

Additional Information for 2-1 Metabolic classification of microorganisms

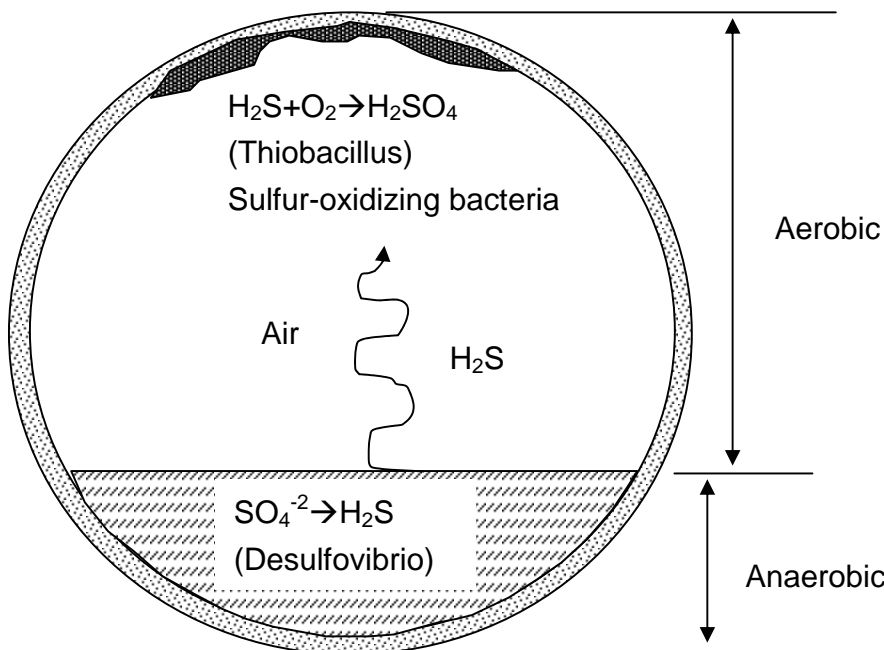
微生物之分類(依碳源與能量來源分)

Classification	Energy source	Carbon Source
Autotrophic:		CO ₂
Photoautotrophic	Light	CO ₂
Clemoautotrophic	Inorganic (Redox Reaction)	CO ₂
Heterotrophic:		Organics
Chemoheterotrophic	Organic (Redox Reaction)	Organics
Photoheterotrophic	Light	Organics

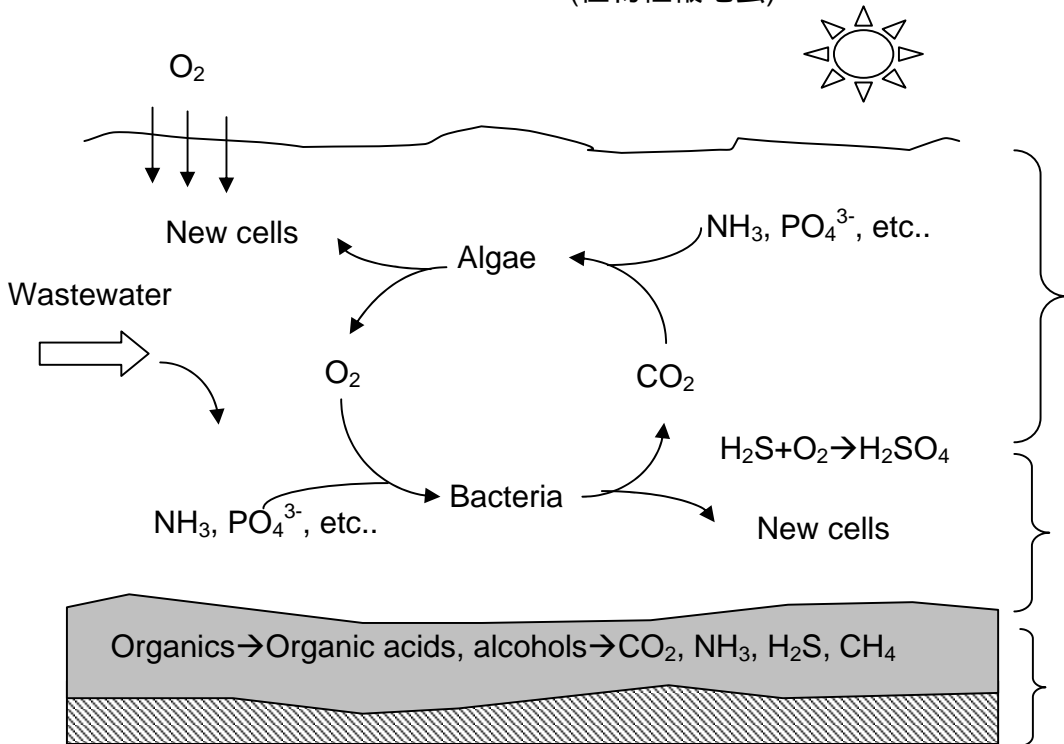
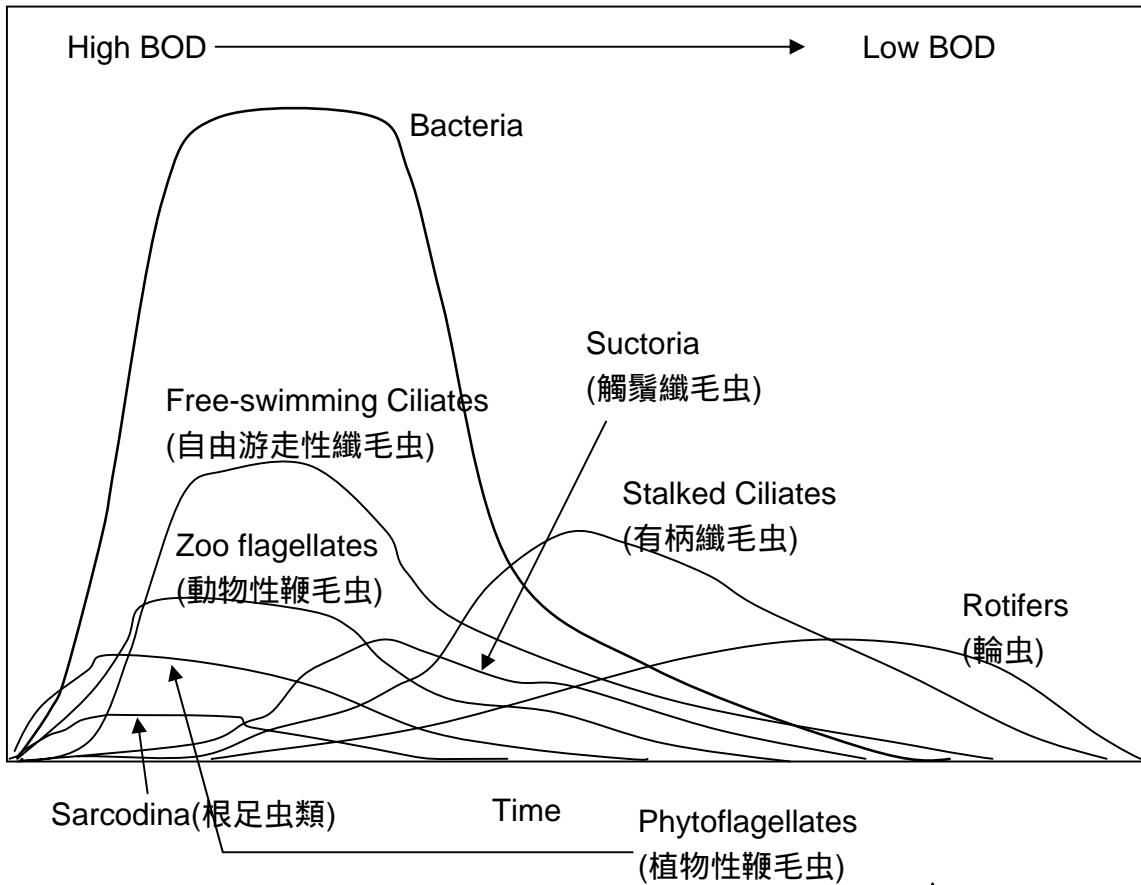
微生物代謝所需之典型電子接受者 (Electron acceptor)

Environment	Electron Acceptor	Process
Aerobic	O ₂	Aerobic metabolism
Anaerobic	NO ₃ ⁻	Denitrification(脫氮作用)
	SO ₄ ²⁻	Sulfate reduction
	CO ₂	Methanogenesis(甲烷生成作用—甲烷生成菌)

Crown Corrosion



活性污泥中 MO 的消長



微生物在廢水處理之角色 (Stabilization pond, 穩定池)

- Activated Sludge (活性污泥)常見之異常問題: **膨化(Bulking)**、變色、解體、發泡。
正常膠羽(Normal flocs): A balance between floc-forming and **filamentous** bacteria.
- **Cometabolism (共代謝作用)**
有機物(Xenobiotics, 污染物, 可視為二級基質, secondary substrate)被轉換成代謝物質, 但本身不做為微生物之能量或營養物來源。微生物利用主要基質(primary substrate, e.g., 葡萄糖)為碳源及能量來源。

Degradation through Metabolism

- Substrates induce *specific enzymes*
- Numerous transformations arranged in pathways
- Intermediates are assimilated for carbon/energy
- Mineralized products (e.g. CO₂, H₂O, Cl⁻)
- Process is typically coupled to cell growth
- Rate is often limited by *key nutrients*

Degradation through Cometabolism

- Need exogenous inducers for *non-specific enzymes*
- Pollutants are only partially transformed
- Products are not assimilated
- Process is not coupled to cell growth
- Rate is often limited by *primary substrate*