



Utilization of Fish Skins for Leather Production: An Innovative Approach for Waste Valorization

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Fish skin, an often discarded byproduct of the seafood industry, holds potential as an alternative raw material for leather production. This study explores the processes of converting fish skin (particularly from Tilapia, Salmon, and Rohu) into durable, aesthetic leather using eco-friendly tanning techniques. Emphasis is placed on preservation, tanning, finishing, and final product quality assessment. The findings highlight fish leather's suitability for fashion, upholstery, and accessories, promoting circular economy practices in the fishery sector.

Introduction

Fish leather is derived from the skins of species such as Tilapia, Salmon, Carp, and Catfish. Compared to bovine leather, fish leather is thinner but highly durable due to its cross-fiber structure. It is gaining attention in sustainable fashion and eco-textiles. This research aims to standardize processing methods and evaluate the market potential of fish leather.

Species Commonly Used

Fish Species	Scientific Name	Key Features
Tilapia	Oreochromis niloticus	Widely available, strong fiber
Salmon	Salmo salar	Smooth, elegant texture
Rohu	Labeo rohita	Abundant in India, good skin yield

Collection and Pre-treatment

Source: Fish processing units and fillet industries

Initial Treatment:

- Washing to remove flesh and fats
- Preservation with salt or borax (up to 1 week)

Degreasing: Removal of oils using mild detergents or solvents

Tanning Process

Step-by-Step Method:

1. Soaking – Rehydrating dried skin (6–8 hrs)
2. Liming – Using calcium hydroxide to remove scales (12–16 hrs)
3. Fleshing – Scraping off residual tissues manually or using machines
4. Deliming and Bating – Neutralizing lime with ammonium salts and enzymes
5. Pickling – Using acid and salt to prepare for tanning
6. Tanning – Vegetable (wattle bark) or chrome tanning
7. Neutralization & Dyeing – Adjusting pH and applying dyes
8. Fatliquoring – Lubrication for flexibility
9. Drying and Finishing – Stretching, drying, buffing, polishing

Properties of Fish Leather

Property	Value/Remarks
Tensile Strength	4.5–6.0 MPa (depending on species)
Thickness	0.6–1.2 mm
Appearance	Scaled pattern, natural shine
Tearing Resistance	High due to cross-fiber arrangement
Flexibility	Very good after proper fatliquoring

Applications

Fashion Industry: Bags, wallets, shoes, belts, watch straps

Interior Decor: Upholstery, cushion covers

Crafts: Jewelry, bookmarks, book covers

Sustainable Alternatives: For consumers avoiding bovine leather

Advantages

- Eco-friendly and biodegradable
- Valorization of fish waste
- Unique scale texture
- High strength despite thinness
- Additional income source

Limitations & Challenges

- Odor control during processing
- Requires skill in tanning
- Limited consumer awareness
- Not suitable for large items
- Competition from synthetic leather

Environmental Significance

Utilizing fish leather reduces fish processing waste and promotes a circular economy. It also decreases environmental pollution from fish skin disposal and supports eco-friendly alternatives in the leather industry.

Conclusion

Fish leather is a promising alternative to traditional leather, offering durability, beauty, and sustainability. With proper processing and promotion, it can empower coastal communities and contribute to a greener leather industry.

References

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