**MAIN CONSIDERATIONS**

**Eco-friendly economy**
- Recycling water, carbon dioxide and other flows
- Choosing photosynthetic production to extract CO₂ from atmosphere
- Few needs for the microalgae

**Competition against fossil fuels**
- The current economic system with fossil fuels imposes:
  - A low price
  - A high caloric potential
  - A low viscosity compared to fuels from plant

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**MAIN STEPS**

**Nitrogen privation**
- Nitrogen = Growth
- No nitrogen = Lipid accumulation

⇒ CULTIVATION IN TWO STEPS: GROWTH then LIPID ACCUMULATION

Under various stresses, we can induce accumulation of interesting biochemical compounds like starch. For example, Nitrogen deprivation on freshwater microalgae strains as Chlorella sorokiniana or Scenedesmus dimorphus can improve lipids content by more than 200% (Adams et al. 2013).

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**Acoustic filter**
- Gentle sound-induced filtration
  - Gentle sedimentation
  - Medium recycling
  - Medium replacement
  - Continuous mode possible

⇒ SOFT SEPARATION OF CELLS AND NITROGEN

An acoustic settler allows to concentrate cells of a culture by settling it thanks to acoustic waves. It is a soft, temporary and stressless method to aggregate cells and it induces no biofouling. The acoustic settling process work through a cycle of mainly pumping and settling cells from growth culture. At the end of the cycle, the aggregated cells fall at the bottom of the settling chamber are softly pushed back to culture vessel.

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**BULLET POINTS**

- Nitrogen needed for cells growth
- Lipid accumulation is better in a medium without nitrogen
- Growth and lipid accumulation hardly compatible in a one-step process
- Sonoperfusion allows a soft separation between medium and cells
- Sonoperfusion can work in a continuous process
- Sonoperfusion can be used to transfer cells from a nitrogen-rich medium to a nitrogen-deprived medium

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**REFERENCES**


