Photosynthetic microalgae as a sustainable platform for the production of high quality edible biomass

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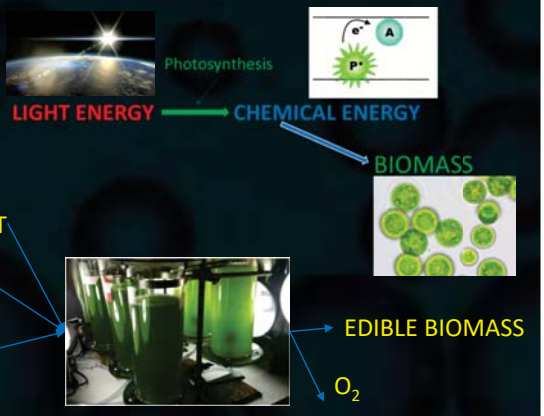
Why microalgae?

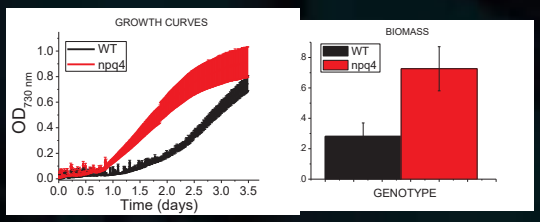
- *Cultivable in closed photobioreactors*
- *Lower H_2O requirement than plants*
- *Flu gasses and wastewater as nutrients*
- *High photosynthetic efficiency*

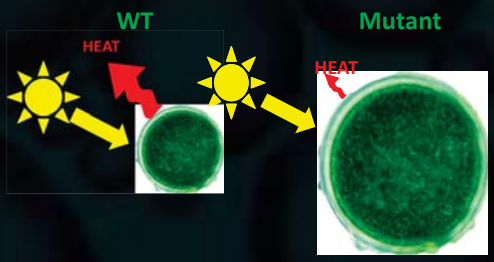
$CO_{2\ consumed}$ / $CO_{2\ released}$ = 1.8

- *Production of metabolites important for human health (Carotenoids, vitamins, fatty acid w3 or w6)*



Solutions to increase prodution yield

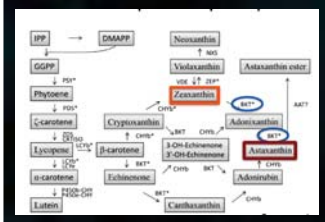




In *Chlamydomonas reinhardtii* mutants with reduced thermal dissipation of the light absorbed: higher photosynthetic efficiency and biomass production

Solutions to increase biomass quality

Astaxanthin is a strong antioxidant with important benefit for human health

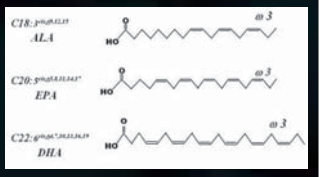


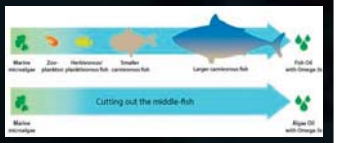
Increase carotenoid content by metabolic engineering: induction of astaxanthin production in *Chlamydomonas reinhardtii*

C. reinhardtii mutant accumulating astaxanthin

- Productivity of 0,3-0,6 gr/L/day with 1% of astaxanthin
- Weak cell wall: increased bioavalability
- Approved by FDA

Omega-3 are acids important for brain, eyes and cardiovascular functions





Omega-3 are nowadays supplemented mainly as fish oil but the primary producers are microalgae.

Nannochloropsis gaditana *(marine algae) strain* obtained by biotechnological manipulation in order to accumulate both EPA and astaxanthin:

- High biomass productivity (1gr/L/day),
- EPA (5%) and Astaxanthin (1%).
- APPROVED BY FDA for human consumption

N. gaditana mutant accumulating astaxanthin and EPA