FREE NOTES · NCERT + NEET LEVEL

Microbes in Human Welfare

Gharelu products me microbes, industrial products (fermented beverages, antibiotics, chemicals, enzymes, bioactive molecules), sewage treatment, biogas, biocontrol agents aur biofertilisers.

01 Gharelu products me microbes
02 Industrial products
03 Sewage treatment
04 Biogas
05 Biocontrol agents
06 Biofertilisers
07 Extra + tricks
08 Important Q&A
09 Common mistakes
10 Practice (NEET style)
11 Quick revision

01 Gharelu products me microbes

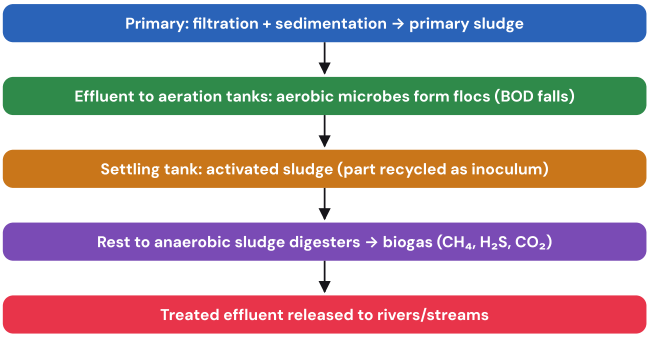
- **Lactobacillus** / LAB: doodh → dahi; vitamin B_{12} badhata; pet me rog wale microbes rokta.
- **Dosa, idli** ka ghol: bacterial fermentation (CO_2 se phoolta). **Bread**: baker's yeast *Saccharomyces cerevisiae*.
- **Toddy**: taad ke ras ka fermentation (South India).
- **Swiss cheese**: *Propionibacterium sharmanii* ki CO_2 se bade chhed. **Roquefort cheese**: khaas fungi se pakta.

02 Industrial products

Product	Microbe
Wine, beer, whisky, brandy, rum (brewer's yeast)	*Saccharomyces cerevisiae*; wine, beer bina distillation, whisky, brandy, rum distillation se
Penicillin (pehla antibiotic; Alexander Fleming, *Staphylococcus* culture me; Chain aur Florey ne upyog saabit kiya)	*Penicillium notatum*
Citric acid	*Aspergillus niger* (fungus)
Acetic acid	*Acetobacter aceti* (bacterium)
Butyric acid	*Clostridium butylicum* (bacterium)
Lactic acid	*Lactobacillus*
Ethanol	*Saccharomyces cerevisiae*
Lipases (detergents, tel ke daag)	Microbial
Pectinases, proteases (fruit juice saaf)	Microbial
Streptokinase (clot buster)	*Streptococcus*; genetic engineering se badla
Cyclosporin A (organ transplant me immunosuppressant)	*Trichoderma polysporum* (fungus)
Statins (cholesterol kam; cholesterol banane wala enzyme rokte)	*Monascus purpureus* (yeast)

03 Sewage treatment

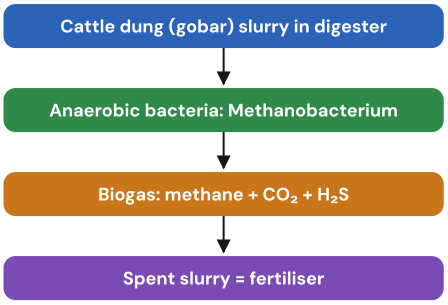
- Sewage = shahar ka ganda paani, organic matter aur microbes; **STPs** me saaf.
- **BOD**: 1 litre paani ka saara organic matter bacteria se oxidise ho to kitni O_2 lagegi; zyada BOD = zyada pradooshit.
- Ministry of Environment and Forests: nadiyan bachane ke liye **Ganga Action Plan** aur **Yamuna Action Plan**.



Sewage treatment ke stages

04 Biogas

- Biogas mainly **methane**, **methanogens** (jaise *Methanobacterium*) anaerobic halat me banate; maveshiyon ke rumen (cellulose todna) aur anaerobic sludge me bhi.
- Biogas plant: concrete tank (10–15 feet gehra), floating cover gas se upar uthta; outlet pipe se khana pakane aur roshni ke liye gas.
- Bharat me IARI aur KVIC ne technology banayi.



Biogas banna

05 Biocontrol agents

- Paudhon ke rog aur keede biological tareeke se control; organic farming insaan, jaanwar ke liye haanikaarak chemicals se bachti.
- **Ladybird** beetles (laal-kaale) aphids, **dragonflies** machhar control.
- ***Bacillus thuringiensis* (Bt)**: spores spray; caterpillars khaate; pet me toxin larva maarta, doosre keede surakshit.
- ***Trichoderma***: jadon ke paas free-living fungus; plant pathogens control.
- **Baculoviruses** (*Nucleopolyhedrovirus*): species-specific, narrow-spectrum; doosre jeevon pe asar nahi; **IPM** ke liye best.

06 Biofertilisers

Biofertiliser	Kaise madad
Rhizobium (symbiotic)	Legumes ki root nodules; hawa ka N_2 fix
Azotobacter, *Azospirillum* (free-living)	Mitti me N_2 fix
Mycorrhiza (fungi, jaise *Glomus*)	Paudhe ke liye phosphorus sokhna; root pathogens, namak, sookhe se suraksha; growth
Cyanobacteria (*Anabaena*, *Nostoc*, *Oscillatoria*)	Dhaan ke kheton me N_2 fix; organic matter

07 Extra + tricks

Antibiotic / product	Srot
Penicillin	*Penicillium notatum*
Streptomycin	*Streptomyces griseus*
Tetracycline	*Streptomyces aureofaciens*
Erythromycin	*Streptomyces erythreus*
Vitamin B_{12}	*Pseudomonas*, *Propionibacterium*

- Acids ka trick: **"CAB-L"** → Citric (*Aspergillus*), Acetic (*Acetobacter*), Butyric (*Clostridium*), Lactic (*Lactobacillus*).
- Primary treatment physical (filtration, sedimentation); secondary biological (aerobic flocs).
- Biogas ≈ 50–70% methane; gobar gas plant se khaad bhi.

08 Important Q&A

Q1. BOD kya? Zyada BOD kya batata?

1 L paani ka organic matter oxidise karne me microbes ki O_2; zyada BOD = zyada pradooshit.

Q2. Baculoviruses IPM ke liye achhe kyun?

Species-specific, narrow-spectrum; doosre ya faydemand keedon ko nuksaan nahi.

Q3. Statins ka microbe aur upyog?

Monascus purpureus; cholesterol banane wala enzyme rokkar blood cholesterol kam.

09 Common mistakes

- Citric acid ko Acetobacter se kehna (Aspergillus niger).
- Methanobacterium ko aerobic kehna (anaerobic).
- Trichoderma (cyclosporin A) aur Monascus (statins) mix karna.
- Sochna ki saari drinks me distillation (wine, beer me nahi).

10 Practice (NEET style)

1. Swiss cheese ke chhed?
2. Clot buster?
3. Free-living N_2 fixer?
4. Butyric acid wala bacterium?
5. Biocontrol fungus?

ANSWERS

1) *Propionibacterium sharmanii* · 2) Streptokinase · 3) *Azotobacter* · 4) *Clostridium butylicum* · 5) *Trichoderma*

11 Quick revision: exam se 5 minute pehle

HOUSEHOLD

- LAB: dahi, B_{12}
- Yeast: bread
- Propionibacterium: Swiss cheese

INDUSTRY

- Penicillin: Fleming
- Aspergillus citric, Acetobacter acetic
- Cyclosporin, statins

SEWAGE/BIOGAS

- BOD zyada = pradooshit
- Flocs, activated sludge
- Methanogens: CH_4

AGRICULTURE

- Bt, ladybird, Trichoderma
- Baculovirus IPM
- Rhizobium, Glomus, Anabaena

Koi doubt? padhaiadda.netlify.app pe AI Doubt Solver se poocho, ya is chapter ka mock test do.