WHAT IS WASTEWATER

Waste water is a term that is used to describe waste material that includes industrial liquid waste and sewage that is collected in towns and urban areas and treated at urban waste water treatment plants.

WASTEWATER TREATMENT

> A process to convert wastewater which is water no longer needed or suitable for its most recent use into an effluent that can be either returned to the water cycle with minimal environment issues or reused.

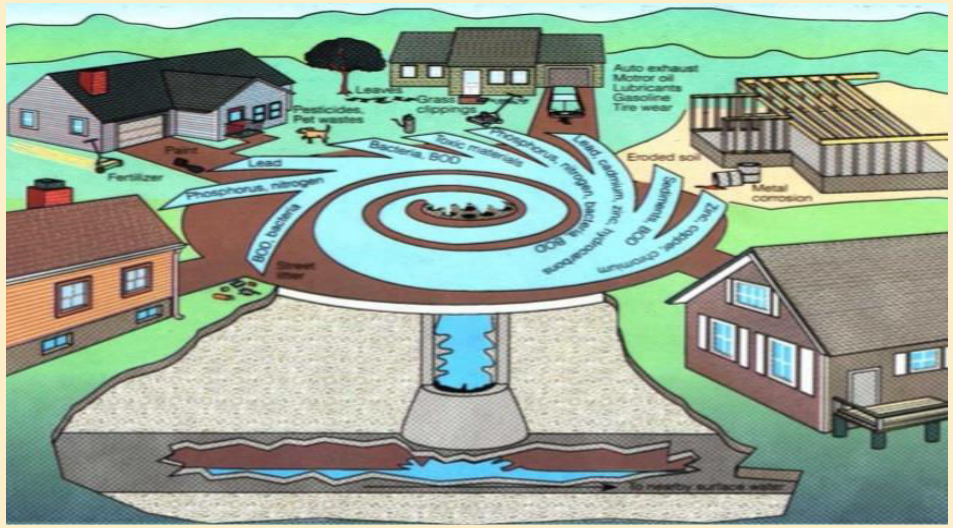
WASTEWATER CONTAMINANTS

- Suspended solids
- Biodegradable organics
- Pathogenic bacteria
- Nutrients

WHERE DOES WASTEWATER COME FROM?

1. Residences
2. Commercial institute
3. Dairy and industrial establishment

WHERE DOES IT ALL GO!



WHY TREAT WASTEWATER?

1. Causes a demand for dissolved oxygen

2. Adds nutrients to cause excessive growth

3. Increases suspended solids or sediments in streams

OBJECTIVES OF WASTEWATER TREATMENT

1. Reduce organic content i.e., bod

2. Removel of nutrients i.e., n,p

3. Removel of pathogenic microbes

LEVELS OF TREATMENT

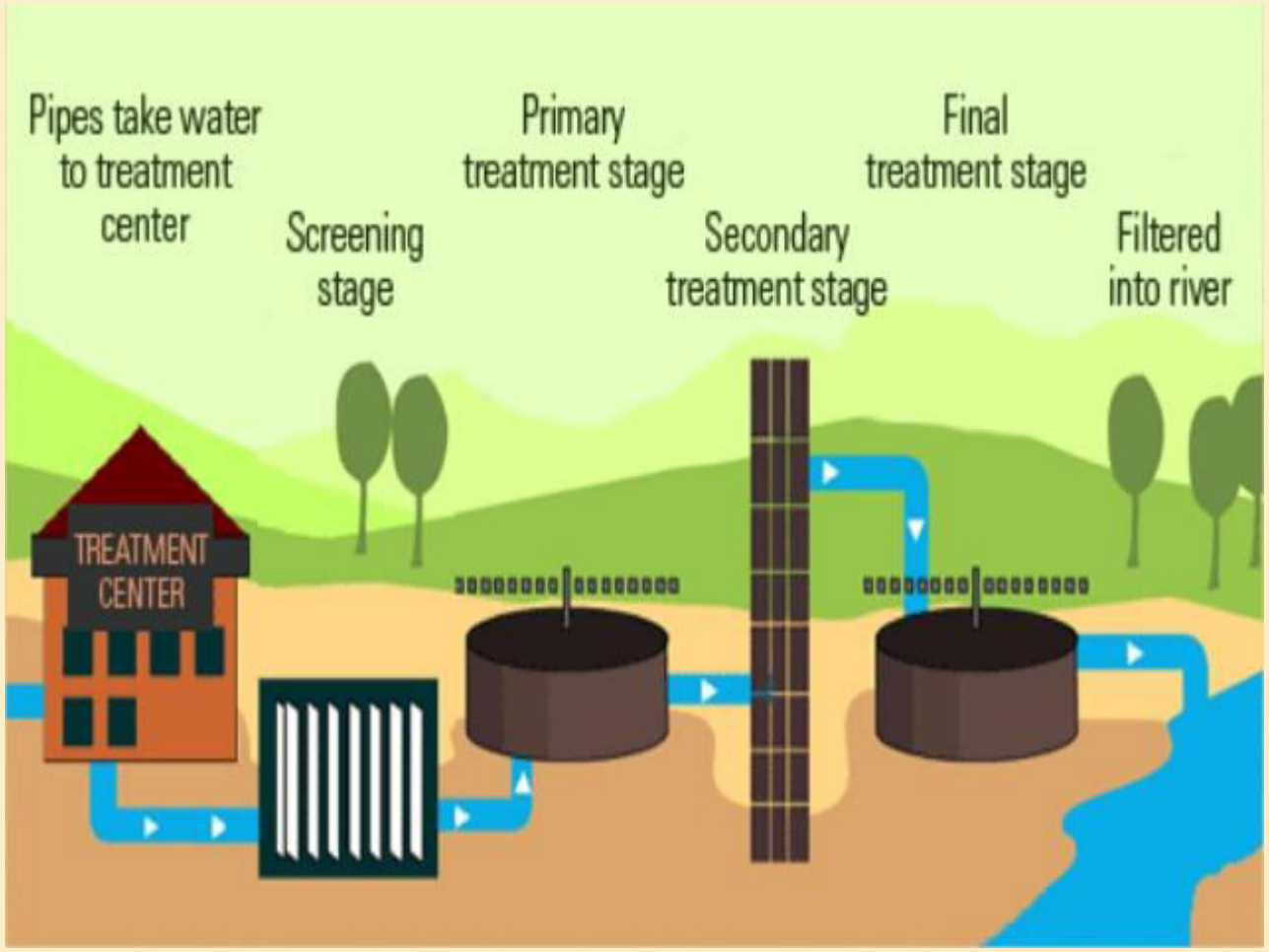
1. Primary

- Removal by physical separation of grits and large objects
- Sedimentation and screening of large debris

2. Secondary

- Biological and chemical treatment
- Aerobic microbiological process(sludge)

LEVELS OF TREATMENT



PRIMARY TREATMENT

Typical materials that are removed during primary treatment include

- Fats, oils and greases

- Sand, gravels and rocks

- Larger settleable solids including human waste

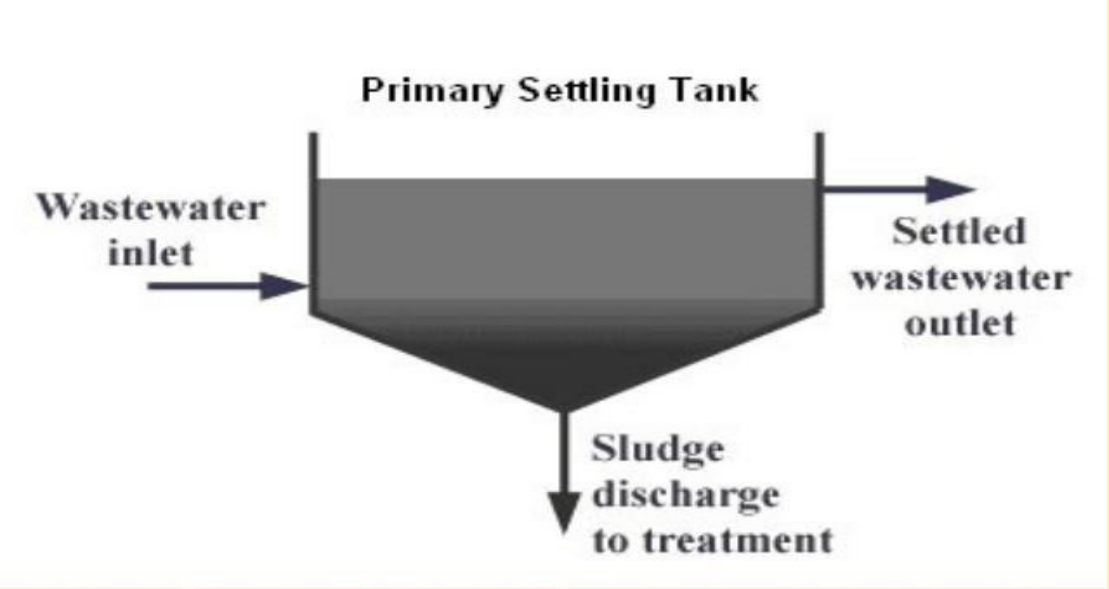
- Floating materials

METHODS USED IN PRIMARY TREATMENT

1. Bar screens
2. Grinding
3. Grit chamber
4. Sedimentation tank-primary setting tank
5. Chlorination of effluent

PRIMARY SETTLING TANK

1. Remove grease, oil
2. Fecal solid settle, floating materials rise to the surface
3. Produce a homologous liquid for later biological treatment
4. Fecal sludge are pumped to sludge treatment plant



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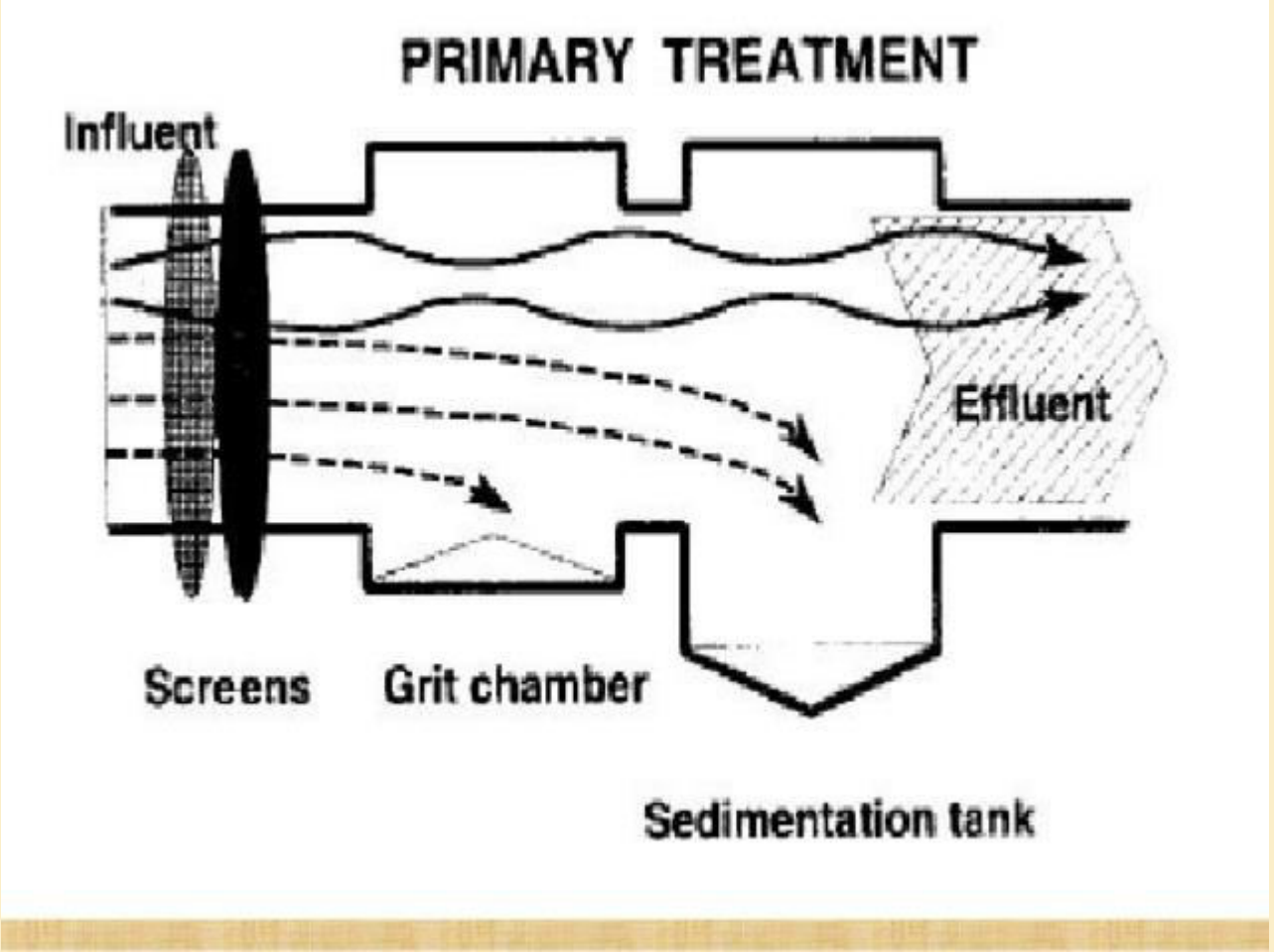


SECONDARY TREATMENT

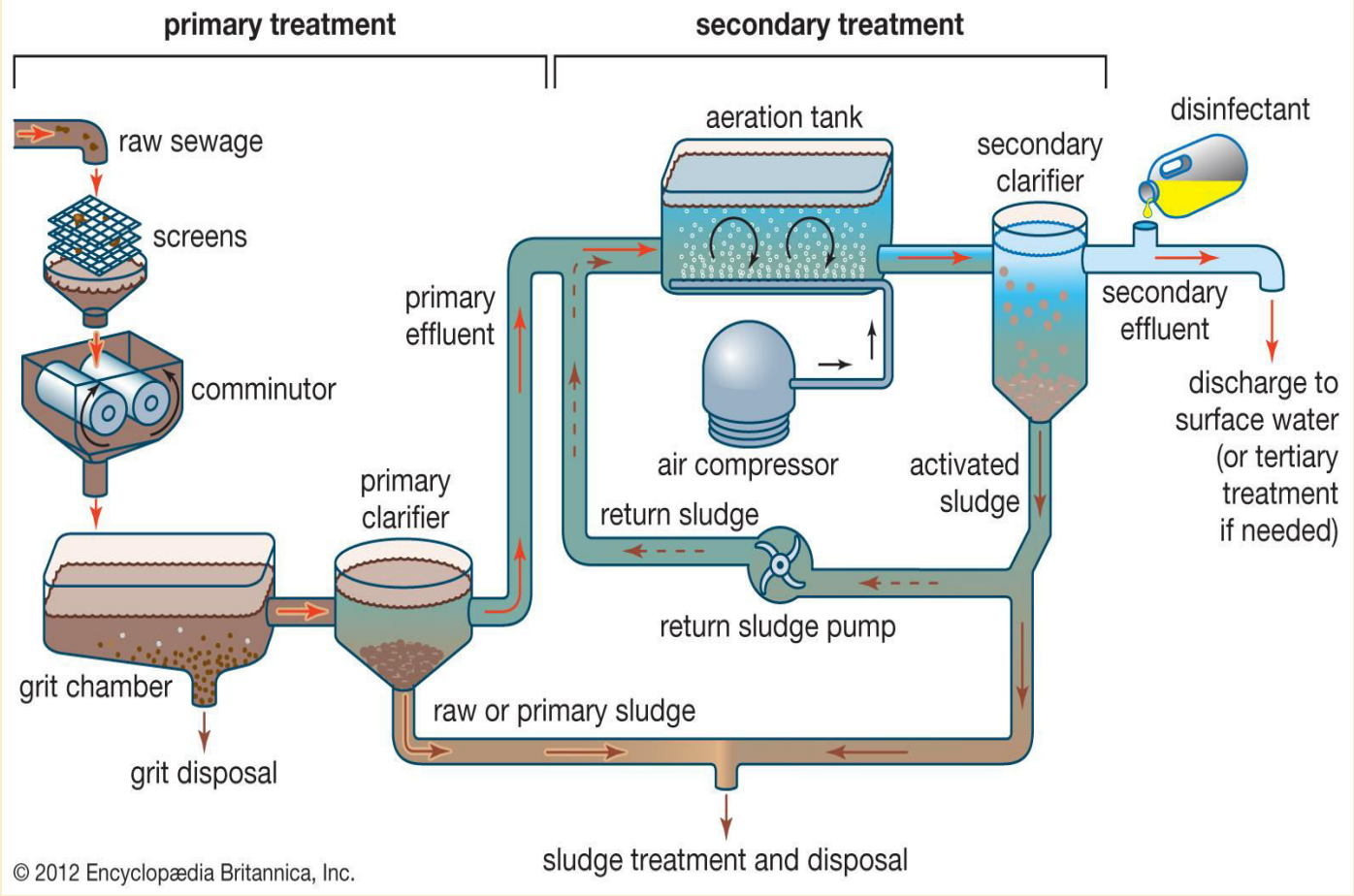
Biological treatment

- Activated sludge

- Trickling filter

- Oxidation ponds

SECONDARY TREATMENT



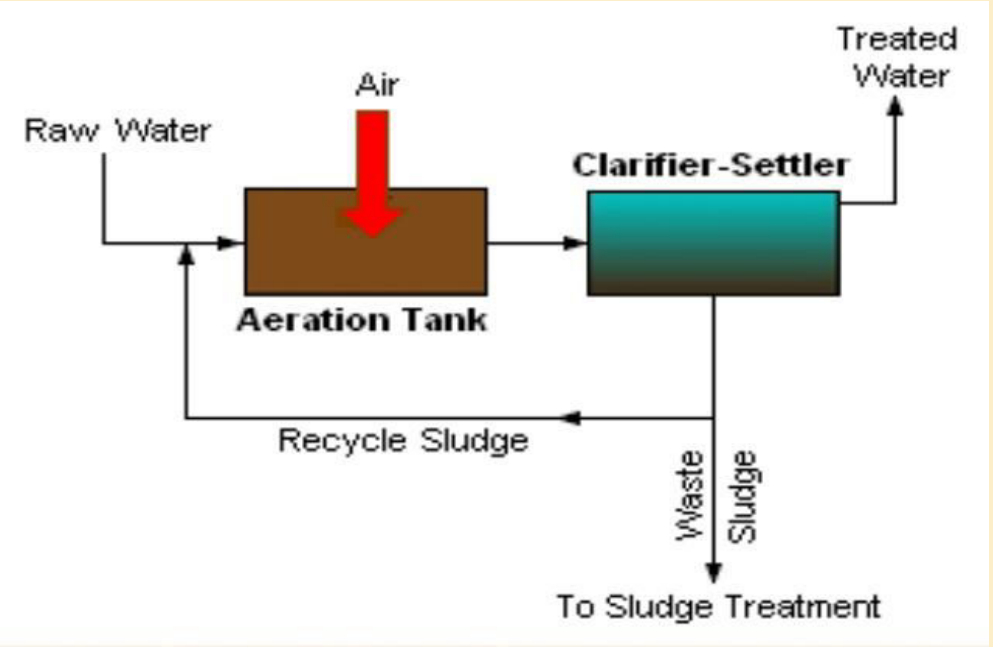
ACTIVATED SLUDGE PROGRESS

5 Physical components

1. Aeration tank
2. Aeration source
3. Secondary clarifiers
4. Activated sludge outflow line
5. Effluent outflow line

80-99% removal Bacteria & 90-99% removal of Viruses

1. Primary wastewater mixed with bacteria rich sludge and air or oxygen is pumped into the mixtures
2. Both aerobic and anaerobic bacateria may exist
3. Promates bacaterial growth and decomposition of organic matter
4. BOD removal is approximately 85%

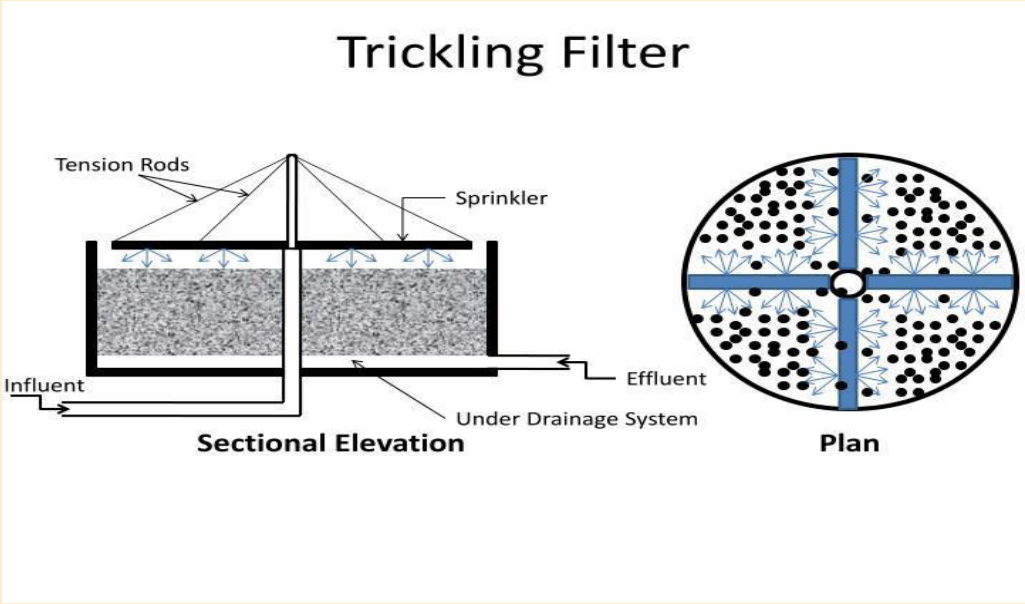


TRICKLING FILTERS

1. Trickling filters are beds made of coke, limestone chips or specially fabricated plastic media
2. Optimize their thickness by insect or worm grazing
3. The primary wastewater is sprayed over the filter and microbes decompose material aerobically

Low pathogen removal

- Bacteria 20-90%
- Viruses 50-90%
- Giardia cysts 70-90%

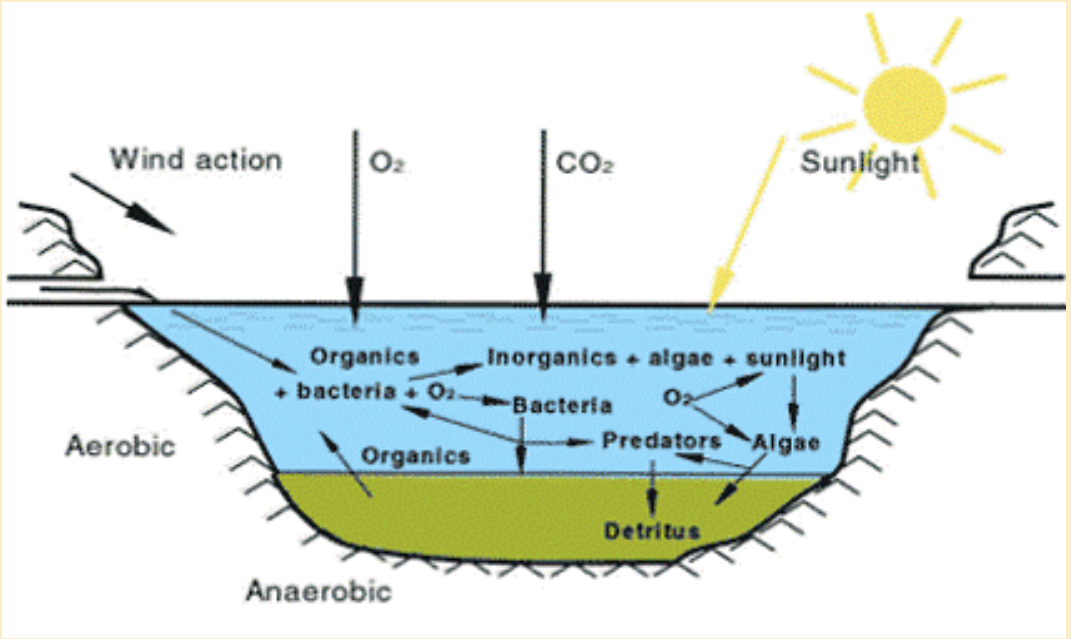


OXIDATION PONDS

1. Oxidation ponds are a few meters deep and up to a hectare in size
2. The are lost cost with retention times of 1 to 4 weeks
3. Odor and mosquitoes can be a problem

Pathogen removel

- Bacteria 90-99%
- Virus 90-99%
- Protozoa 67-99%



OXIDATION PONDS

- Stabilization ponds are the preferred wastewater treatment process in developing countries due to low cost, low maintenance. this is balanced by larger land requirement.

WHEN THE TREATMENT IS DONE

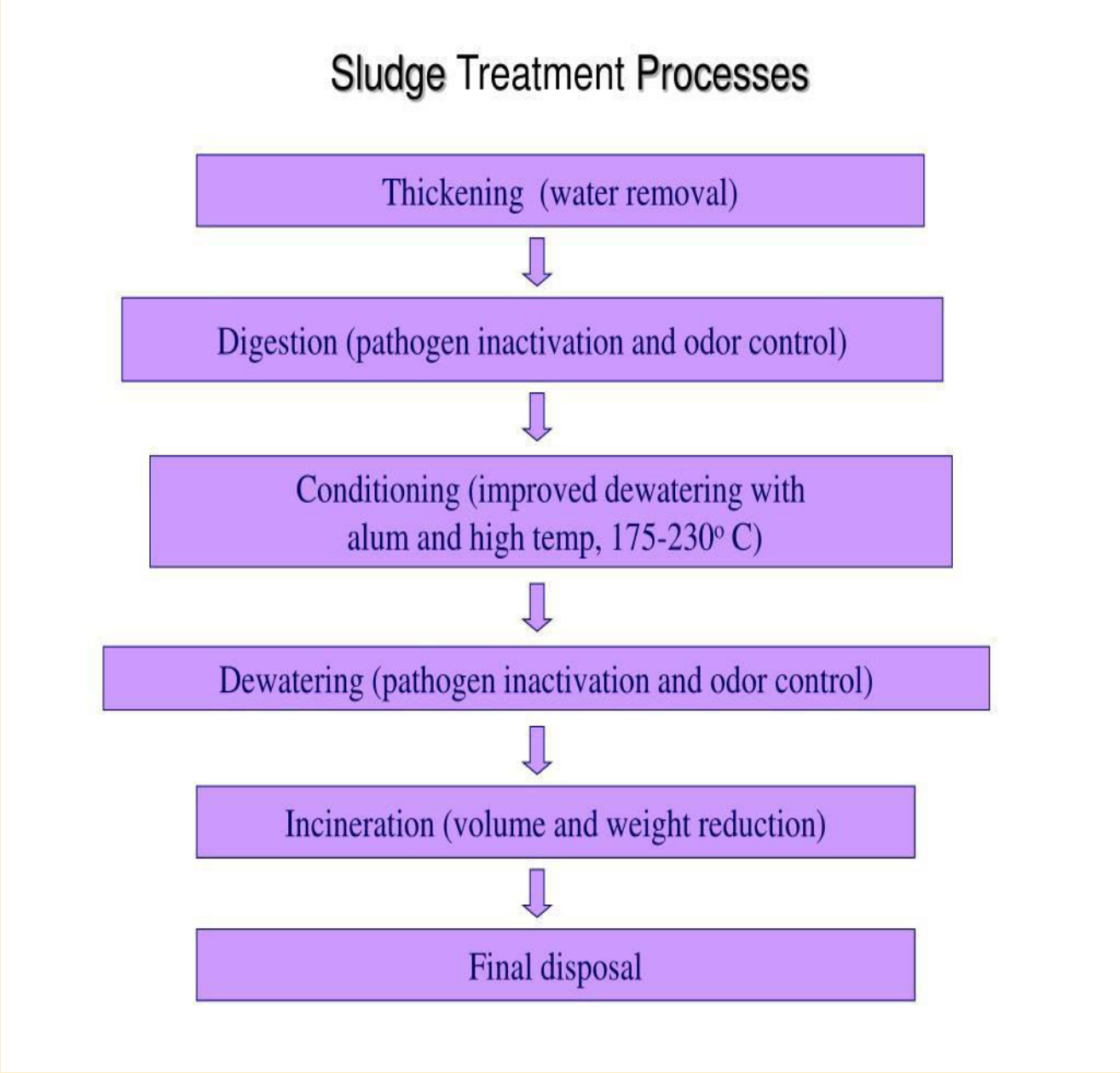
Effluent back to stream after

- A final carbon filtration
- Chlorination/de-chlorination

Sludge-very nutrient rich

- Applied directly to land as fertilizer
- Incinerated
- Composted

SLUDGE TREATMENT PROCESSES



WASTEWATER TREATMENT ALTERNATIVES

- Septic tanks
- Constructed wetlands
- Composting

WASTEWATER TREATMENT PLANT

THANK YOU