

Process for Obtaining Adhesive from Leather Wastes

1. Technology:

This patent outlines a novel approach for the production of adhesive from leather waste through collagen hydrolysis, which addresses substantial environmental and performance challenges in the adhesive industry. This technology is consistent with the current trends in resource efficiency and sustainability by transforming waste into a valuable product. This invention pertains to a process that transforms leather waste material, specifically leather trimming, into a high-quality adhesive. The method uses mild concentrations of sulfuric acid and sodium hydroxide to convert collagen into adhesive through collagen hydrolysis. By optimizing the process parameters, such as temperature, extraction duration, and reagent concentrations, the adhesive properties are optimally enhanced. Trimming waste was collected and pretreated to eliminate impurities, thus ensuring a pure material for hydrolysis. It was hydrolysed in an aqueous solution that contained 1.5% sulfuric acid and 1.5% sodium hydroxide. This procedure was implemented for 60-120 minutes at temperatures that were elevated to 70-90°C. The extraction process was optimized by the combination of acids and bases, which facilitates the decomposition of collagen into adhesive. To maximize yield and quality, the process parameters were carefully managed. Cross-linking compounds have been added to improve the adhesive's mechanical properties. These agents improve the bonding and static bending strength, thereby enhancing their performance in a variety of applications.

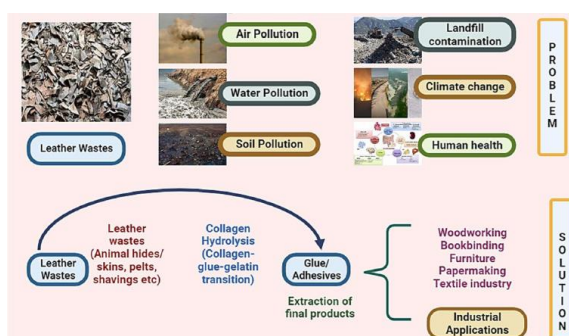


Fig. 1 Schematic representation of overall invention relates to a process for converting leather waste into a high-quality adhesive and its industrial applications

2. Problem Addressed:

Environmental pollution and resource inefficiency are exacerbated by the substantial waste produced by the leather industry. The environment is adversely affected by conventional leather disposal methods, including landfills and incineration. Consequently, the leather industry's circular economy is bolstered by the conversion of leather waste into valuable adhesive products, which reduces landfill use. The extraction of adhesives from leather residue offers an alternative source of adhesives, thereby decreasing reliance on synthetic adhesives that are derived from petrochemicals. The requisite strength and flexibility are frequently lacking in conventional adhesives. This approach improves bonding strength and gap-filling capabilities, while also offering an eco-friendly formulation with minimal toxicity. This approach promotes safer handling and a reduced environmental impact in comparison to traditional synthetic adhesives. Furthermore, the appropriate curing and setting periods facilitate efficient handling during the manufacturing process, while also ensuring robust bonds and an enhanced adhesive solution for a variety of industrial applications.

3. Industrial Applications:

The environmental benefits, flexibility, and strength of adhesives derived from leather waste render them suitable for a wide range of industrial applications. The adhesive can be applied to a variety of building materials, including laminates and flooring. It can be implemented in the manufacturing of upholstered furniture, providing improved adhesion for foams and fabrics. The adhesive can be used in vehicle interiors to bond components such as ornamental materials, thereby reducing the use of synthetic adhesives. This process has the potential to provide the textile industry with eco-friendly adhesives for fabric bonding, coatings, and laminates. Moreover, the adhesive produced from leather waste is likely to be marketed to artisans and craftspeople as a sustainable bonding solution for a variety of materials.

4. Patent Application Number: 202341080544