Ethyl acrylate (EA) is washed with 5% NaOH to:

- Deionized (DI) water is used throughout the process.
- Produced by filtering municipal water.
- Stored for later use.

**THE GLIXO SOLUTION**

- A hydrogel wound dressing that provides:
  - Natural cooling sensation
  - Oxygen exchange for faster healing
  - Moisture at the wound site
  - Simple removal by rinsing with water, for ease of use at home and in clinical settings

**PROCESS OVERVIEW**

**Chronic Wounds**
- Treatment is challenging due to:
  - Increased risk of infection
  - Patient discomfort
  - Slow healing rates
  - Large cost burden on the Canadian healthcare system.

**Recovered from ethanol washing streams**

**Natural cooling sensation**

**PEA Recovery**

**Some wound dressing options include:**

- **Gauze**
  - Adheres to the wound, causing pain and damage upon removal

- **Hydrocolloids**
  - Expensive
  - Slow healing due to low oxygen exchange

**Process Overview**

1. **Water Filtration**
   - De-ionized (DI) water is used throughout the process.
   - Produced by filtering municipal water.
   - Stored for later use.

2. **Primary Feed Preparation**
   - Dissolution and mixing of:
     - Polymer backbone, hydroxypropyl methylcellulose (HPMC)
     - Reaction initiator, potassium persulfate (KPS)

3. **EA Feed Preparation**
   - Ethyl acrylate (EA) is washed with 5% NaOH to:
     - Remove impurities
     - Remove MeHQ, an inhibitor that prevents EA polymerization during storage.
     - EA is heated before the reactor with a hot water loop

4. **Graft Copolymerization Reaction**
   - EA is grafted onto HPMC using KPS as an initiator:
     - Continuously stirred tank reactor
     - High exothermic (-484 kJ per kg hydrogel)
     - Reaction conditions: T=60°C, P=115 kPa

5. **Washing and Separation**
   - DI Water
   - Ethanol
   - Ethanol
   - DI Water

6. **PEA Recovery**
   - Recovered from ethanol washing streams
   - Water is added to precipitate PEA from the solution
   - Sold to qualified suppliers to be purified and used in various biomedical applications

**PROJECT IMPACTS**

- **Safety**
  - Compliance with medical product quality regulations
  - Proper storage and heating of EA monomer
  - Prevention of thermal runaway
  - Inherently safer design
  - Limiting use of hazardous substances
  - Low temperatures and pressures throughout
  - Process and safety control systems identified through hazard and operability (HAZOP) study

- **Environmental**
  - Reduction of waste through PEA byproduct recovery
  - Hydrogel biodegradability prevents environmental accumulation
  - Minimal plant footprint

- **Social**
  - Creating jobs in Alberta within the biomedical field
  - Improving accessibility and affordability for Canadian consumers

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**REFERENCES**


