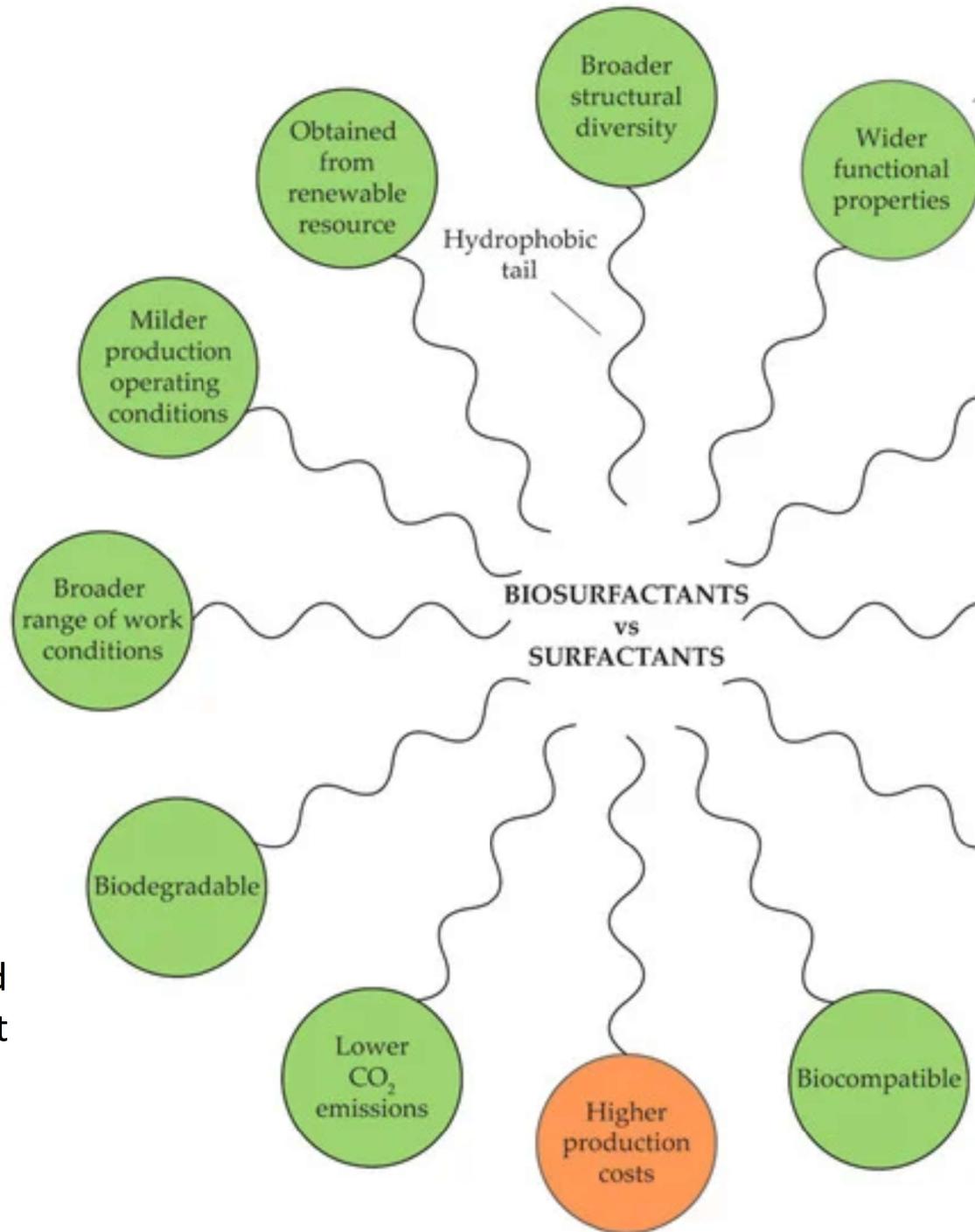


## Biotechnological Utilization of Food & Agro-Industrial Residues and By-Products

### Sustainable Production of Biosurfactants

Advantages (green circles) and disadvantages (orange circles) of biosurfactants in comparison to chemically derived surfactants; schematic presentation of a surfactant micelle cluster.

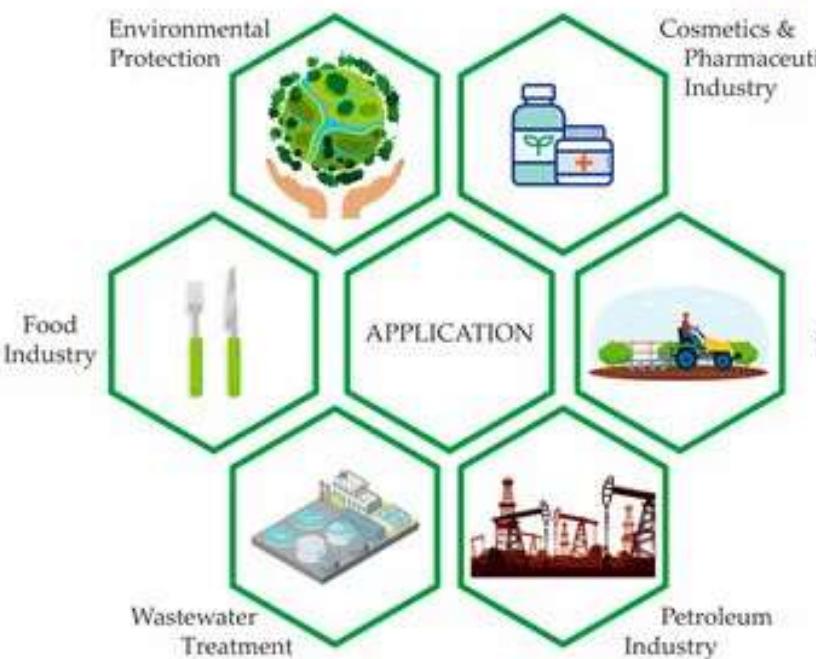
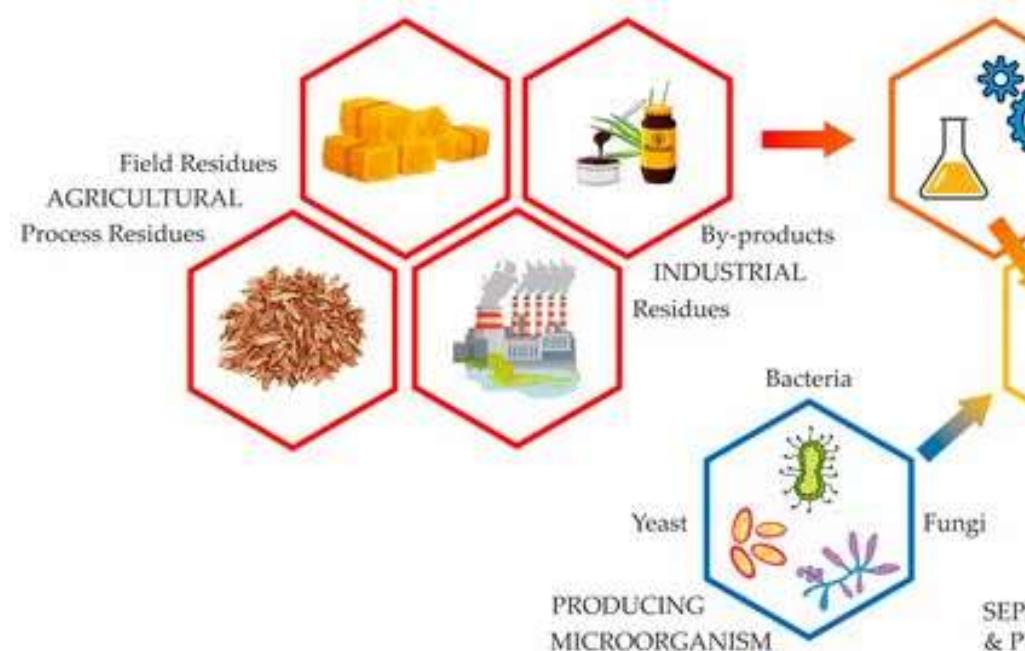


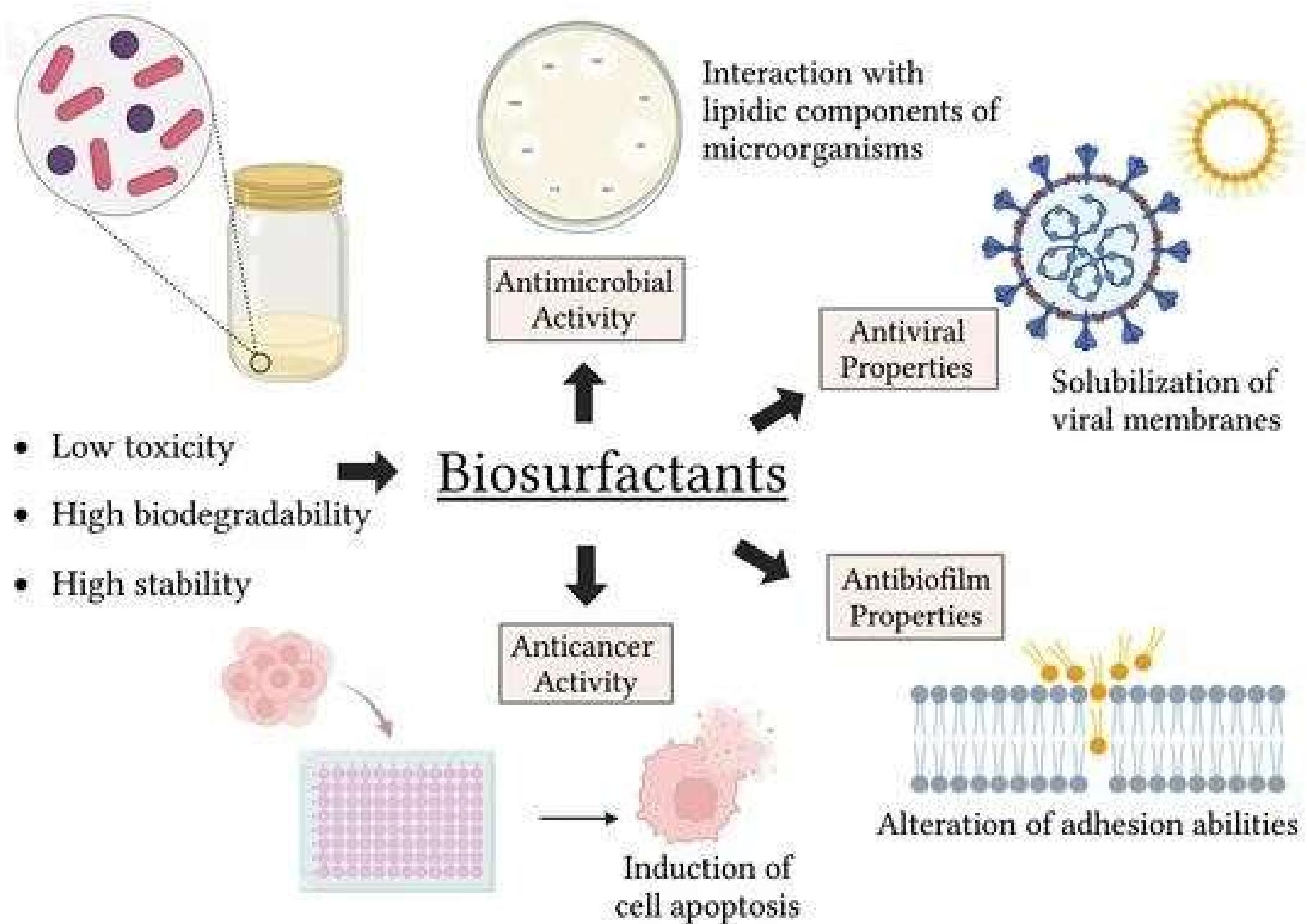
Food & agricultural bioprocess residues

Industrial residues

Waste water

Bioprocess needs ENERGY





We need food or agriculture wastes:

- enriched in sugars
- enriched in lipids
- purified water from waste

-lost cost energy for

- pretreatment of the biomass/agriculture/food wastes
- Bioprocess: fermentation
- Downstream processes