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Mikrobiologi Lingkungan: Mikroba Air

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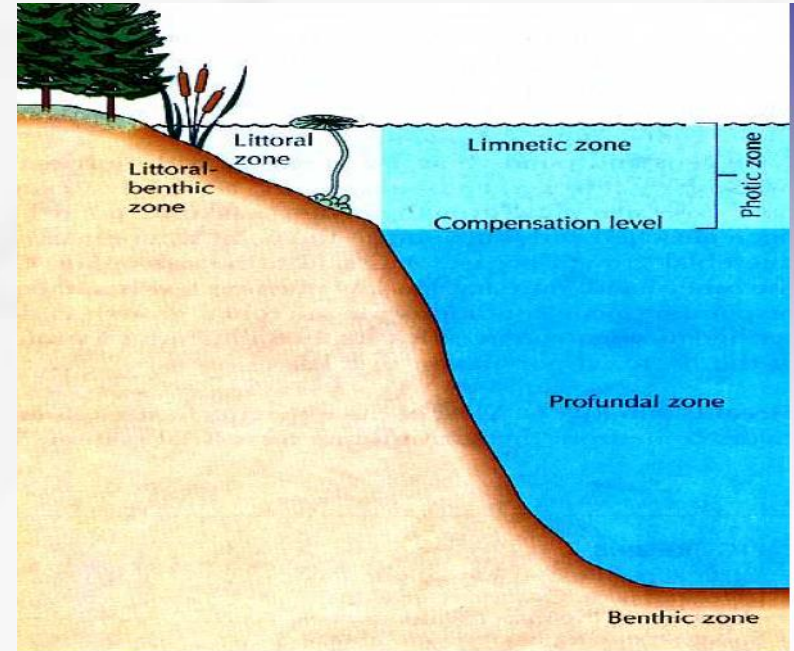
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Lingkungan Akuatik

- Temperatur
- Tekanan hidrostatik (tiap kedalaman 10m bertambah 1 atm)
- Cahaya (Zona Photic)
- Salinitas (0-32% NaCl Great Salt Lake, Utah; Laut 2,75%)
- Turbiditas (Bening mata air-sungai Cilliwung)
- pH (umum 6,5 - 8,5; Laut 7,5 -,5)
- Nutrien (Nitrat, fosfat → algae; Hg Pseudomonas → metil-Hg atmosfer)



Type of reservoir	Lake	Number of bacteria thousand/ml
Oligotrophic	Bajkal	50-200
	Onega	240-340
	Ladoga	100-300
Mezotrophic	Deep (Moscow area)	1000-1400
	Imoloze (Upper Woloczek)	420
	Kolomienskie	1100
Eutrophic	White (Kosino, Moscow area)	2200
	Black (as above)	4000
	Batorin (Bialerus)	3500-8000

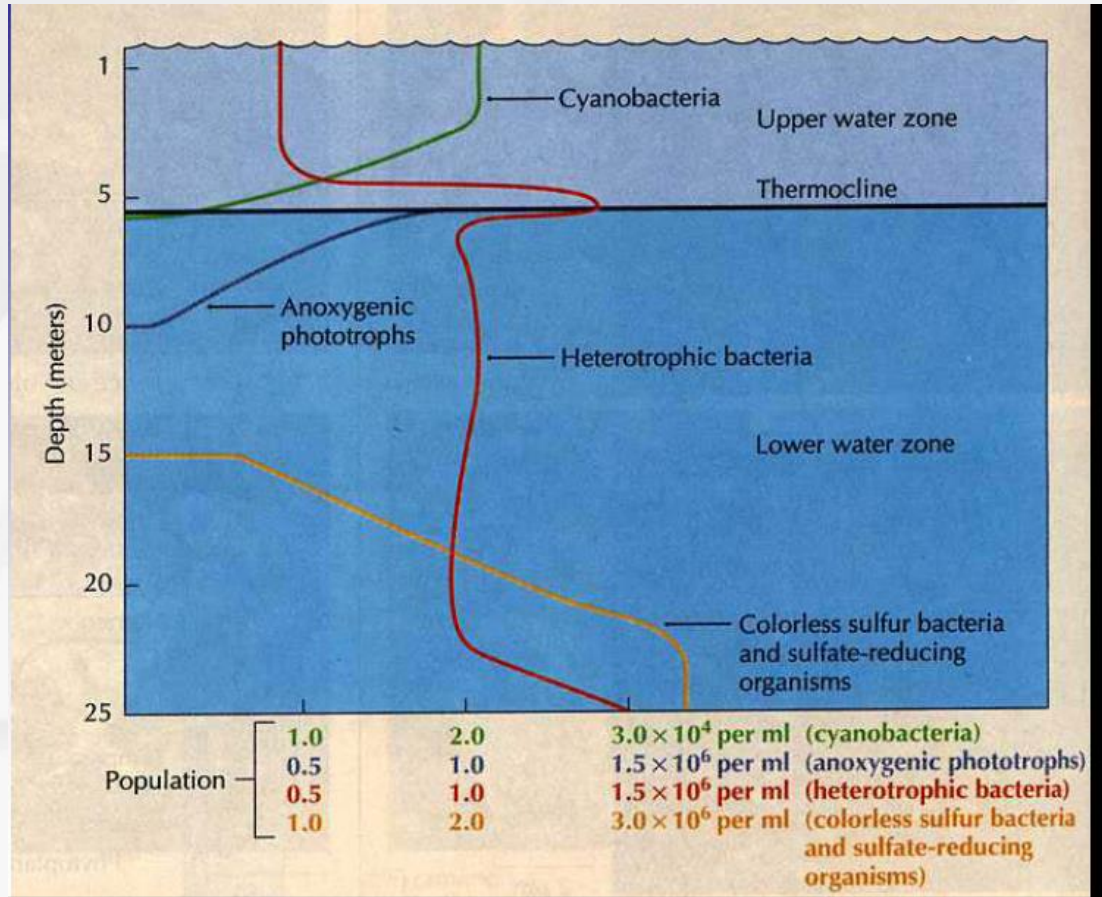


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Komposisi Mikroba Pada Kedalaman Tertentu





Faktor Kualitas Perairan

PP No. 22 Tahun 2021

BAKU MUTU AIR NASIONAL

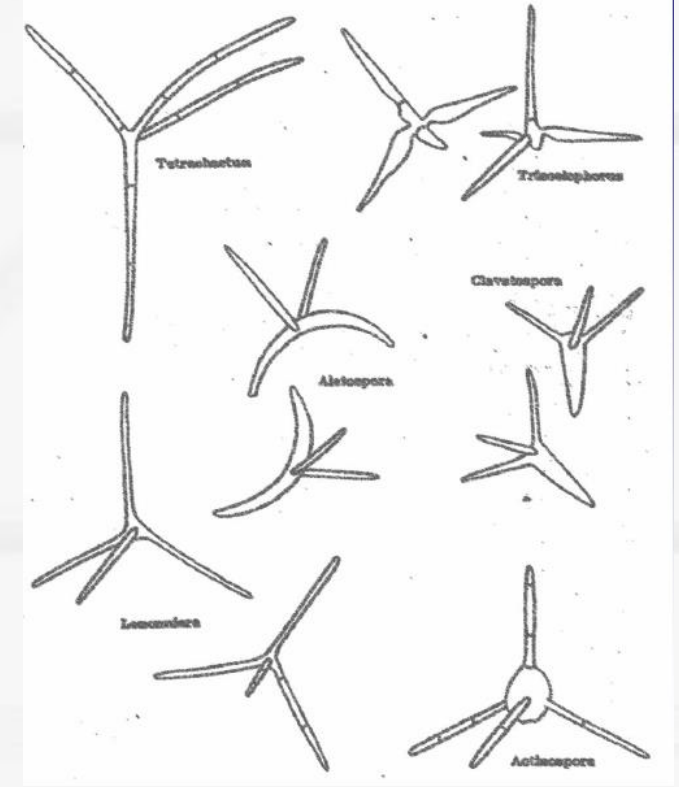
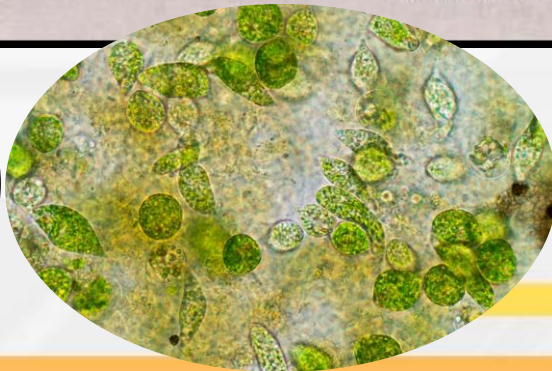
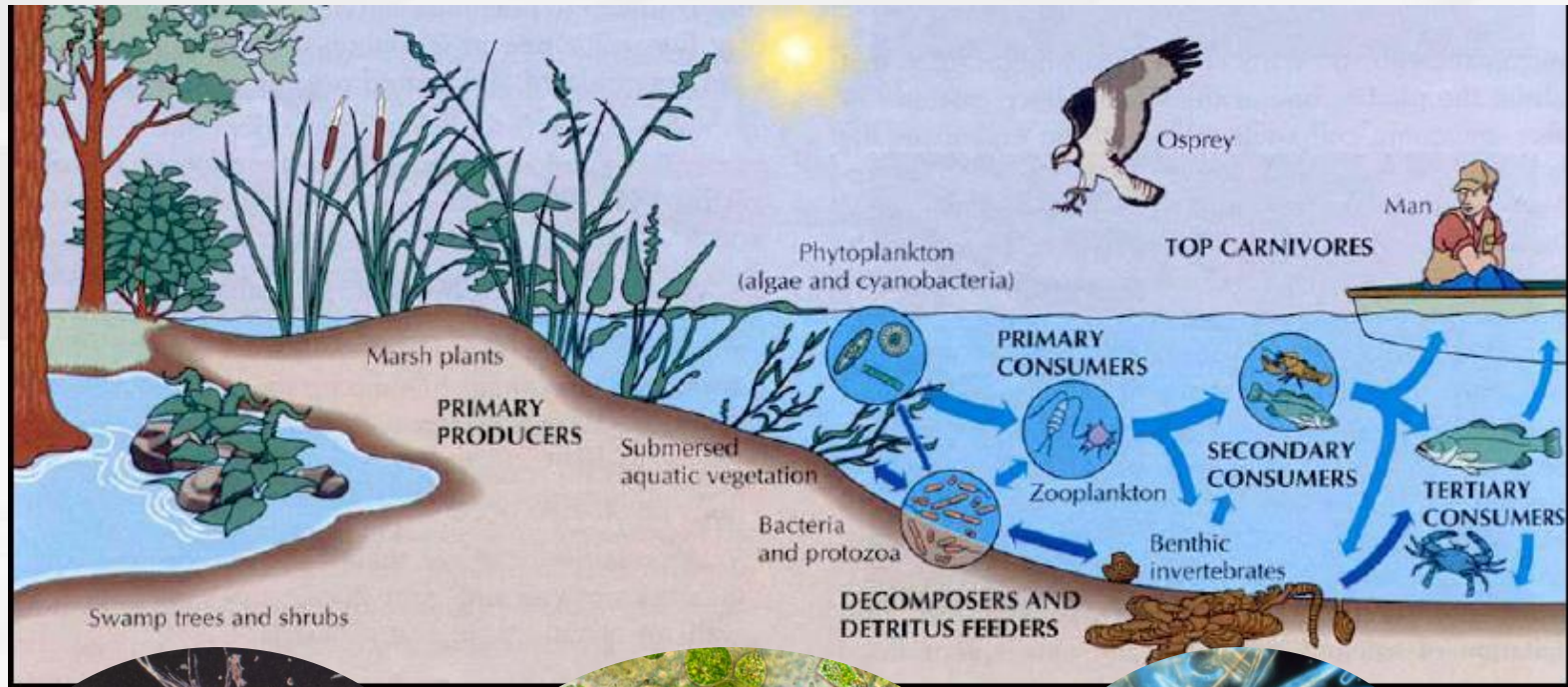
I. BAKU MUTU AIR SUNGAI DAN SEJENISNYA

No	Parameter	Unit	Kelas 1	Kelas 2	Kelas 3	Kelas 4	Keterangan
46.	Fecal Coliform	MPN/100 mL	100	1.000	2.000	2.000	
47.	Total Coliform	MPN/100 mL	1.000	5.000	10.000	10.000	

1. **Kelas satu:** Air baku air minum, dan/atau peruntukan lain yang setara
2. **Kelas dua:** Prasarana/sarana rekreasi air, pembudidayaan ikan air tawar, peternakan, air untuk mengairi pertanaman, dan/atau peruntukan lain yang setara
3. **Kelas tiga:** Pembudidayaan ikan air tawar, peternakan, air untuk mengairi tanaman, dan/atau peruntukan lain yang setara
4. **Kelas empat:** Pertanaman dan/atau peruntukan lain yang mempersyaratkan mutu air yang setara



Peranan Mikroba Akuatik



Fungi Air

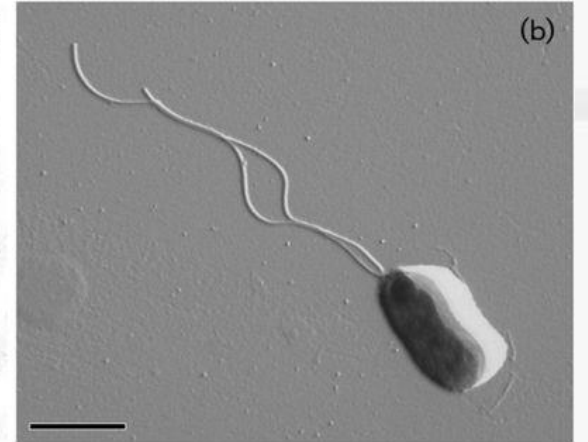
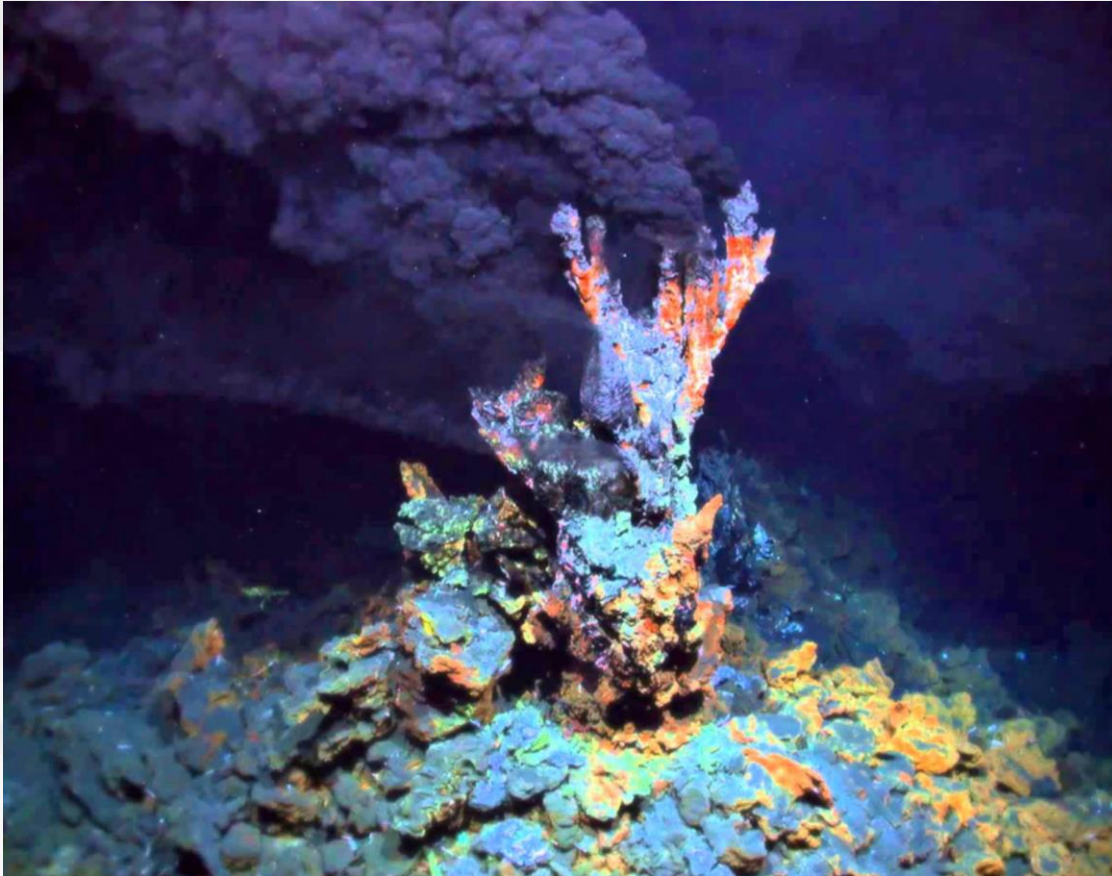


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Extrememophile Microbe



Nautilia nitratireducens

- Thermophilic
- Sulfur-reducer



Waterborne Bacterial Infection

Disease type	Species or genera of bacteria
Typhoid	<i>Salmonella typhi</i>
Paratyphoid	<i>Salmonella paratyphi</i>
Animal salmonellosis	<i>Salmonella sp.</i>
Bacterial dysentery	<i>Shigella sp.</i>
Cholera	<i>Vibrio cholerae</i> , <i>Vibrio cholerae</i> type eltor
Stomach and intestine catarrhs	Enteropathogenic <i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , <i>Aeromonas hydrophila</i> , <i>Plesiomonas shigelloides</i> , <i>Pseudomonas aeruginosa</i> , <i>Vibrio parahaemolyticus</i> , <i>Campylobacter</i> (<i>Vibrio</i>) <i>fetus</i> subsp. <i>jejuni</i> , <i>Clostridium perfringens</i> , <i>Bacillus cereus</i>
Yersiniosis	<i>Yersinia enterocolitica</i>
Tularemia	<i>Pasteurella</i> (<i>Francisella</i>) <i>tularensis</i>
Leptospirosis	<i>Leptospira sp.</i>
Skin infections	<i>Pseudomonas aeruginosa</i> , <i>Mycobacterium</i> (<i>M. balnei</i> , <i>M. phlei</i> , <i>M. marinum</i> , <i>M. kansasii</i> , <i>M. fortuitum</i> , <i>M. chelonae</i> , <i>M. goodii</i>)
Bacteremia conjunctivitis, ear and upper-respiratory system infection	<i>Pseudomonas aeruginosa</i> , <i>Pseudomonas cepacia</i>
Fever (pyrogens)	Gram-negative water rods (<i>Pseudomonas</i> , <i>Achromobacter</i> , <i>Xantomonas</i> , <i>Moraxella</i> , <i>Acinetobacter</i>)
Legionnaires disease	<i>Legionella pneumophila</i>



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Algae Bloom

Golden brown alga : Navicula



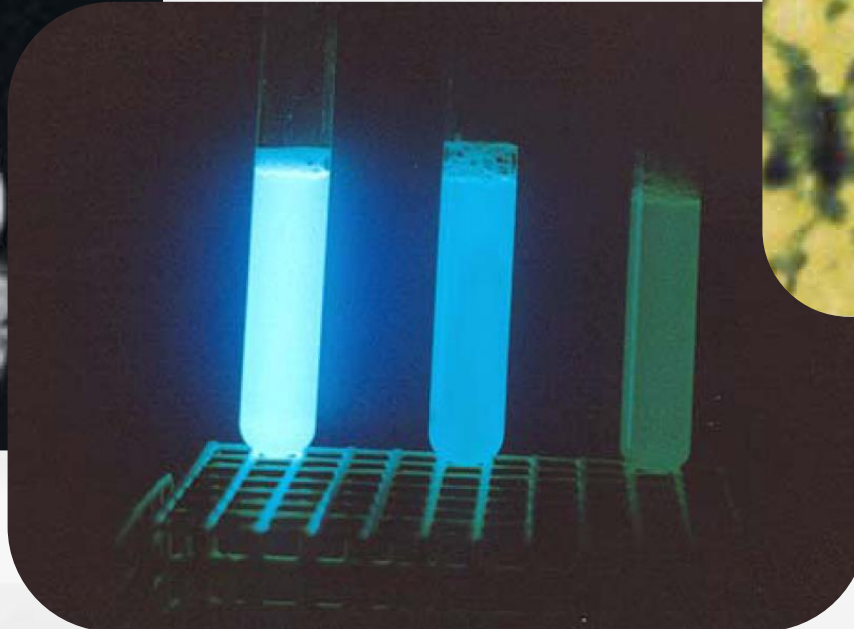
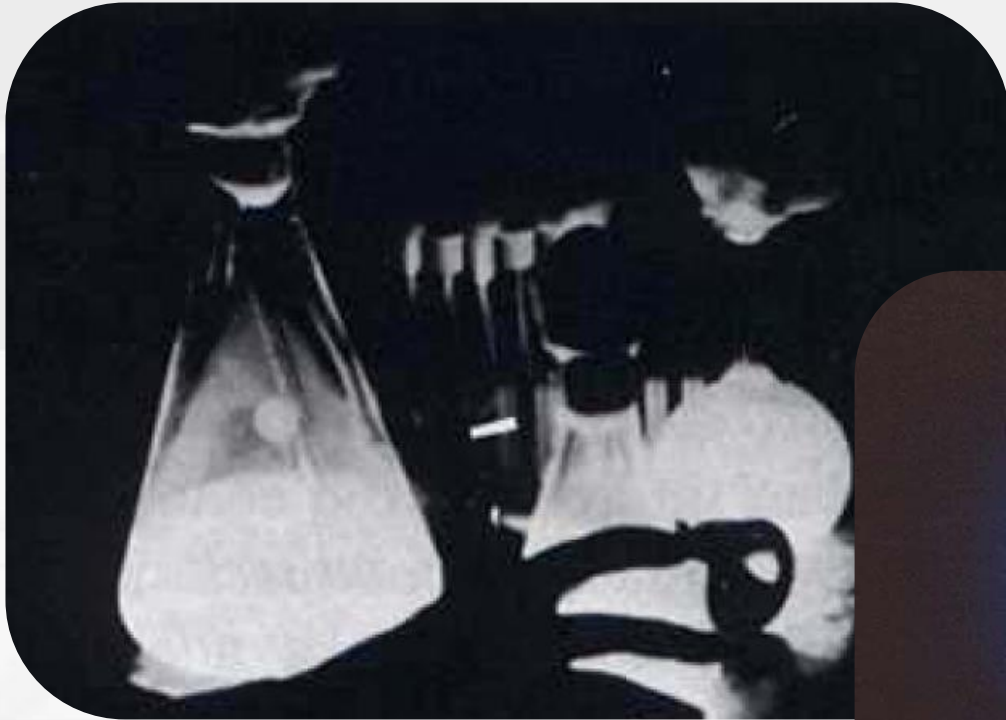


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Bioluminescent Bacteria

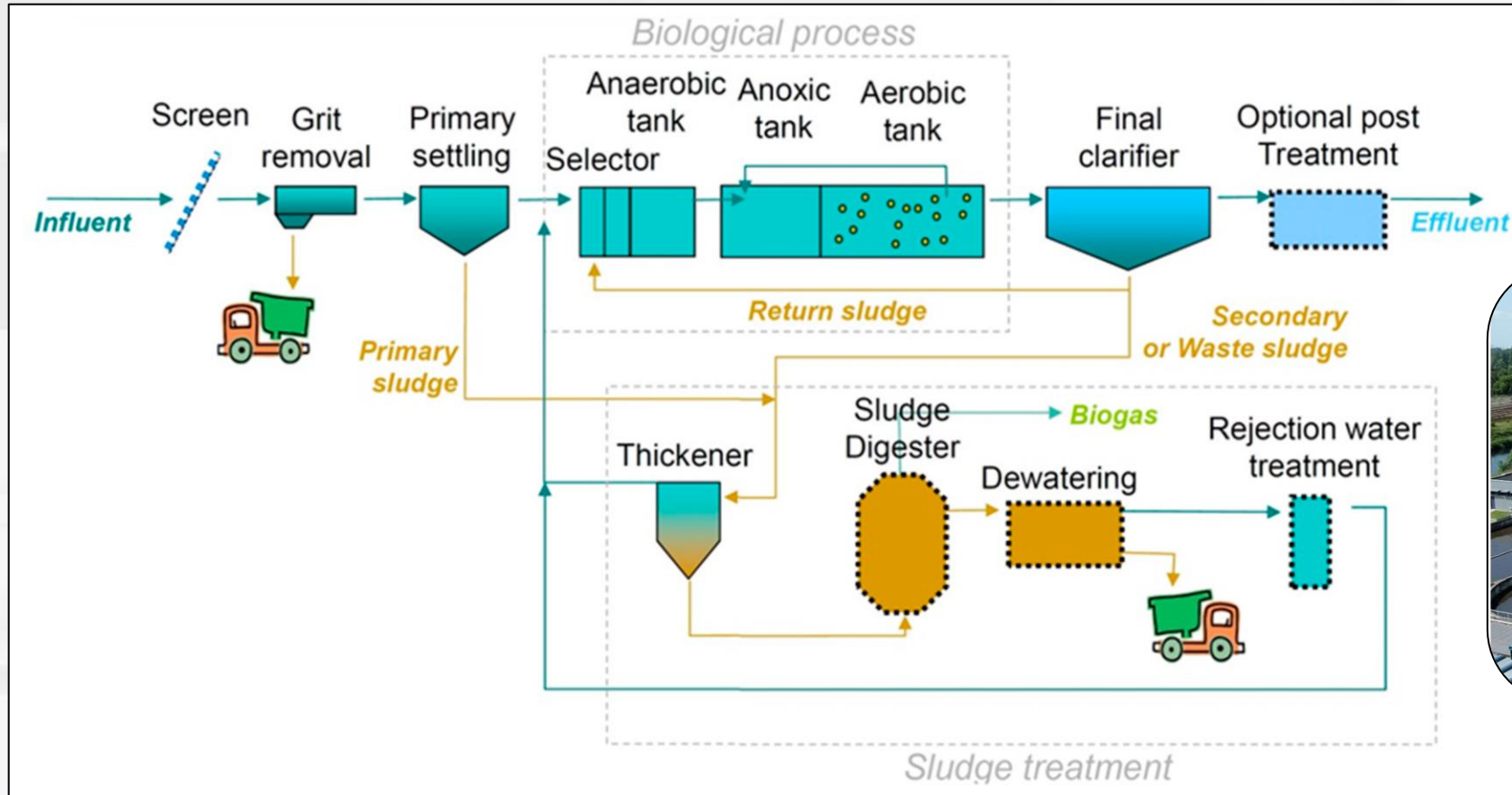




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Instalasi Pengolahan Air Limbah





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Terima Kasih