The large-scale fermenter

Technology for Biobased Products

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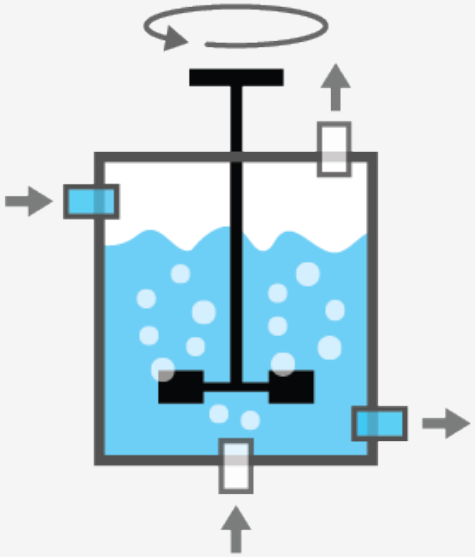
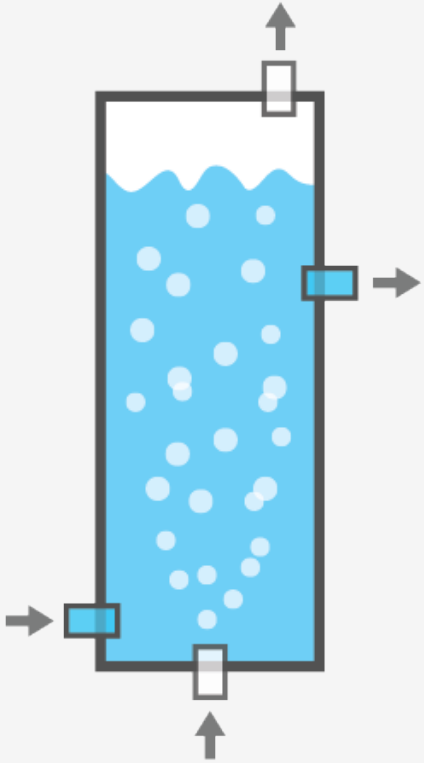
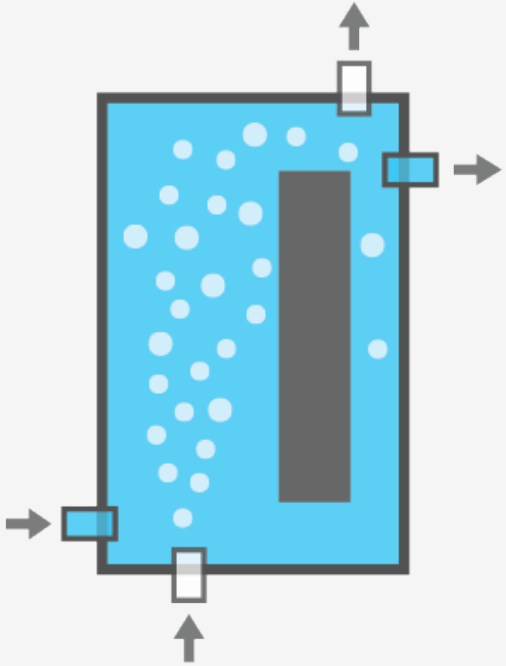
Reactor types



Stirred Tank Reactor

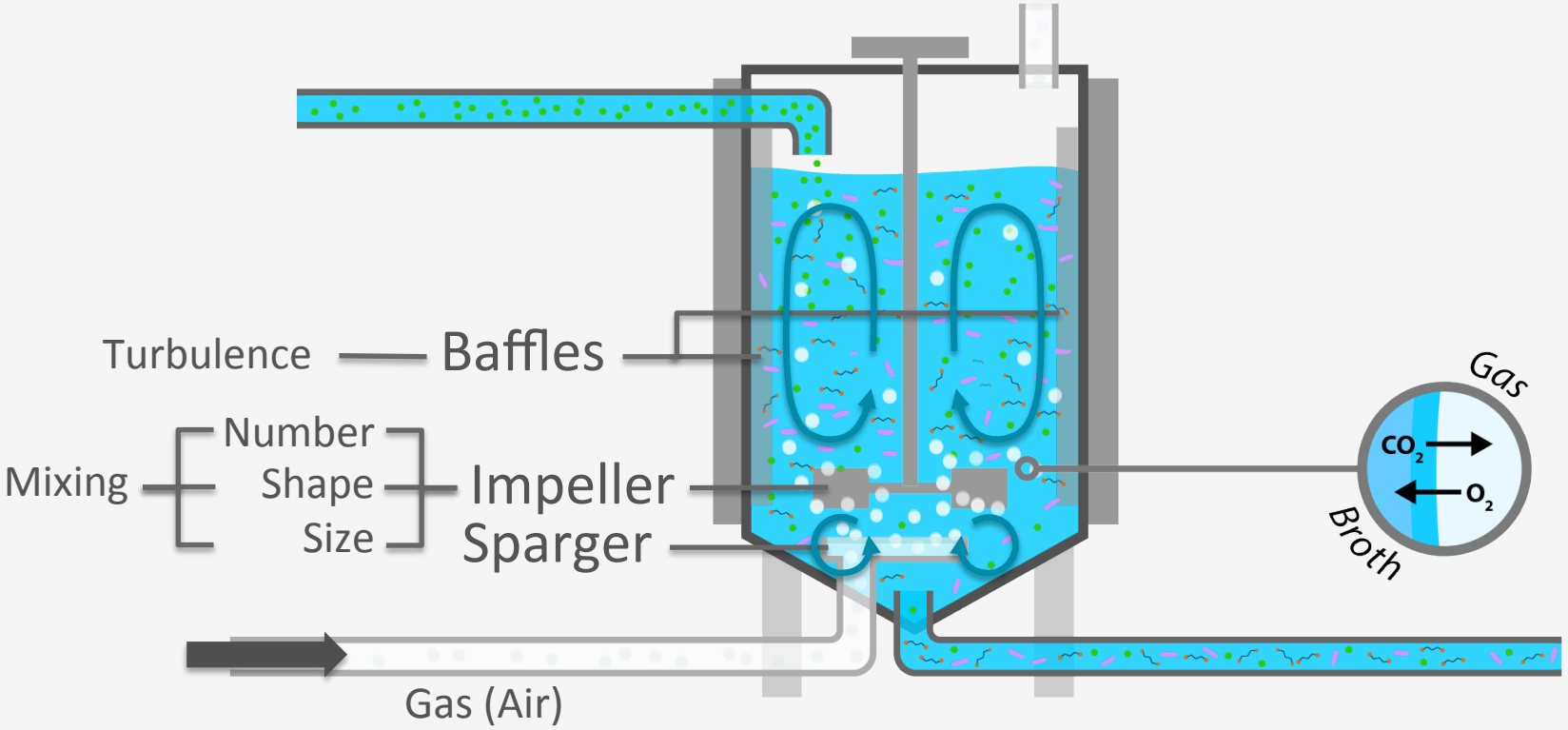


Bubble Column

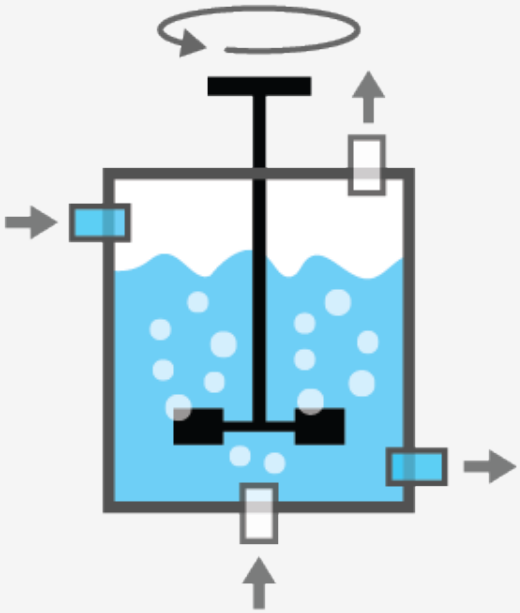


Airlift Loop Reactor

STR: Stirred Tank Reactor



STR: Stirred Tank Reactor



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- Condition control (T, pH, …)
- Easy cleaning
- Scale-up is well described
- Good gas transfer

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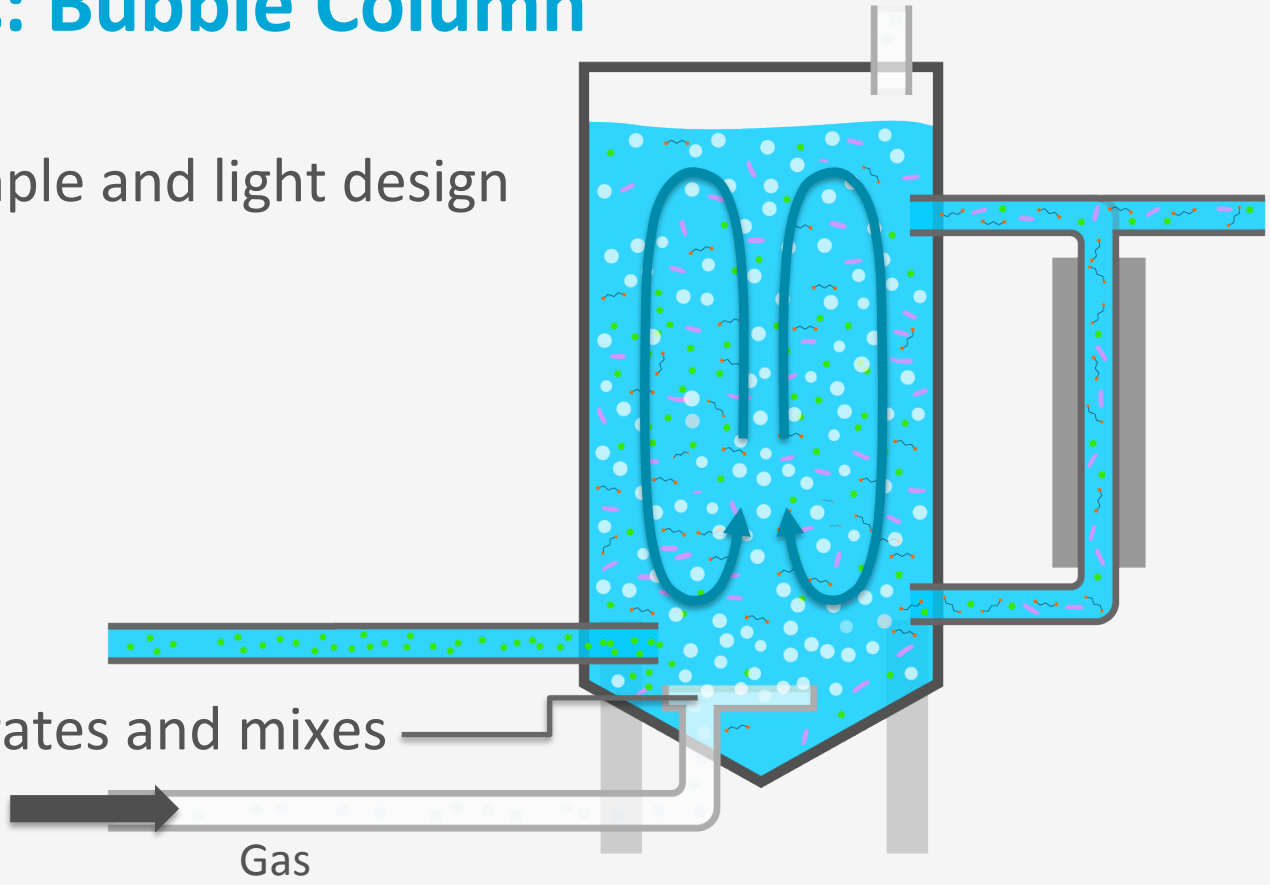
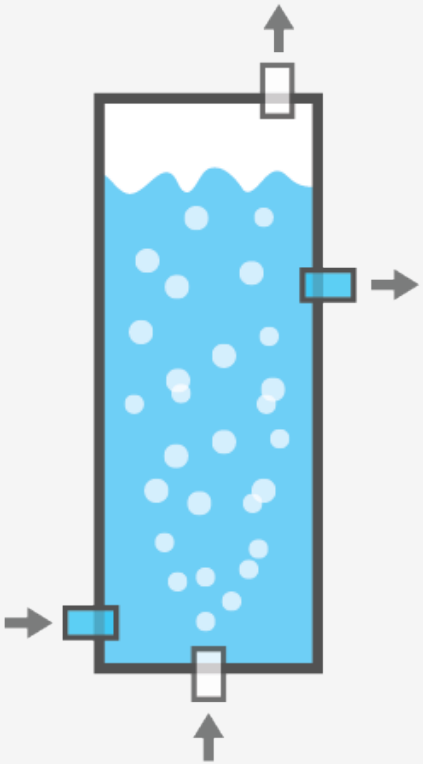
- Investment cost (large scale)
- Maintenance
- Mixing

BC: Bubble Column

Simple and light design



BC: Bubble Column



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- Investment cost
- No moving parts
- Easy cleaning
- Good gas transfer, good mixing

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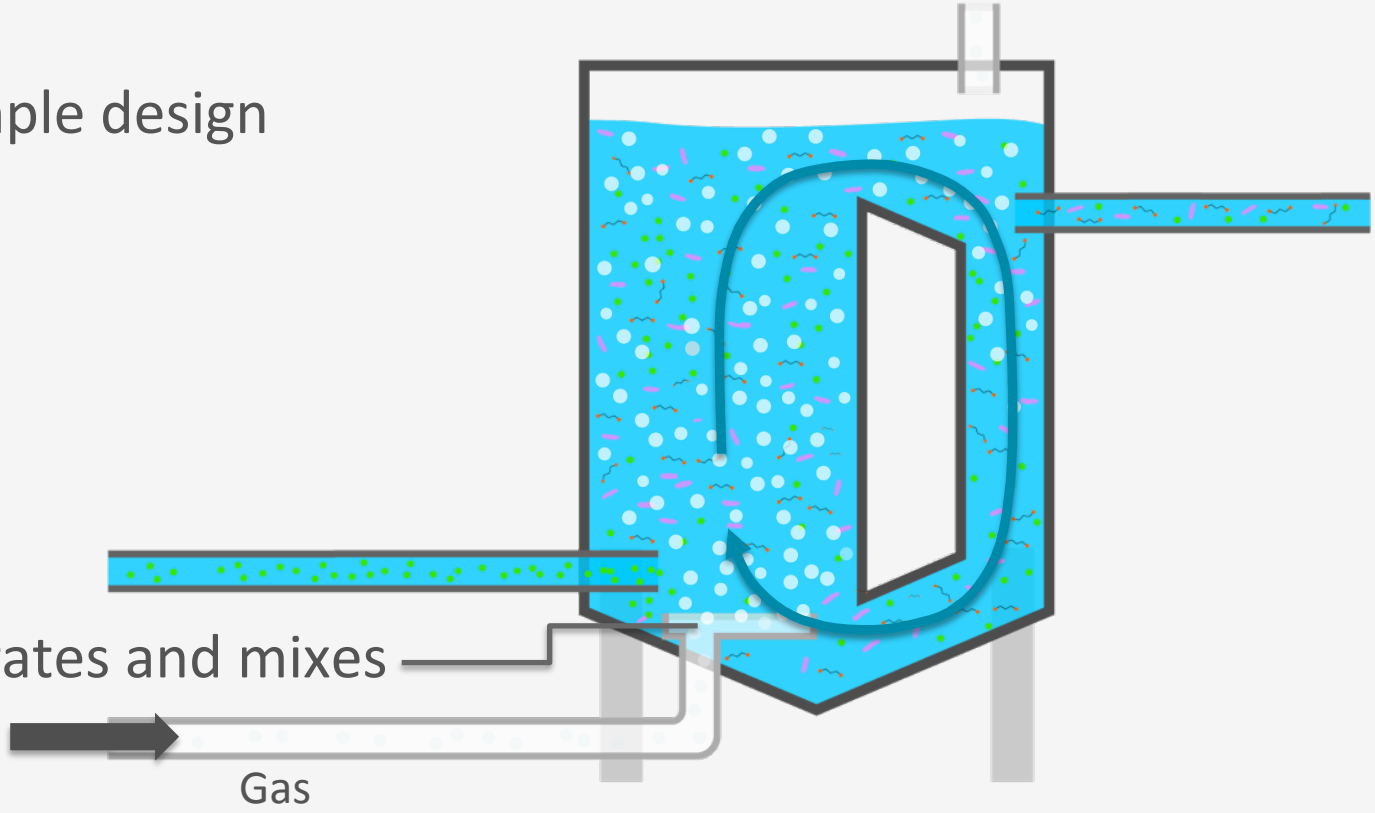
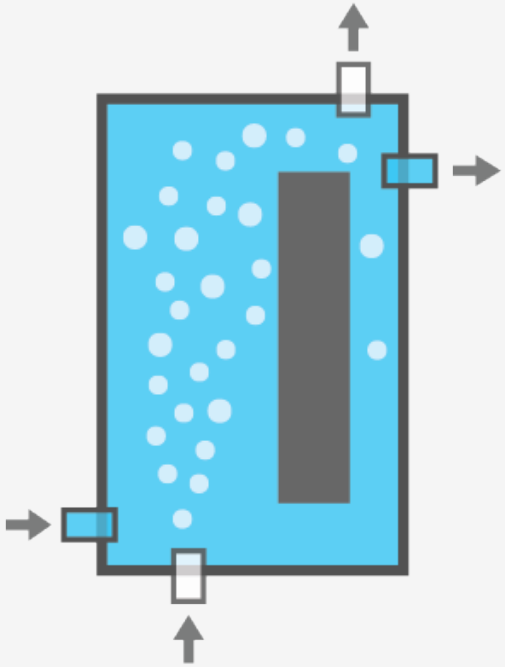
- Condition control (T, pH, …)
- Foaming
- Limited by viscosity

ALR: air lift reactor

Simple design



ALR: air lift reactor



- Simple, low costs
- No moving parts
- Easy cleaning
- Good gas transfer
- Recirculation loop can be used for cooling

- Condition control (T, pH, …)
- Foaming
- Poor mixing compared to BC

Comparison

	STR	BC	ALR
Mixing	+	+++	++
Gas transfer	+++	+	++
Heat transfer	++	+++	+++
Energy input	++	+	+
Control options	++	+	+
Handling of viscous broth	+++	+	+
Very large scale operation	+	+++	++
Ease of cleaning	++	++	++
Low maintenance	+	+++	+++

See you in the next unit!