

Production and Evaluation of Fish Glue from Fish Waste

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Fish glue is a protein-based adhesive made by hydrolyzing collagen from fish skin, bones, and air bladders. Unlike synthetic adhesives, fish glue is biodegradable, non-toxic, and derived from renewable sources. This makes it an excellent candidate for eco-friendly adhesive applications in woodworking, bookbinding, and conservation work.

Objectives

- To extract glue from fish processing waste.
- To evaluate the physicochemical properties of fish glue.
- To analyze its adhesive strength and compare it with commercial glues.

Raw Materials & Ingredients

- Fish waste (preferably skins, heads, and bones of species like Rohu, Tilapia, or Catla)
- Distilled water
- Acetic acid or citric acid (for pH adjustment)
- Sodium bicarbonate (for neutralization)
- Preservatives (optional – e.g., benzoic acid)
- Glycerol or sugar (for plasticizing, optional)

Equipment Required

- Hot plate / water bath
- Beakers, flasks
- pH meter
- Filter cloth / muslin cloth
- Blender or grinder
- Oven/dryer
- Weighing balance

Procedure

Step 1: Pre-treatment

Clean fish waste with cold water to remove blood and scales.

Cut into smaller pieces for easy processing.

Step 2: Collagen Extraction

Boil fish waste in distilled water (1:3 ratio) at 70–80°C for 4–5 hours.

Optional: Add 0.5% acetic acid to facilitate collagen hydrolysis.

Maintain pH between 3.5–5 for optimal gelatin release.

Step 3: Filtration

Filter the hot mixture through muslin cloth to remove solid residues.

The filtrate contains dissolved collagen/gelatin.

Step 4: Concentration

Simmer the filtrate to concentrate the solution and thicken it.

Avoid boiling as it may denature the proteins.

Step 5: Neutralization

Adjust pH to ~7 using sodium bicarbonate carefully.

Add preservatives if necessary.

Step 6: Drying or Storage

The glue can be stored as liquid or dried into solid flakes for storage.

For drying, pour glue into trays and dry at 50°C in an oven.

Analysis Parameters

- pH of glue
- Viscosity (using viscometer)
- Adhesive strength (lap shear test)
- Solubility in water
- Microbial load (for storage stability)

Applications

- Woodworking (furniture)
- Restoration of antique books and paintings
- Adhesives for biodegradable packaging
- Potential use in biomedical fields (wound dressing research)

Expected Outcomes

- Successfully extracted fish glue from processing waste
- Adhesive properties comparable with commercial glues
- Promotion of waste utilization and value addition in fish processing industry