**Drinking Water Purification**

**Conventional Treatment**

- **Coagulation**
  - Aluminum or iron salts added to the water to remove negative charges from suspended particles, allowing them to stick together.

- **Floculation**
  - Gentle stirring of water increases collisions between microflocs, forming visible floc particles.

- **Sedimentation**
  - Water is held still in settling basin, floc particles sink to the bottom, and clarified water is drawn from top.

- **Filtration**
  - Water flows through granular or membrane pores, removing contaminants and making water clear.

**Advanced Oxidation Processes**

- **Ultraviolet Light**
  - Wavelengths can be selected to disinfect individual pathogens [7].

- **Oxidizing Agents**
  - UV light is effective against all pathogens. Wavelengths around 254 nm are best at inactivating DNA [2]. UV light produces no DBPs but does not leave a residual disinfectant in water.

- **Disinfection**
  - Solar disinfection (SODIS) is used in developing countries & requires at least 4 hours of direct sunlight exposure.

- **Flocculation**
  - Flow rate 0.1-0.3 m/h [4]

- **Sedimentation**
  - Clarified water is drawn from top.

**Developing Countries**

- **Pathogens in contaminated water are deadly**

**Point-of-Use Solutions**

- **Membrane Filtration devices**
  - Can remove pathogens & turbidity from water using gravity or hand-pumps.

**Sources**


**NEW RESEARCH**

- Wavelength can be selected to disinfect individual pathogens [7].

- Could be installed in distribution systems in the future [7].

- Too expensive right now, but costs are likely to decline [8].

- More efficient, longer lifespans, no mercury, no DBPs [8].

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**Rapid Sand Filter (RSF)**

- using sand and water under pressure
- sand particles are entrapped by macroflocs [1].

- filtration rate is 1 m/d [1].

- water is held still in settling basin, floc particles sink to the bottom, and clarified water is drawn from top.

- **Slow Sand Filter (SSF)**
  - Flow rate 0.1-0.3 m/h [4].

- **Membrane Filters**
  - **Nanofiltration** 1 - 10 nm
  - Removes Bacteria, Parasites, Floc particles
  - Removes Viruses, Proteins, Some ions
  - **Ultrafiltration** 0.01 – 0.1 nm
  - Removes Cylinders & endocrine disruptors [5]
  - **Reverse Osmosis** 0.001 – 0.005 nm
  - Removes all dissolved salts & ions

**Sources**