Autotrophic microalgae as an alternative source of omega 3 oils: from green water to health conscious consumer

Imogen Foubert, Charlotte Bruneel, Eline Ryckebosch, Charlotte Lemahieu, Lieselot Balduyck, Lore Gheysen, Valerie Matton, Celine Dejonghe & Koenraad Muylaert

KU Leuven University Kulak, Food & Lipids, Kortrijk, Belgium

POTENTIAL OF MICROALGAE
Selected species of autotrophic microalgae: potential as alternative source of n-3 LC-PUFA for use in human nutrition
- Enough n-3 LC-PUFA
- Added value compared to fish oil
  - Also present in polar lipids
  - Presence of carotenoids
  - Higher oxidative stability

STABILITY DURING WET STORAGE
- Much neglected topic
- Short period of storage of wet algae paste can cause detrimental lipolysis (and thus high amounts of free fatty acids) depending on storage temperature
- Also depends on species ~ cell strength ~ cell integrity after harvesting: T-Isochrysis versus Nannochloropsis
- Also depends on cell disruption treatment: rupture of cell induces lipolytic processes but in many species necessary for efficient lipid extraction

DRIYING
- Freeze drying nor spray drying leads to lipid oxidation
- Spray drying leads to loss of carotenoids
- Deserves further detailed study

CELL DISRUPTION AND EXTRACTION
- Cell disruption does not only lead to more efficient lipid extraction but also induces lipolytic processes
- Choice of extraction solvent (different classical solvents, supercritical CO2 with or without co-solvent) influences lipid extraction efficiency, but also non-lipid extraction, type of lipids extracted, extraction of carotenoids, antioxidants

THROUGH LAYING HEN’S FEEDING
- Technically this certainly is a feasible route
- N-3 LC-PUFA enrichment efficiency depends on
  - Supplementation dose
  - N-3 profile (EPA or DHA better than ALA)
  - N-3 bioaccessibility: presence of rigid cell wall (T-Isochrysis versus Nannochloropsis) and biomass versus oil
- Extra: enrichment of carotenoids: better oxidative stability ??

ADDITION TO FOOD PRODUCTS
- Important to investigate influence of thermal and mechanical processing common to food products
- In model systems
- In tomato based systems
Gheysen et al. In preparation

Future research (PhD Valerie Matton): application in processed meat products

Financial support from

Imogen.Foubert@kuleuven.be
http://www.kuleuven.be/foodandlipids
K.U.Leuven Campus Kortrijk, Lab: Food & Lipids, Belgium.