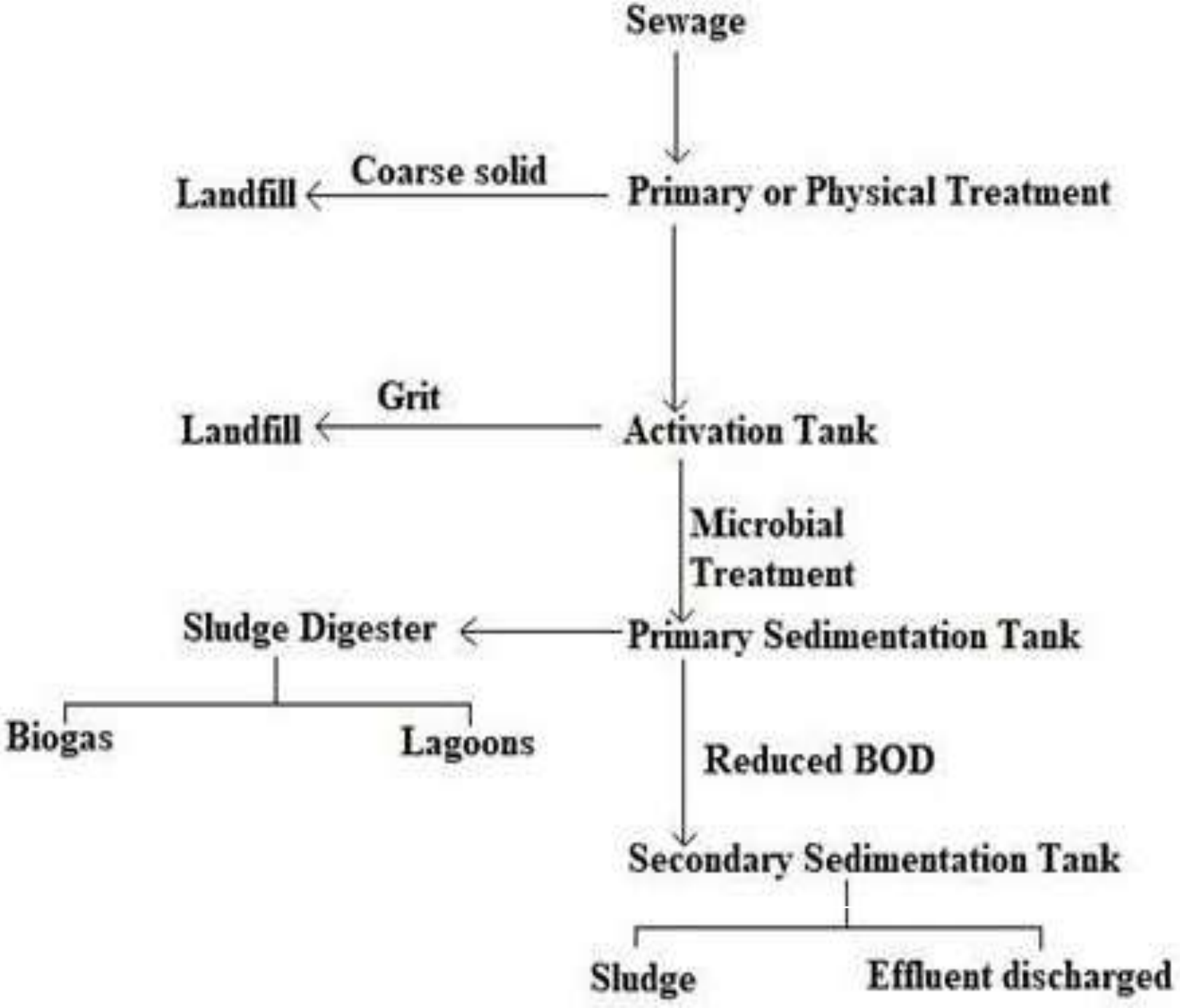
MICROBES IN SEWAGE TREATMENT

Definition

- Aerobic microorganisms are inoculated into the sewage treatment plant. These microbes utilize the organic components of the sewage and reduce the toxicity. This can be measured by BOD (Biological oxygen demand). After the biological treatment, the sludge is pumped from the treatment plant into a large tank

Primary Sewage Treatment

- This process is also known as a physical process. In primary treatment, sewage is collected in a basin where sludge can settle to the base, whereas oil and lighter substances float on the top. Substances in these layers are then removed, and the remaining liquid is sent to secondary treatment. Sewage sludge is treated in a separate process called sludge digestion.


Sewage
Coarse solid
Landfill
Primary or Physical Treatment
Grit
Landfill
Activation Tank
Microbial
Treatment
Sludge Digester
Primary Sedimentation Tank
Biogas
Lagoons
Reduced BOD
Secondary Sedimentation Tank
Sludge
Effluent discharged

Secondary Sewage Treatment:

- This process is also called the biological process. In secondary treatment, dissolved and suspended biological matter are removed, often with the help of microorganisms in a controlled environment.

- 1. Most secondary treatment systems use aerobic bacteria that consume the organic components of the sewage. Some systems use fixed-film techniques, where the bacteria grow on filters, and the water passes through them.
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- 2. The sewage is often mixed with air to facilitate decomposition as oxygen is critical for the growth of bacteria. This air helps in the growth of useful aerobic microbes into flocs (masses of bacteria associated with fungal filament to form mesh-like structures).
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- 3. During their growth period, these microbes consume a major part of the organic matter transforming it into microbial biomass, a lot of minerals are also released during this. This significantly decreases the Biochemical Oxygen Demand (BOD). Hence, the sewage water is treated till the BOD is reduced.

- 4. When the BOD of effluent is reduced significantly, it is then passed into a settling tank, where the bacterial ‘flocs’ are left to settle down as sediment. This sediment is called activated sludge. A small part of the activated sludge is then pumped back into the aeration tank to serve as the inoculum.
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- 5. The remaining part of the sludge is pumped back into large tanks called anaerobic sludge digesters. Here, other anaerobic bacteria like methanogens are also present. Along with organic mass, these microbes also digest aerobic microbes (bacteria and fungi) of the sludge.
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- 6. A mixture of gases like methane (CH_4), hydrogen sulphide (H_2S), carbon dioxide (CO_2), etc., are produced during this digestive process. These gases form biogas that is used as an alternate source of energy.
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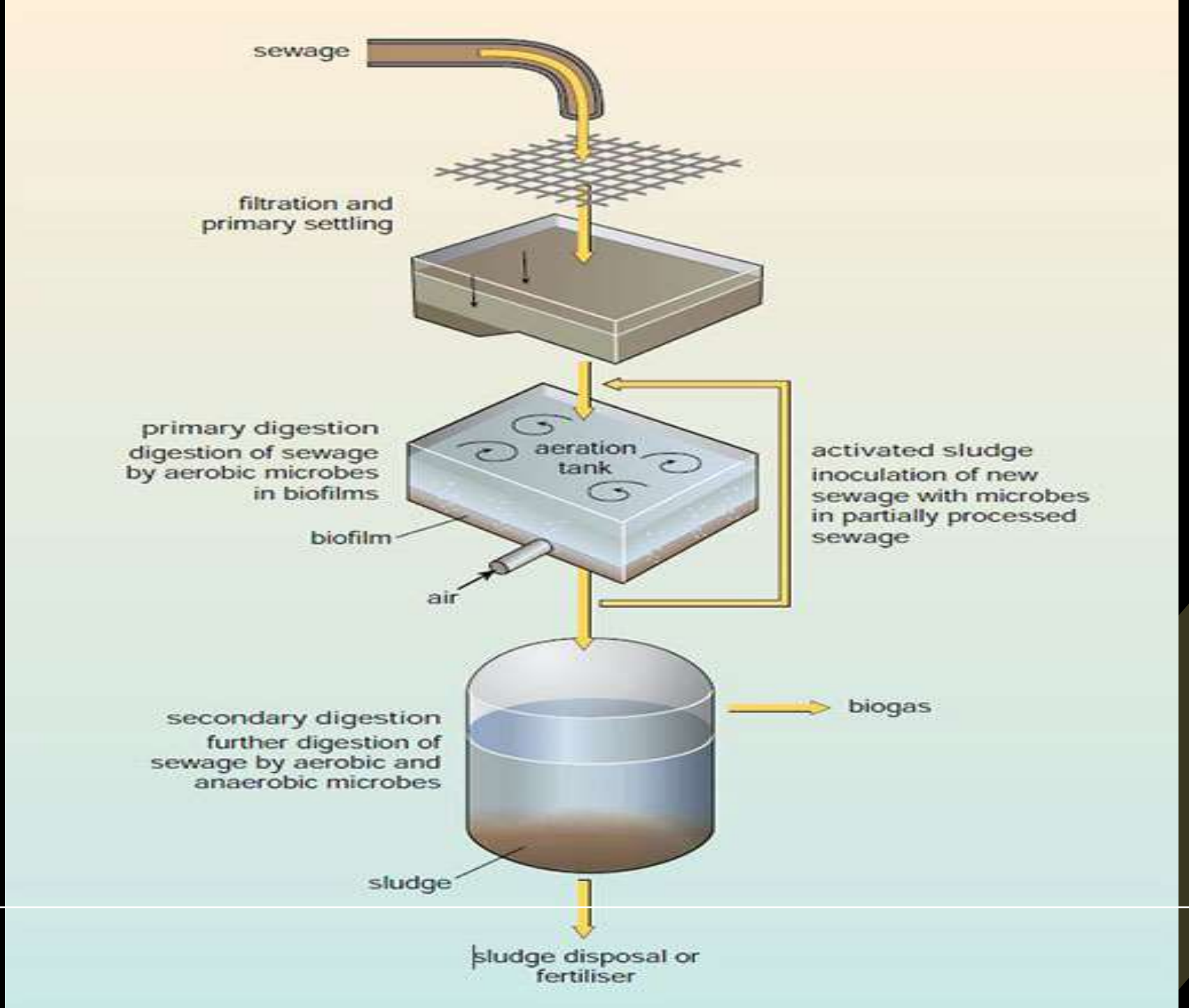
- 7. The effluent from the secondary treatment plant is discharged into natural water bodies like rivers and streams.


sewage
filtration and primary settling
primary digestion
digestion of sewage by aerobic microbes in biofilms
aeration tank
biofilm
air
activated sludge
inoculation of new sewage with microbes in partially processed sewage
secondary digestion
further digestion of sewage by aerobic and anaerobic microbes
biogas
sludge
sludge disposal or fertiliser