom.

This natural and biodegradable material is soft and similar in texture to suede. It is water-resistant, making it an excellent choice for faux leather bags and jackets, and is free from toxins.^[6]

5.1.3 Cork Leather

Cork, a highly versatile material, can also be transformed into leather. This eco-friendly leather alternative, made from cork tree bark, is lightweight, water-resistant, and surprisingly durable.^[7]

5.1.4 Leaf Leather

Leaf leather is a naturally occurring plant-based leather created from fallen leaves. It is sustainable, organic, and stylish, making it an ideal choice for eco-conscious accessories and a fully biodegradable option for leather.^[8]

5.1.5 Apple Skin Apple Leather

AppleSkin is a faux leather fabric that is sustainably sourced from the by-products of the apple juice industry.

This plant-based leather is certified by OEKO-TEX and is 100% cruelty-free, utilizing waste to produce a beautiful, versatile alternative to leather.^[9]

5.1.6 Bananatex® Leather

Loved by renowned fashion designer Stella McCartney, Bananatex® is a plant-based leather grown in the Philippines from banana plant by-products. It is natural, eco-friendly, cruelty-free, sustainable, ethical, and has achieved Cradle to Cradle Gold certification, making it the ultimate choice for a leather substitute.^[10]



5.1.7 Coconut Leather

Coconut leather closely resembles the real thing but is entirely made from organic waste from the coconut industry. Its unique feature is its breathability, flexibility, and water-resistance, allowing it to be used in a wide range of products.^[11]

5.1.8 Bio-Alloy™ Vegan Leather

Produced by Modern Meadow, Bio-Alloy™ is a premium faux leather fabric. It is as soft and luxurious as genuine leather but is made from natural raw materials, and its manufacturing process emits 90% fewer greenhouse gases than that of animal leather.^[12]

6. CONCLUSION

Other alternatives to traditional leather include lab-grown leather and recycled rubber, both of which are sustainable and cruelty-free. Lab-grown leather, created from yeast cell collagen, is bio-fabricated to mimic the appearance of animal leather. Recycled rubber, often sourced from old car tires, serves as a popular substitute for leather in boots, shoes, and accessories.

Recently, the leather manufacturing industry has faced criticism over issues related to animal welfare, environmental impact, and working conditions in some regions. In response, there have been efforts to improve sustainability practices and increase transparency in the supply chain.

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