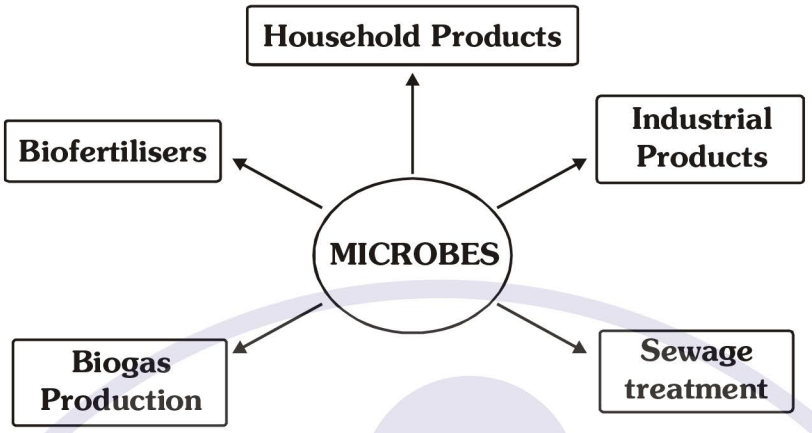
MICROBES IN HUMAN WELFARE



MICROBES IN HOUSEHOLD PRODUCTS

S.No.	Microbes	Function	Significance
1.	Lactobacillus and Lactic Acid bacterias (LAB)	Convert milk into curd	* **Increase** the amount of **Vitamin B_{12}** * Check the growth of disease causing microbes in stomach
2.	Saccharomyces cerevisae (Baker's yeast)	Fermentation	* Baking process (**bread** etc.)
3.	Propionibacterium sharmanni	Fermentation	* Formation of **Swiss Cheese** * **Large holes due to large amount of CO_2 produced by bacteria**.
4.	Penicillium roquefort	Fermentation	* Formation of **Roquefort Cheese**

MICROBES IN INDUSTRIAL PRODUCTS

S.No.	Microbes	Product	Remarks
1.	Saccharomyces cerevisae (Brewer's yeast)	Alcoholic beverages	* Wine and beer (without distillation) * Whisky, brandy & Rum (with distillation)
2.	Penicillium notatum	Penicillin (antibiotic)	* Discovered by Alexander Fleming * Established as an effective antibiotic by Chain & Florey

ORGANIC ACIDS PRODUCED BY MICROBES

S.No.	Microbes	Product
1.	Aspergillus niger (fungus)	Citric Acid
2.	Acetobacter aceti	Acetic acid (Vinegar)
3.	Clostridium butylicum	Butyric acid
4.	Lactobacillus	Lactic acid

ENZYMES PRODUCED BY MICROBES

S.No.	Microbes	Product	Remarks
1.	Aspergillus	Pectinase	* Clearing bottle juice in industries
2.	Aspergillus	Protease	
3.	Aspergillus	Lipase	* Detergents
4.	Streptococcus	Streptokinase	* As 'clot buster' for removing blood clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

BIOACTIVE MOLECULES PRODUCED BY MICROBES

1.	Trichoderma polysporum (Fungus)	Cyclosporin A	* Immunosuppressive agent used in organtransplant patient.
2.	Monascus purpureus (Yeast)	Statin	* Blood-cholesterol lowering agent * Competitively inhibits the enzyme responsible for cholesterol synthesis

MICROBES AS BIOCONTROL AGENTS

S.No.	Microbes	Significance
1.	Bacillus thuringiensis	* Bt-toxin produced by bacteria kills many insects which attack plants. Eg. **Bt-Cotton**
2.	Nucleopolyhedrovirus	* Attack insects & other arthropods.
3.	Trichoderma (fungi)	* Effective against various plant pathogens.

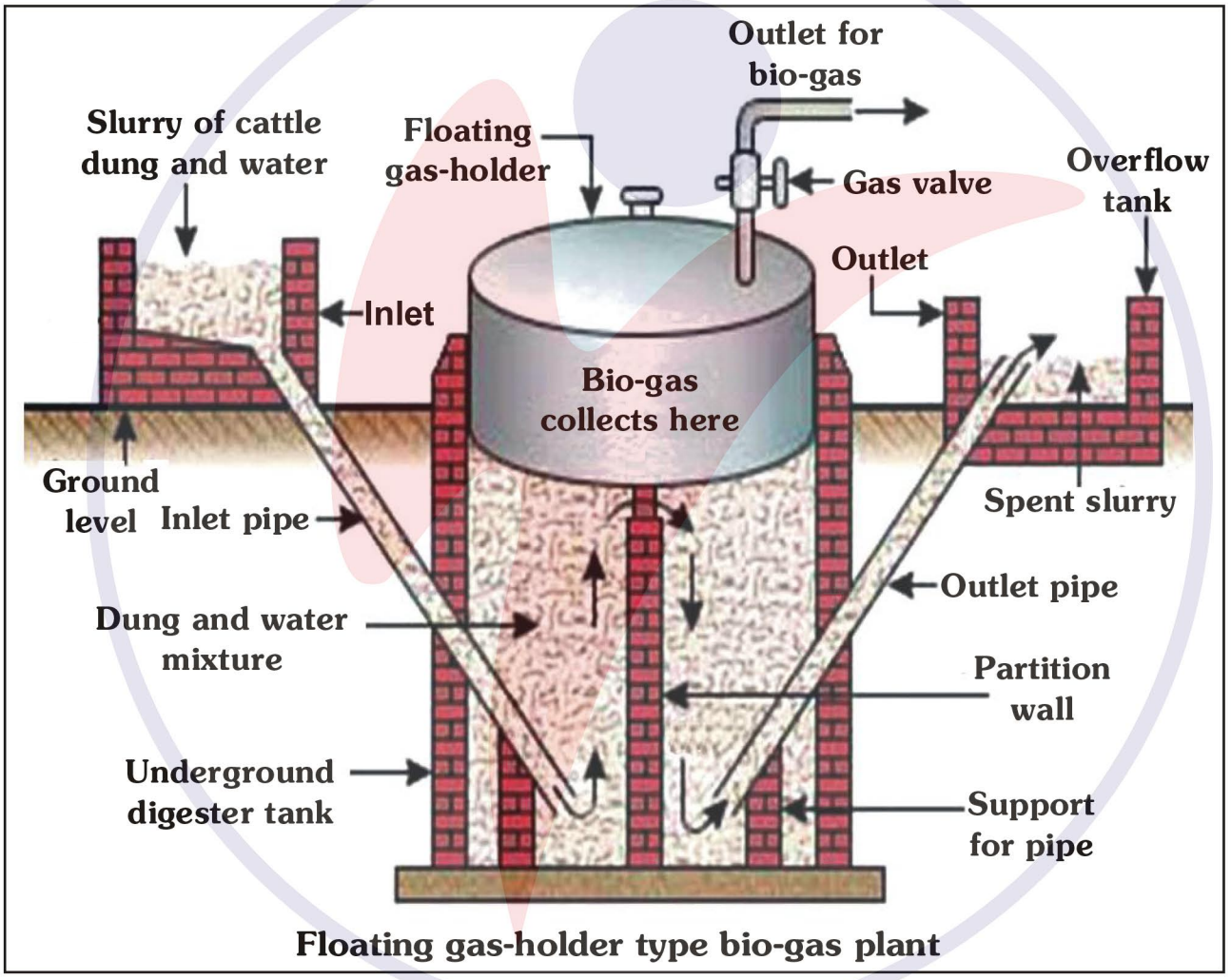
MICROBES AS BIOFERTILISERS

S.No.	Microbes	Significance
1.	Rhizobium	* Symbiotic nitrogen fixation
2.	Azospirillum	* Free living bacteria; Nitrogen fixation
3.	Azotobacter	
4.	Anabaena	* Cyanobacteria; Nitrogen fixation; add organic matter to soil and increase its fertility; used in paddy field as biofertilisers
5.	Nostoc	
6.	Oscillatoria	
7.	Glomus (fungi)	* Mycorrhiza; absorbs phosphorus from soil

MICROBES IN PRODUCTION OF BIOGAS

- **Biogas:** produced by cattle dung; also known as gobar gas.
- Biogas is mixture of gases: **Methane (50-70%)**; Carbon dioxide (30-40%)

  Traces: H_2, N_2, H_2S
- Microbes: **Methanogens** bacteria (Example: **Methanobacterium**)
- Technique developed by **Indian Agricultural Research Institute (IARI)** and **Khadi and Village Industries Commission (KVIC)**.



Floating gas-holder type bio-gas plant