Novel food and nutraceutical ingredients: Can biotechnology rise to the challenge?

Ingrediente microbiene inovative pentru aplicații în industria alimentară si nutraceutică: Este biotehnologia soluția?

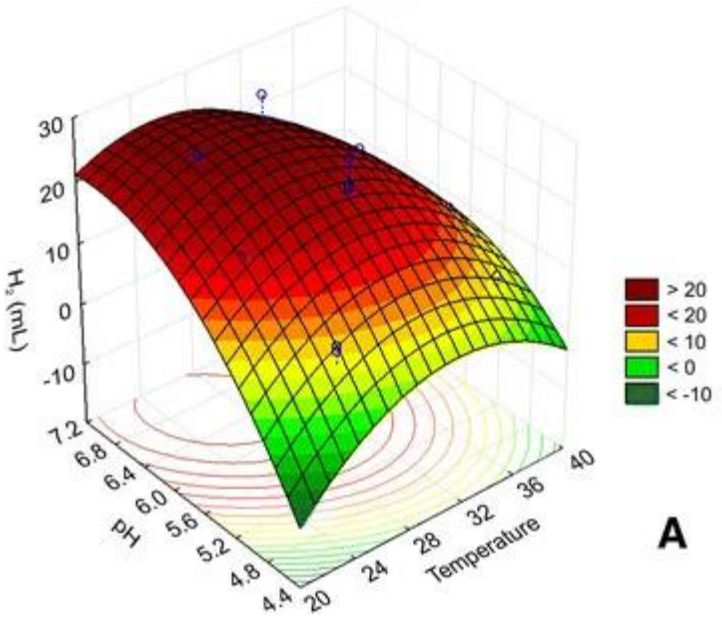
Iulian Zoltan Boboescu, PhD
April 2023

2010-2015

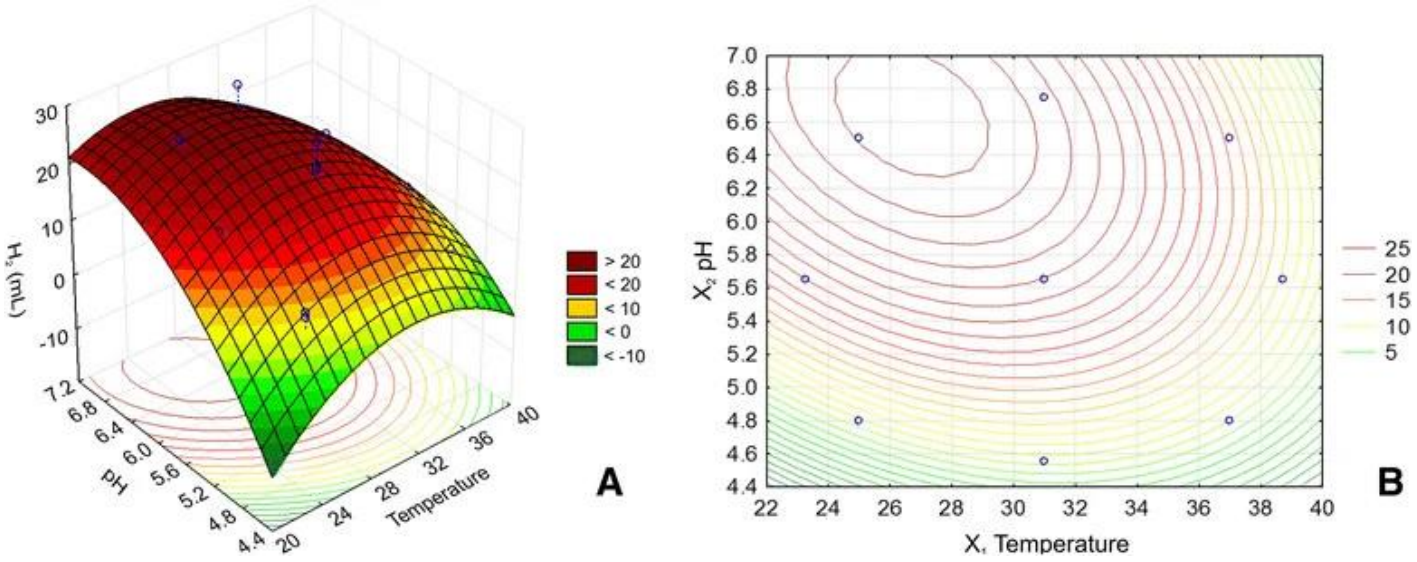
Universitatea Politehnica Timişoara

SZBK

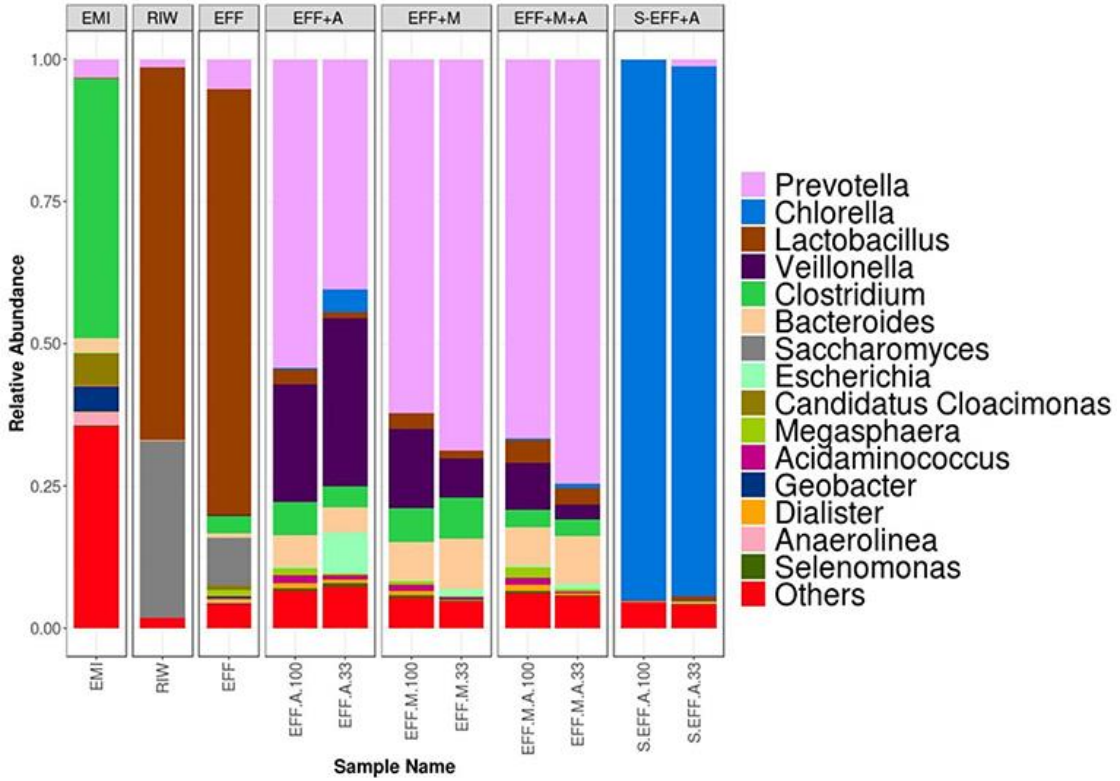
European Commission



A



Prediction of the optimum area for the highest biohydrogen production yields. Response surface **(A)** and contour plot **(B)** analysis



Taxonomic profiles at the genus level. Enriched microbial inoculum (**EMI**) has a different profile of microbial genera compared to both the raw initial wastewater (**RIW**) and dark fermented wastewater (**EFF**)

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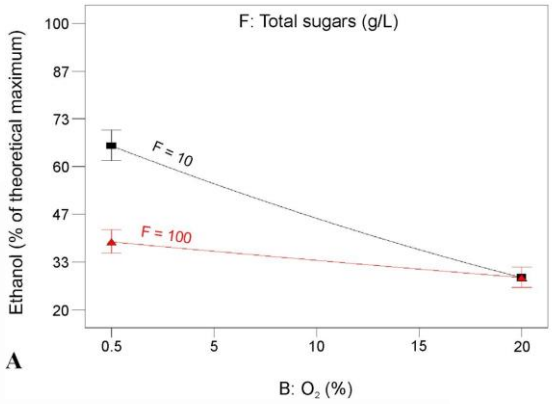

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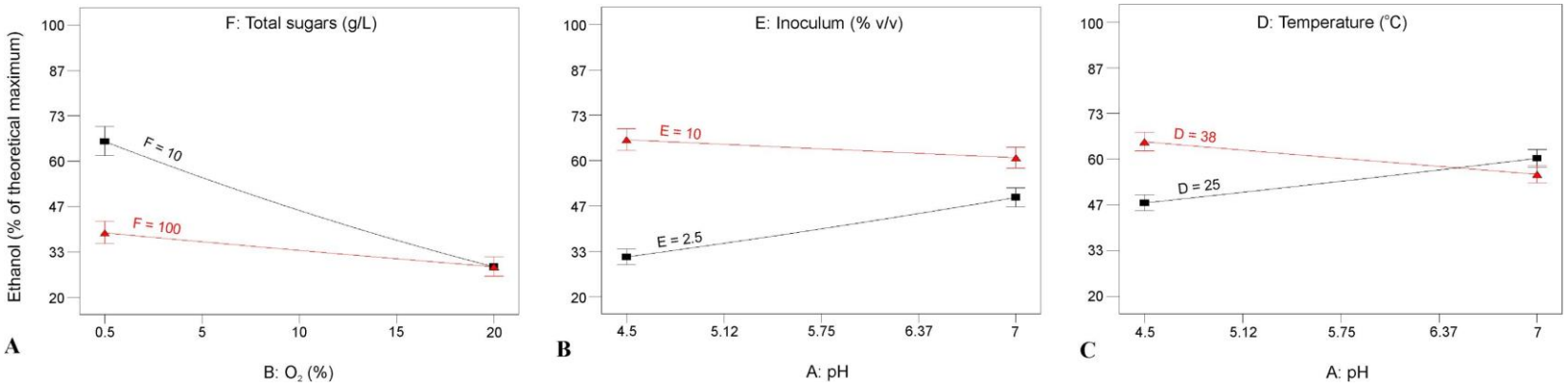
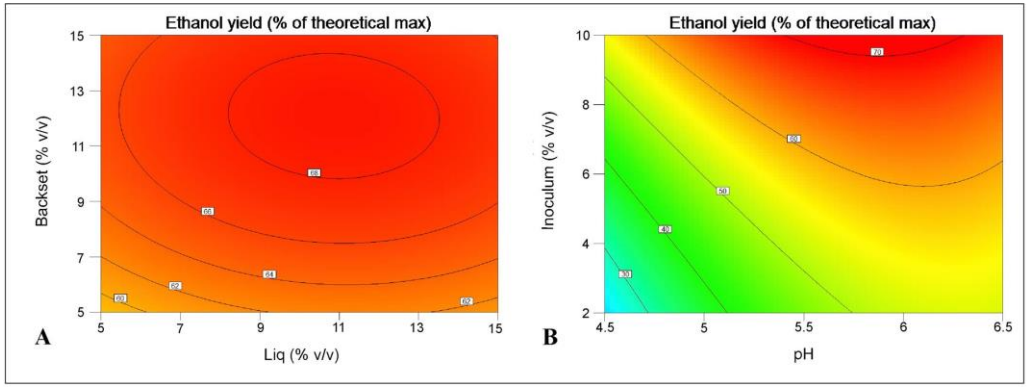
Mitacs

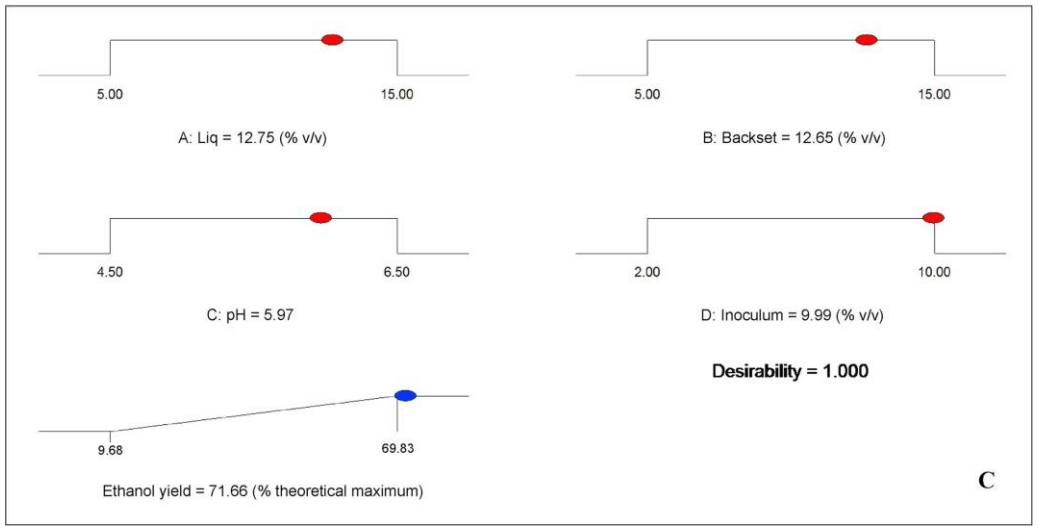
2016-2019



Interactions manifested among the investigated influencing factors and their effects on the ethanol yields. A: the presence of O_2 and the concentration of total monomeric sugars; **B**: the initial pH and volume of yeast inoculum; **C**: the initial pH and process temperature



Prediction of the optimum areas for maximizing ethanol yield values as a function of backset and liq. addition (**A**) as well as the initial pH and inoculum volume (**B**). Maximizing the ethanol yields from hemicellulosic hydrolysate (**C**).

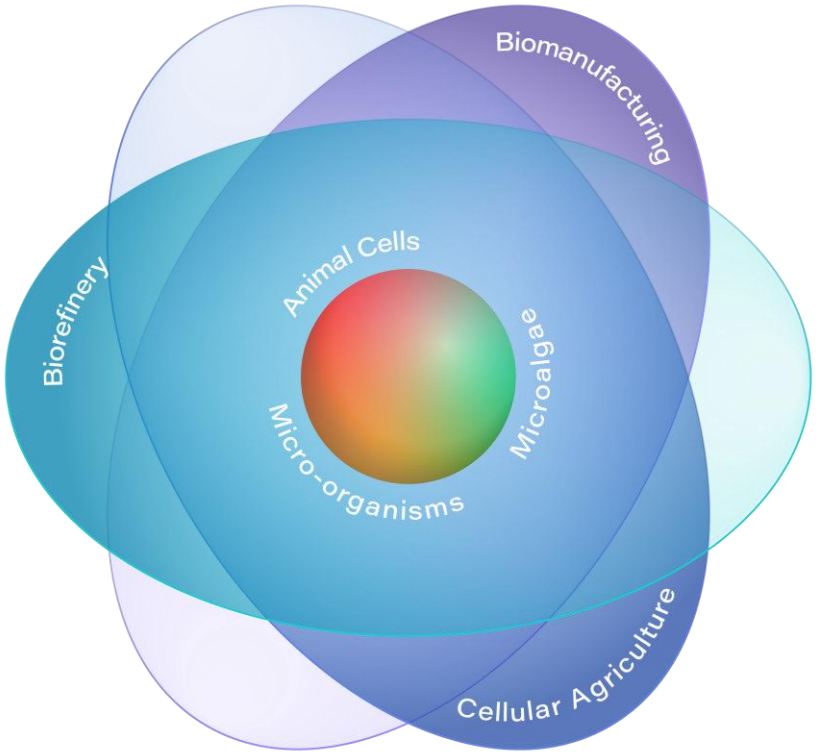


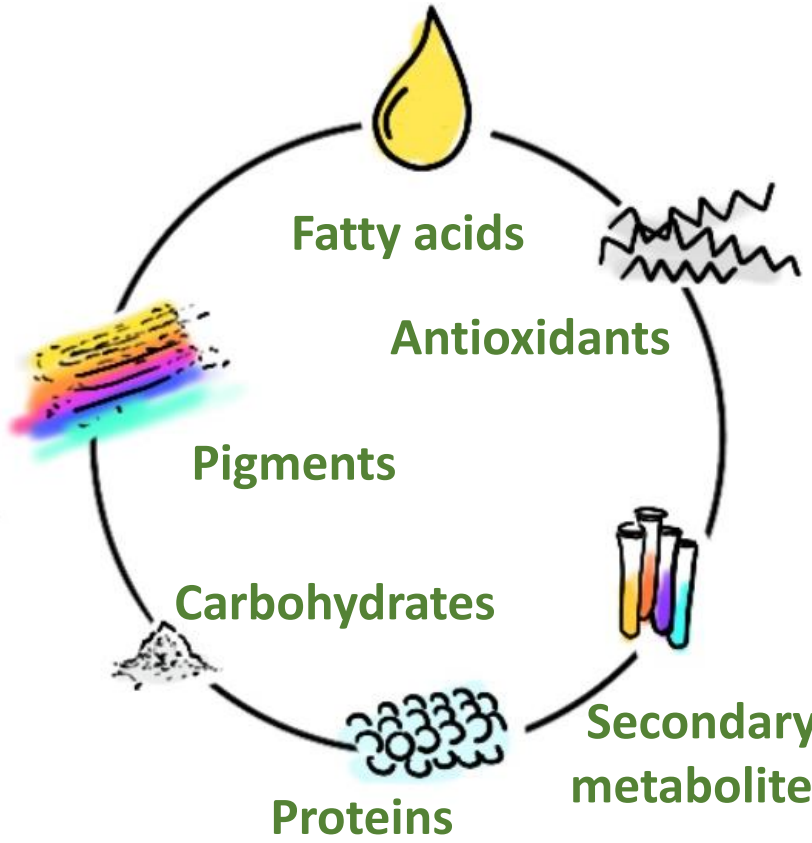
2020-2021

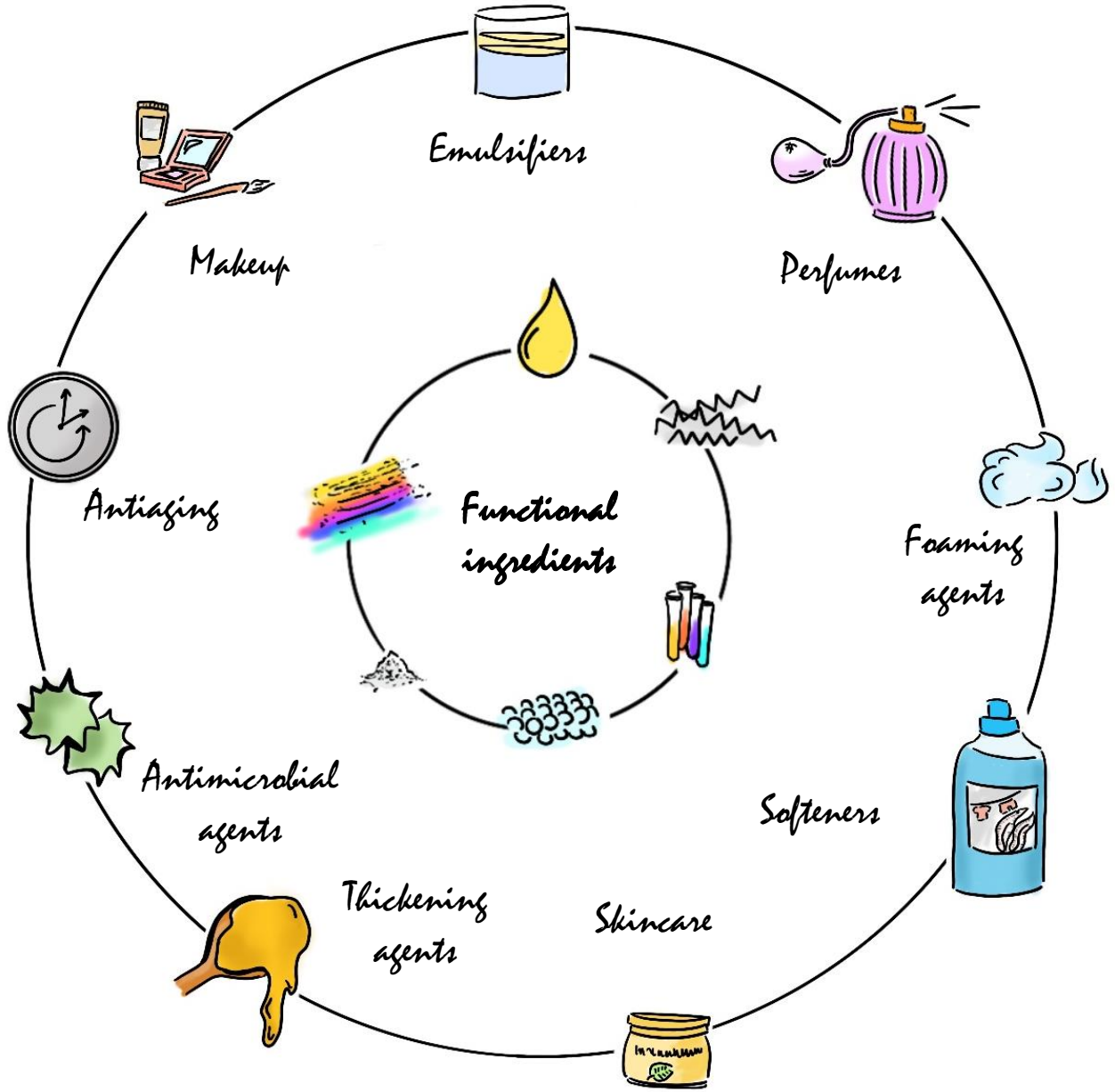
2010-2015

2016-2019

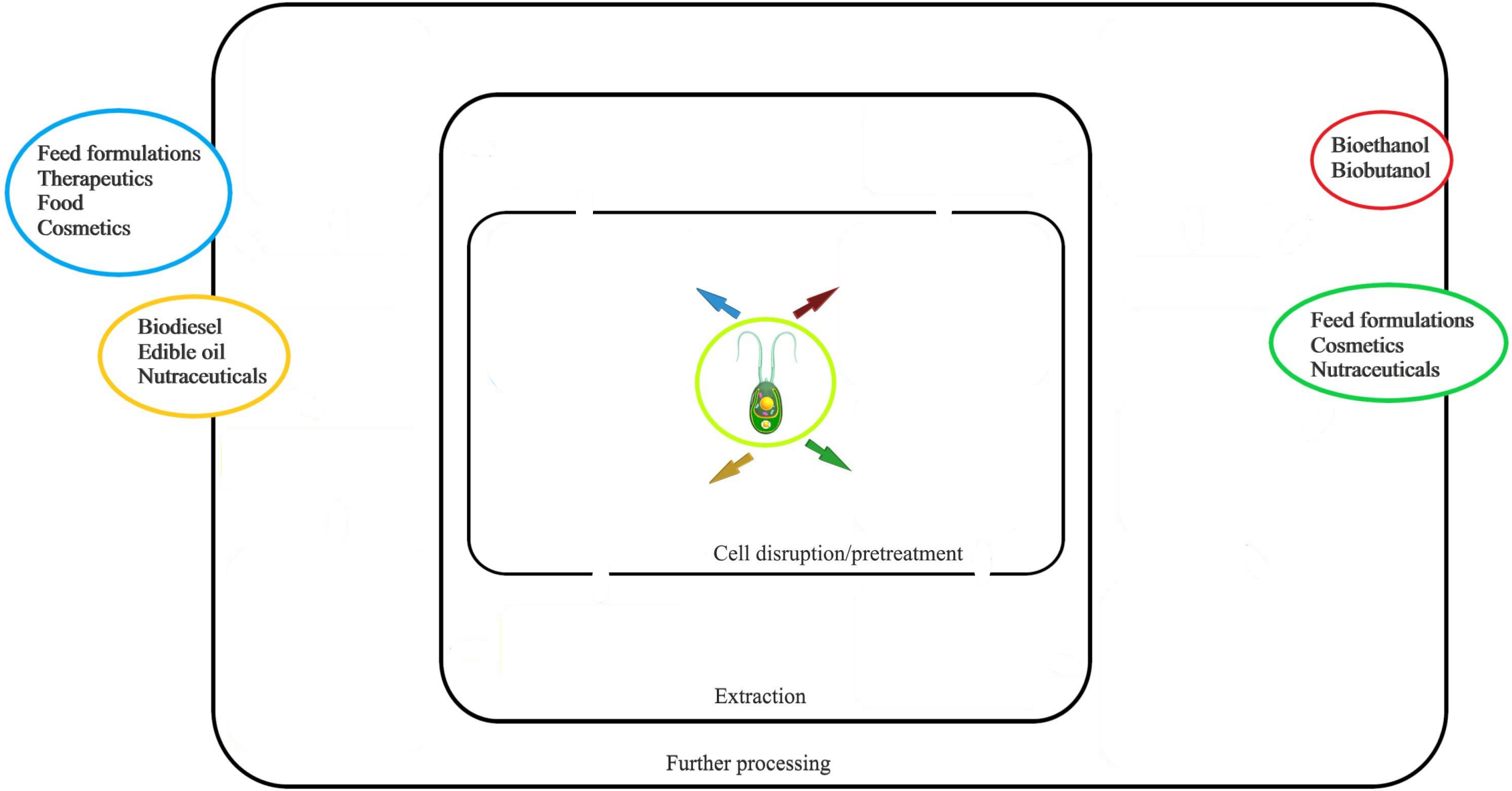
prof.dr.ir. RH (Rene) Wijffels




Fatty acids
Antioxidants
Pigments
Carbohydrates
Proteins
Secondary metabolites


Emulsifiers
Perfumes
Foaming agents
Softeners
Skincare
Thickening agents
Antimicrobial agents
Antiaging
Makeup
Functional ingredients

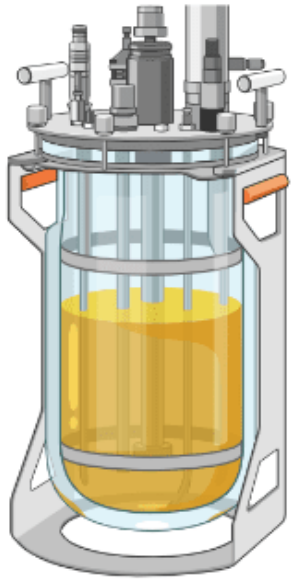
A multiproduct approach + simplification

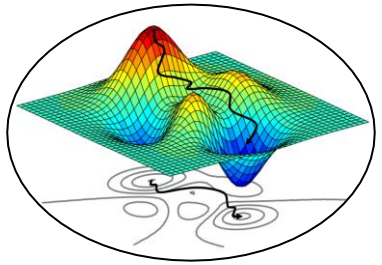


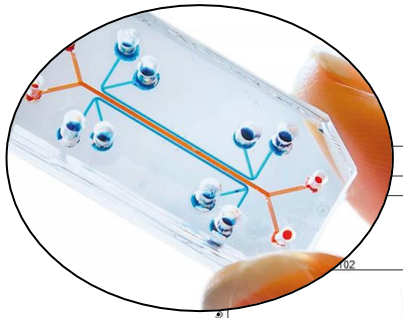
Production

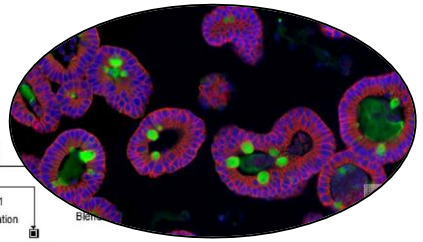
Downstream processing

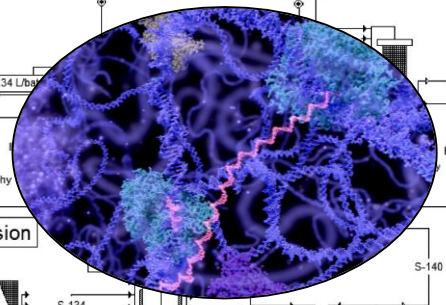
Applications

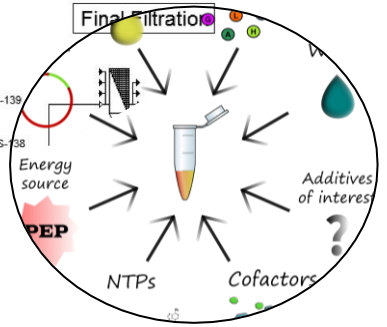


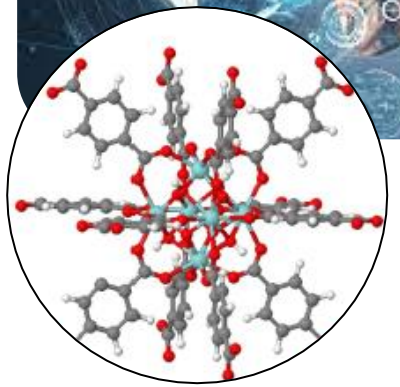












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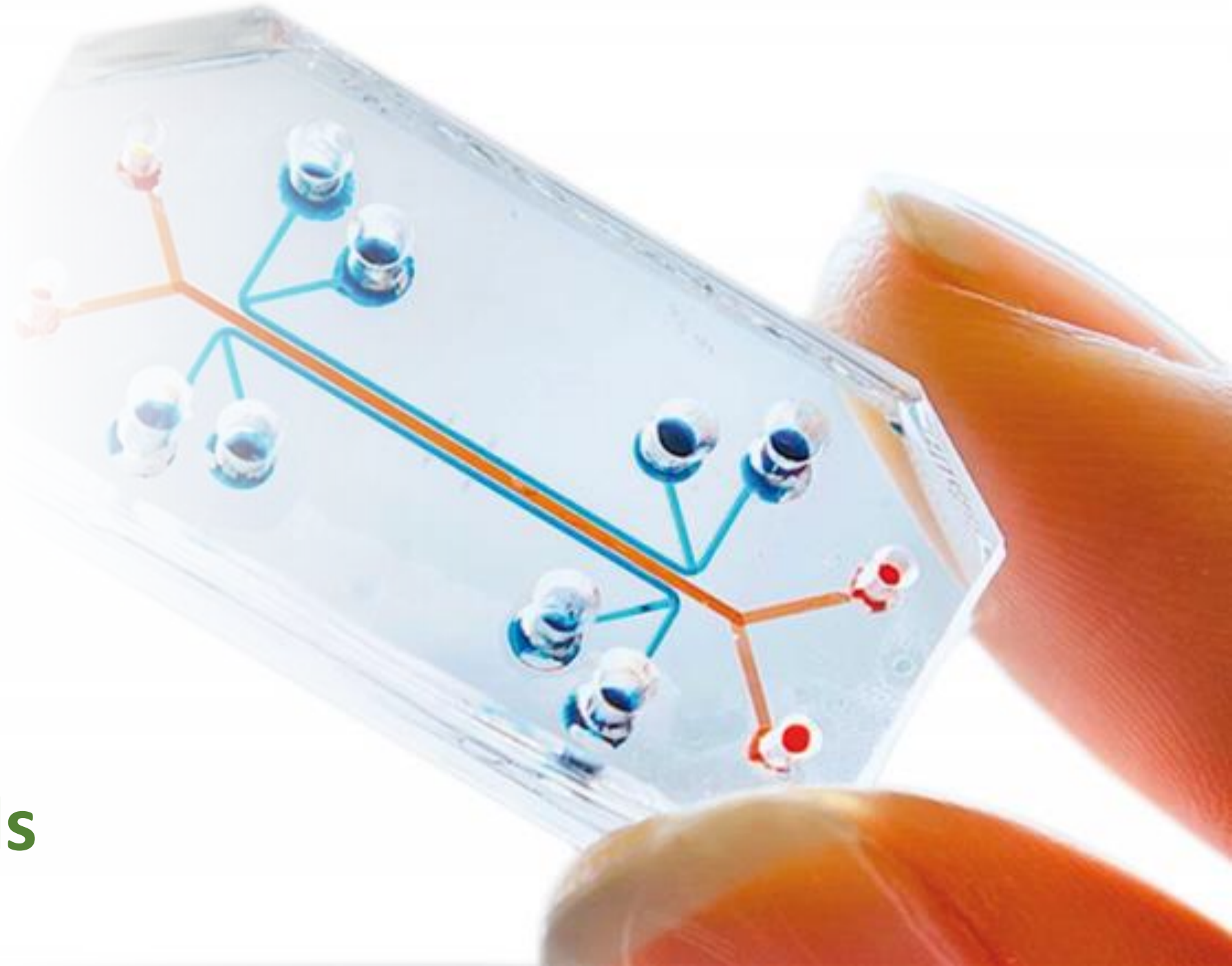
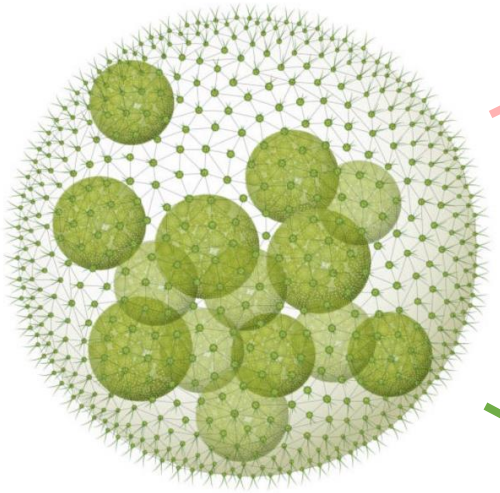


External fields

CURRENT Purification Technologies

Algae Cells

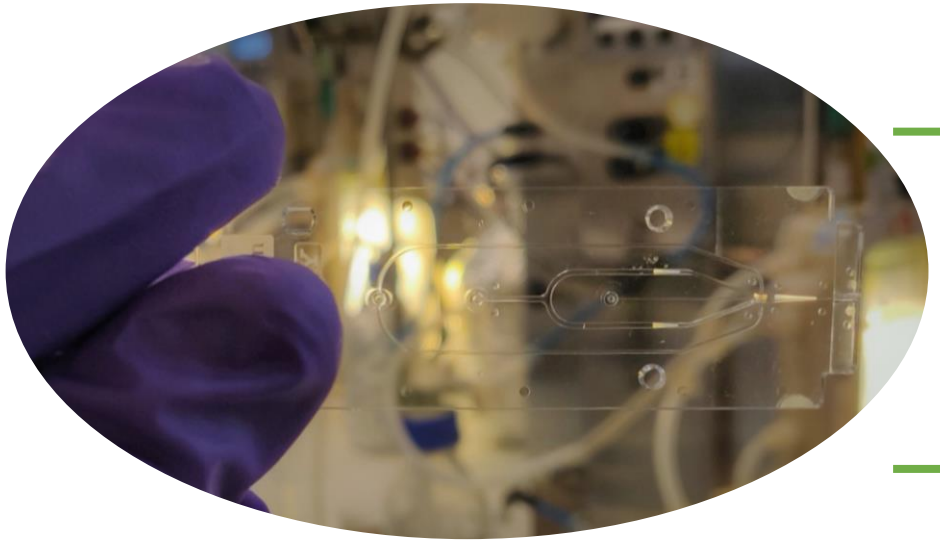


Functional Food and Nutraceutical Ingredients

HARVEST
Cell concentration

DISRUPTION
Extraction of cell components

PURIFICATION
Separation of cell components

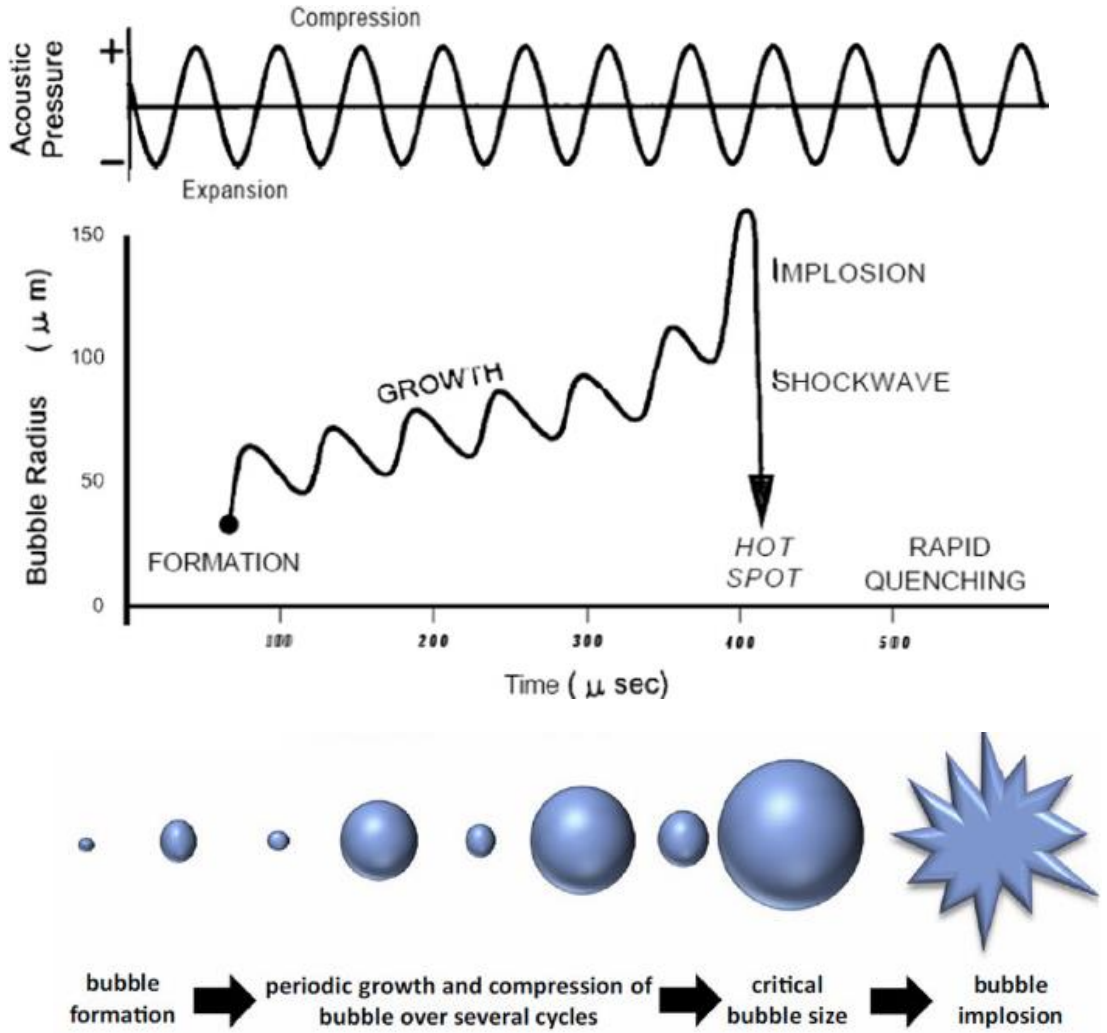


10 cm

NOVEL On-a-chip Approach

External fields

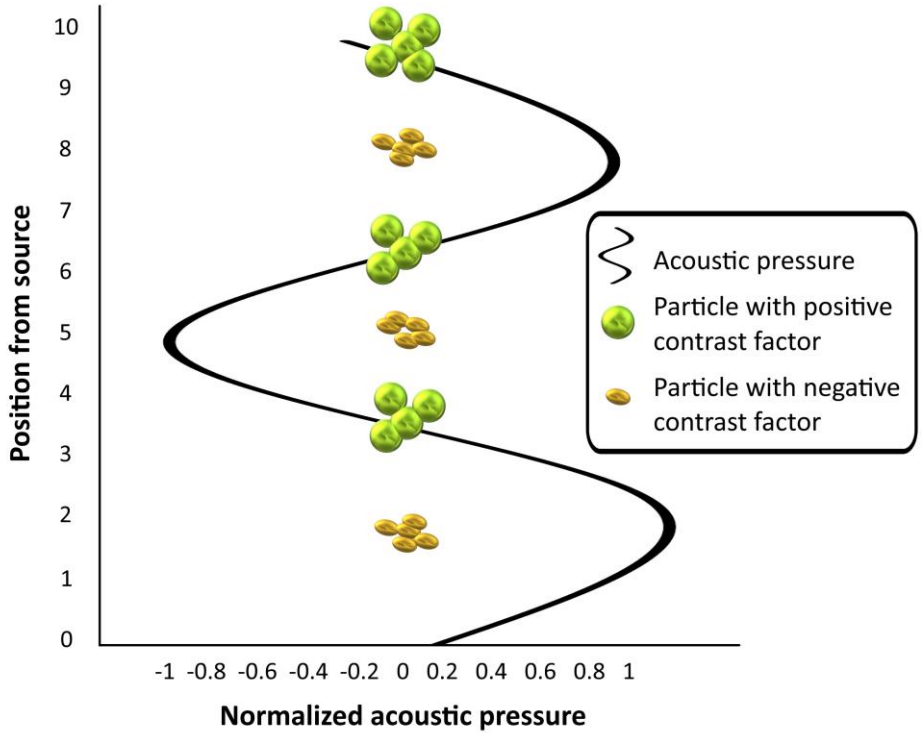
ULTRASONICATION AND SONOCHEMISTRY (20 kHz – 80 kHz)



Vyas et al. 2019

External fields

ACOUSTOPHORESIS (150 kHz – 3 MHz)



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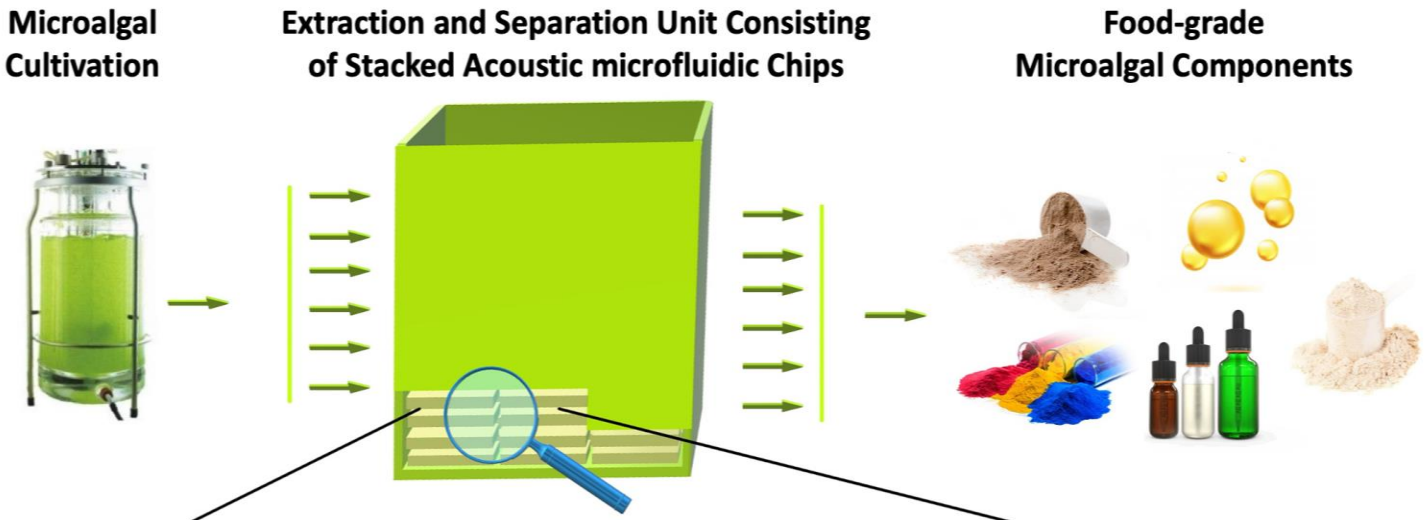
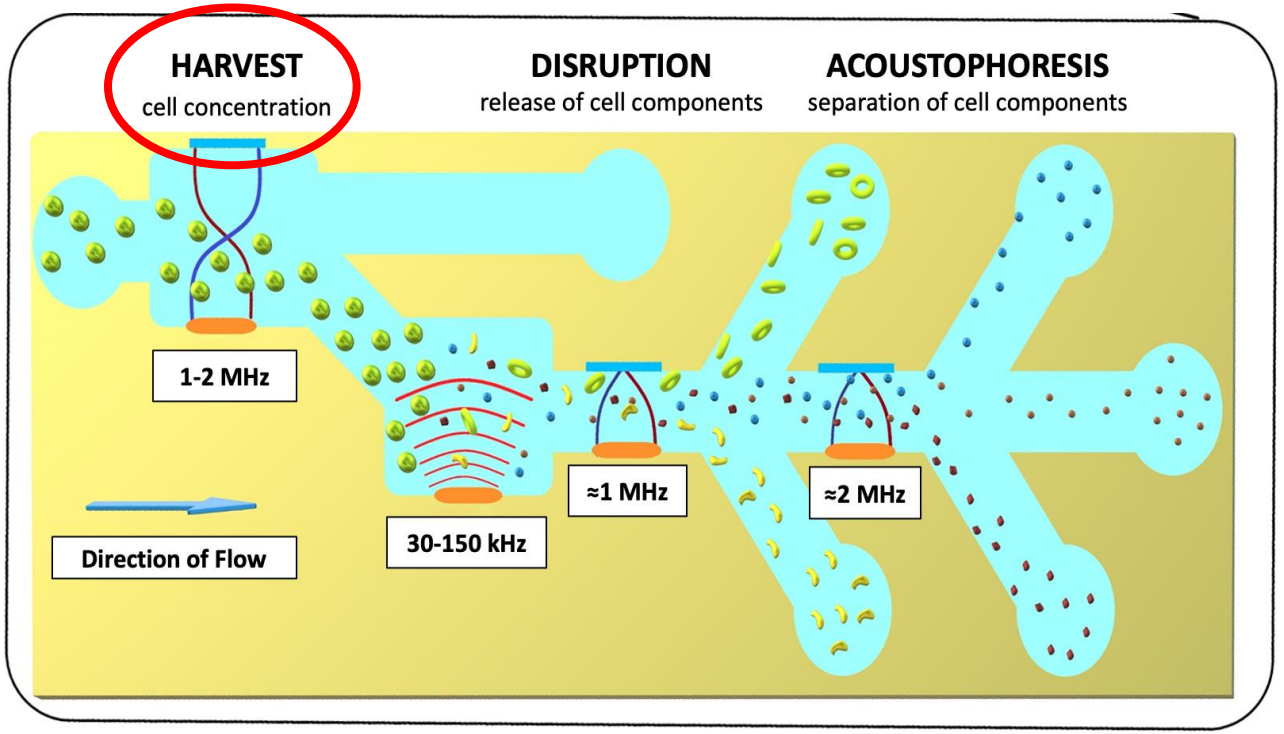
PROPOSITION

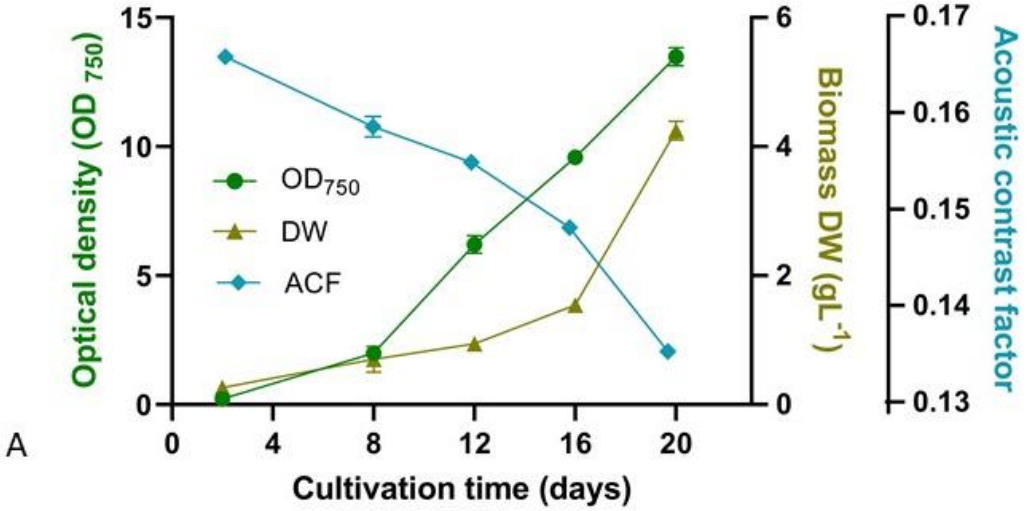


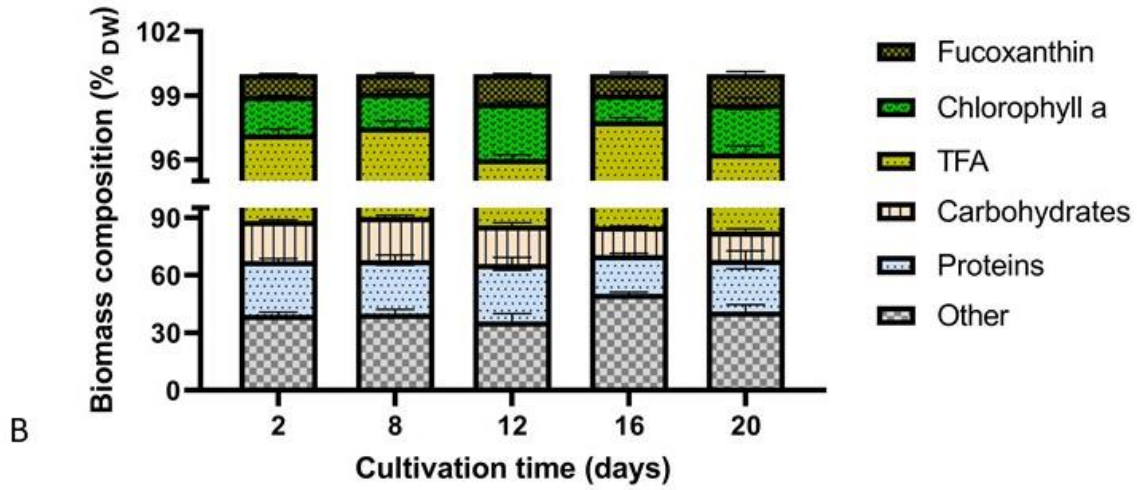
Harvesting of microalgal cells



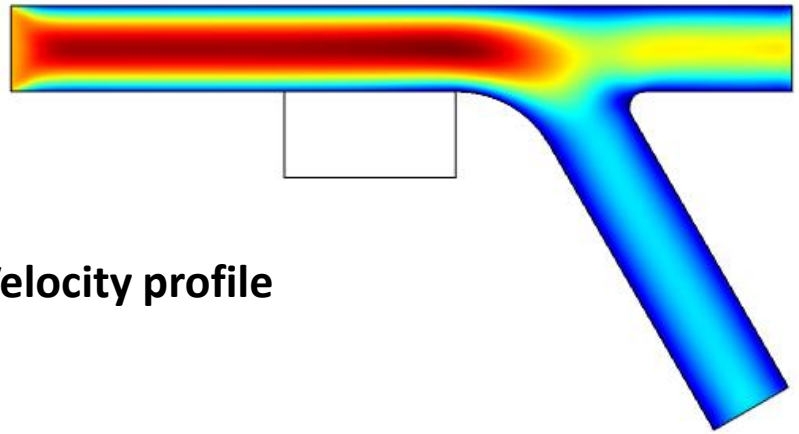
Harvesting of microalgal cells

Determine the acoustic properties of selected microalgal cells and their components

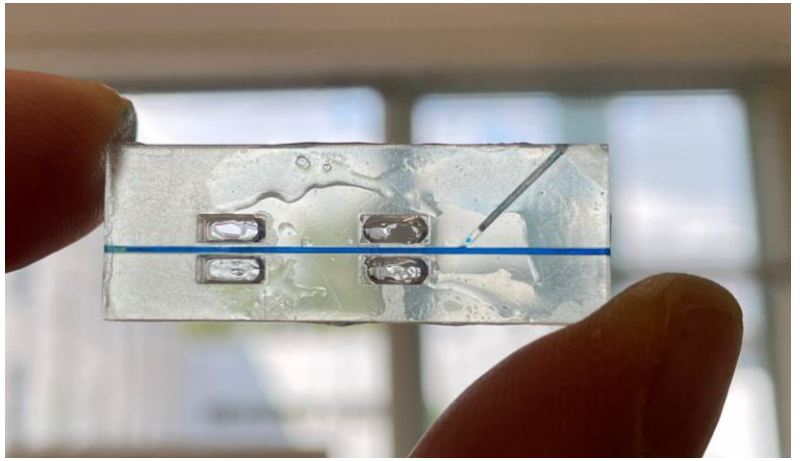




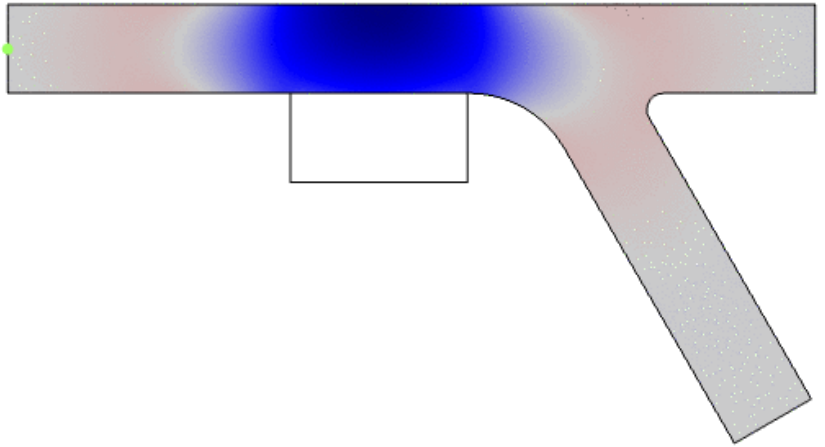
Harvesting of microalgal cells



Velocity profile



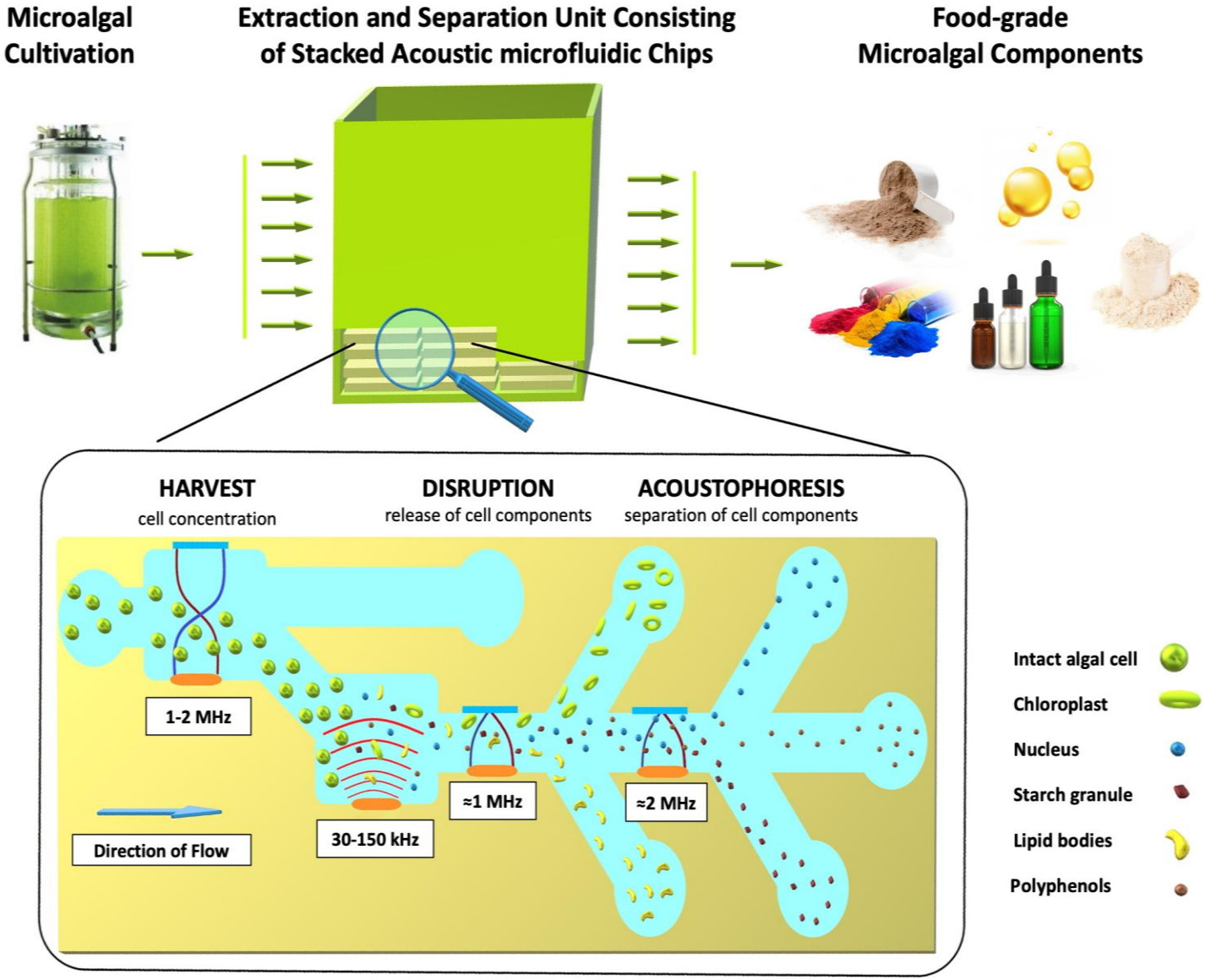
Harvesting chip: Height = 110 um; Length = 1000 um (1mm); Frequency = 3400 kHz



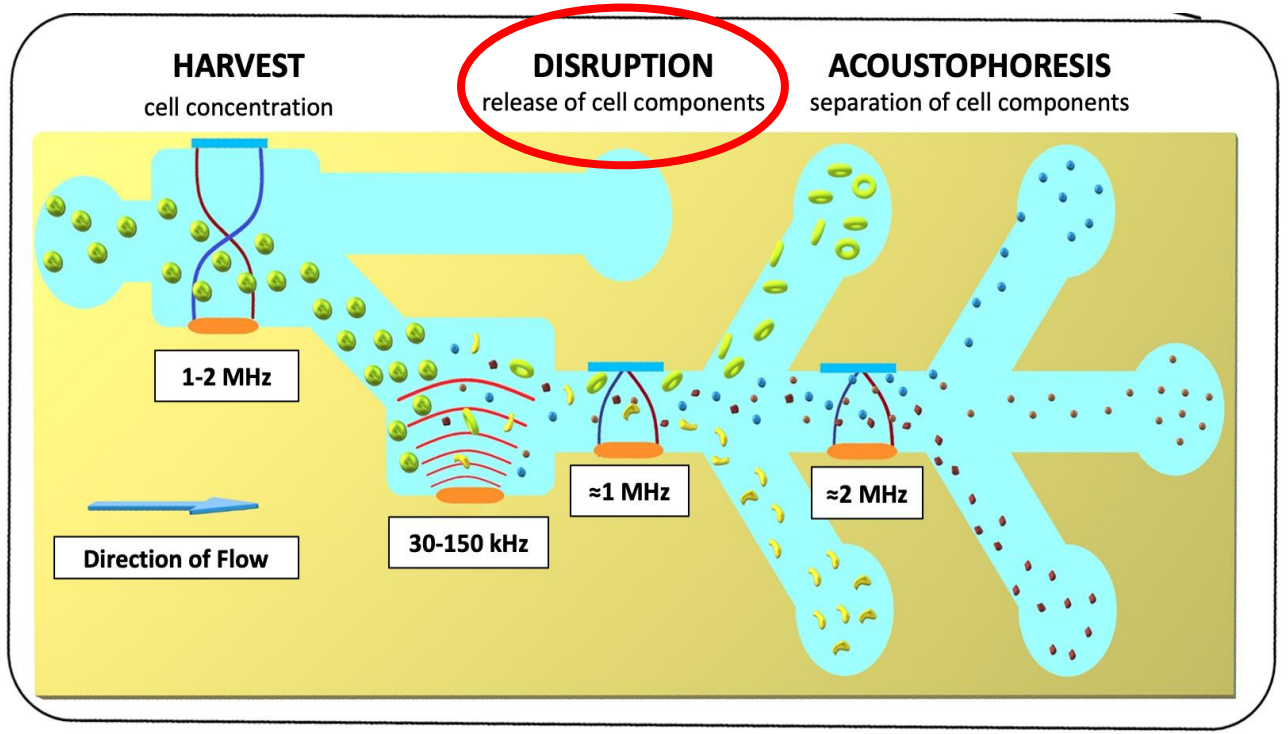
Acoustic profile + cell concentration

External fields

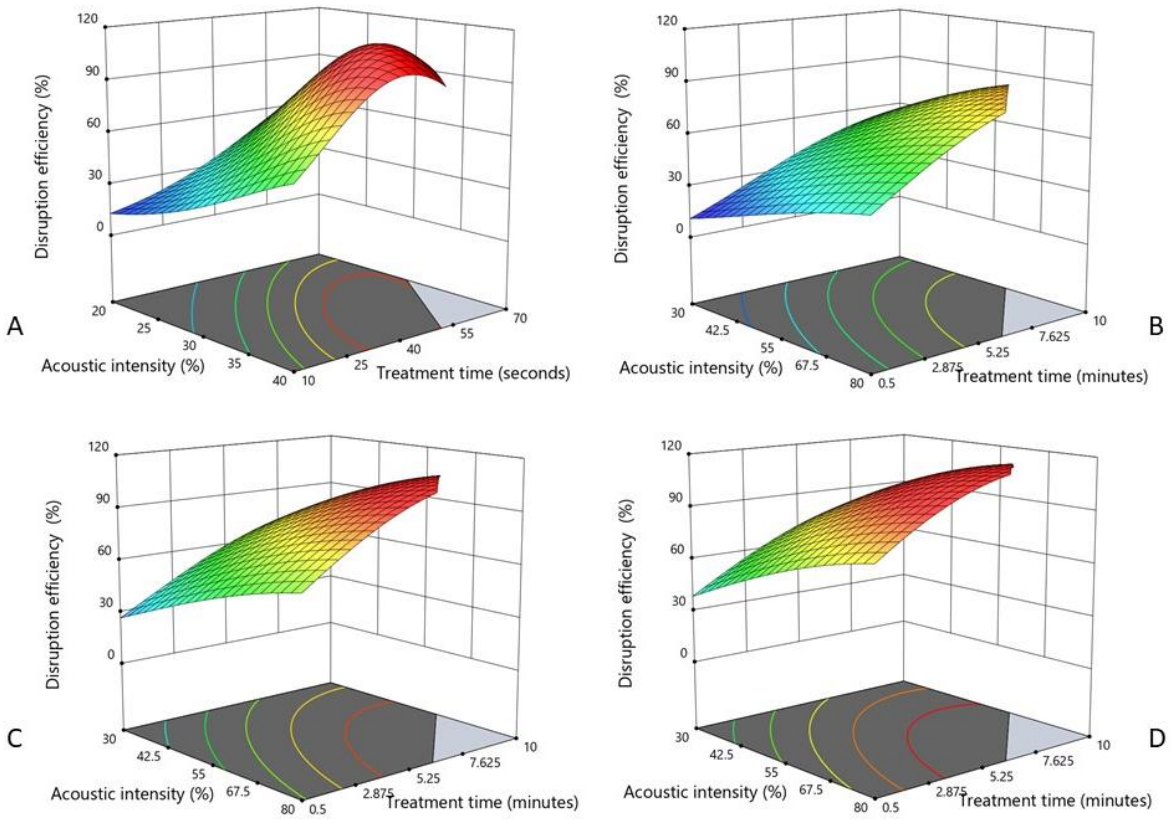
PROPOSITION

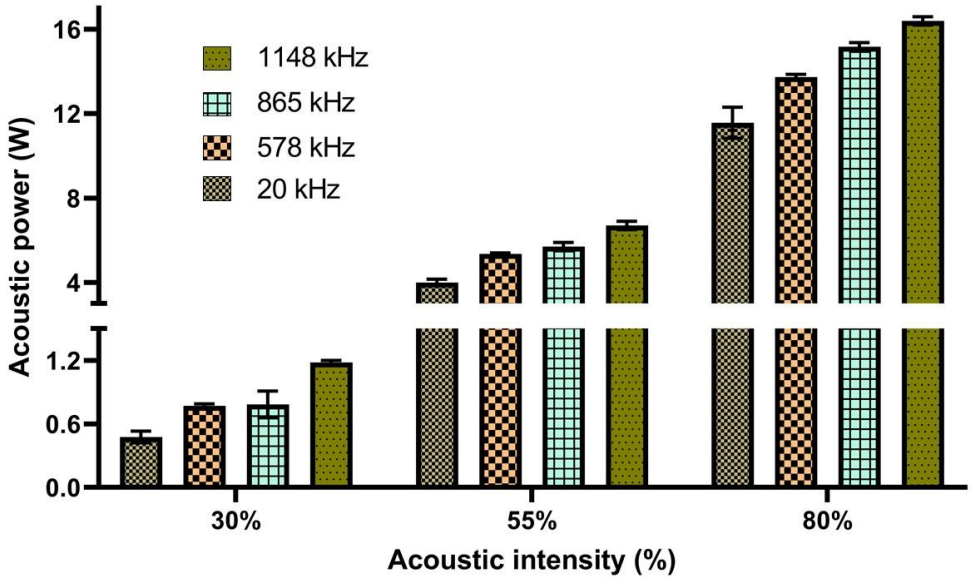


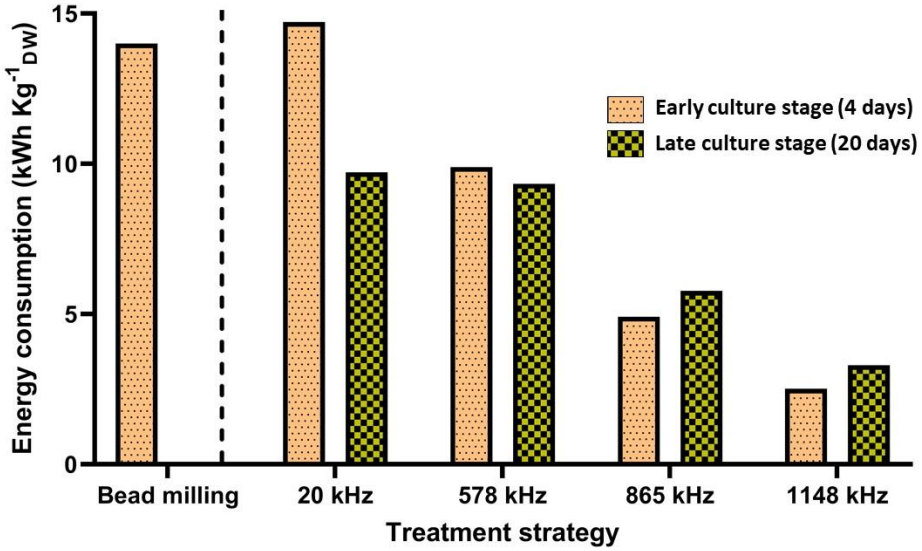
Mild cell disruption



Mild cell disruption







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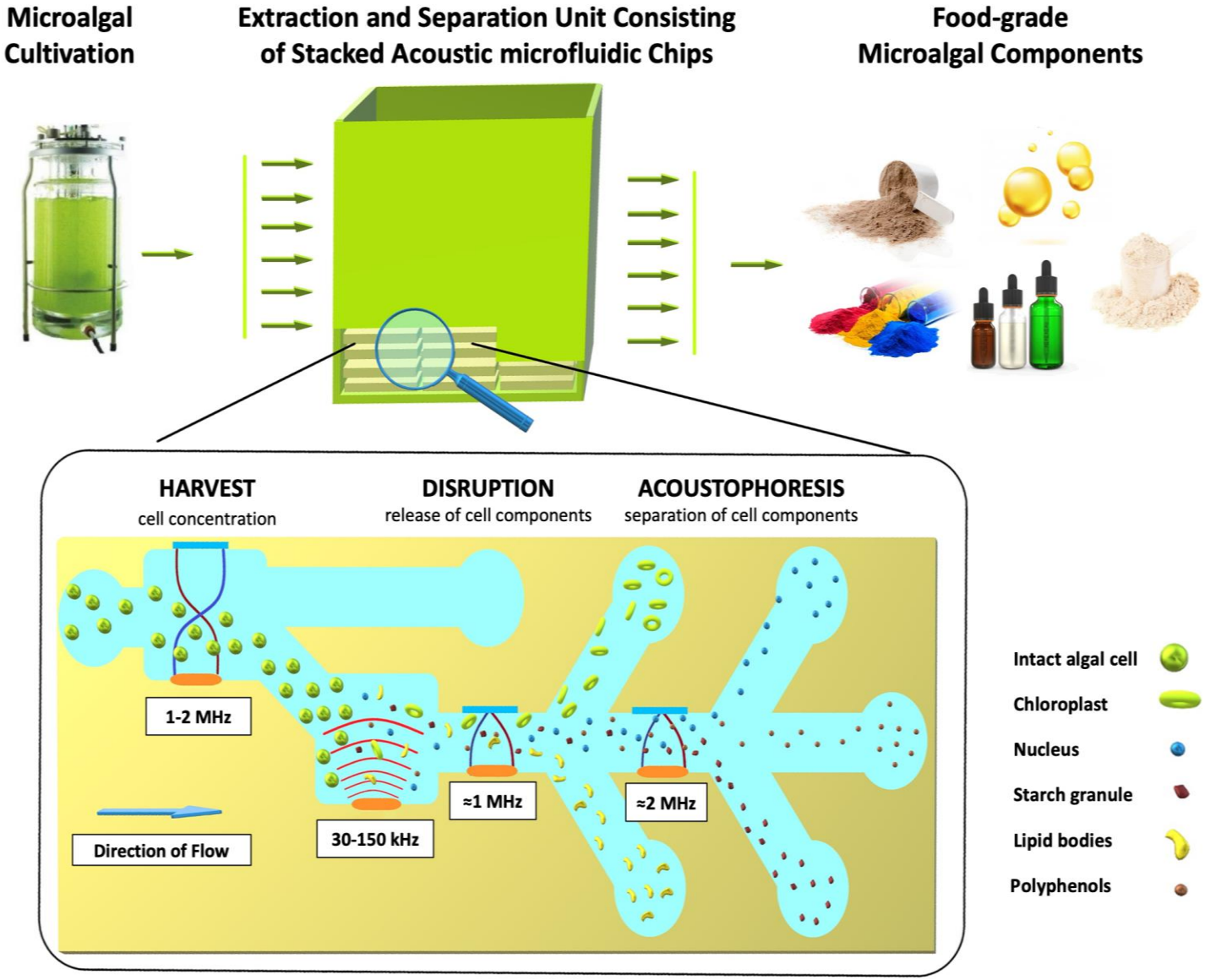
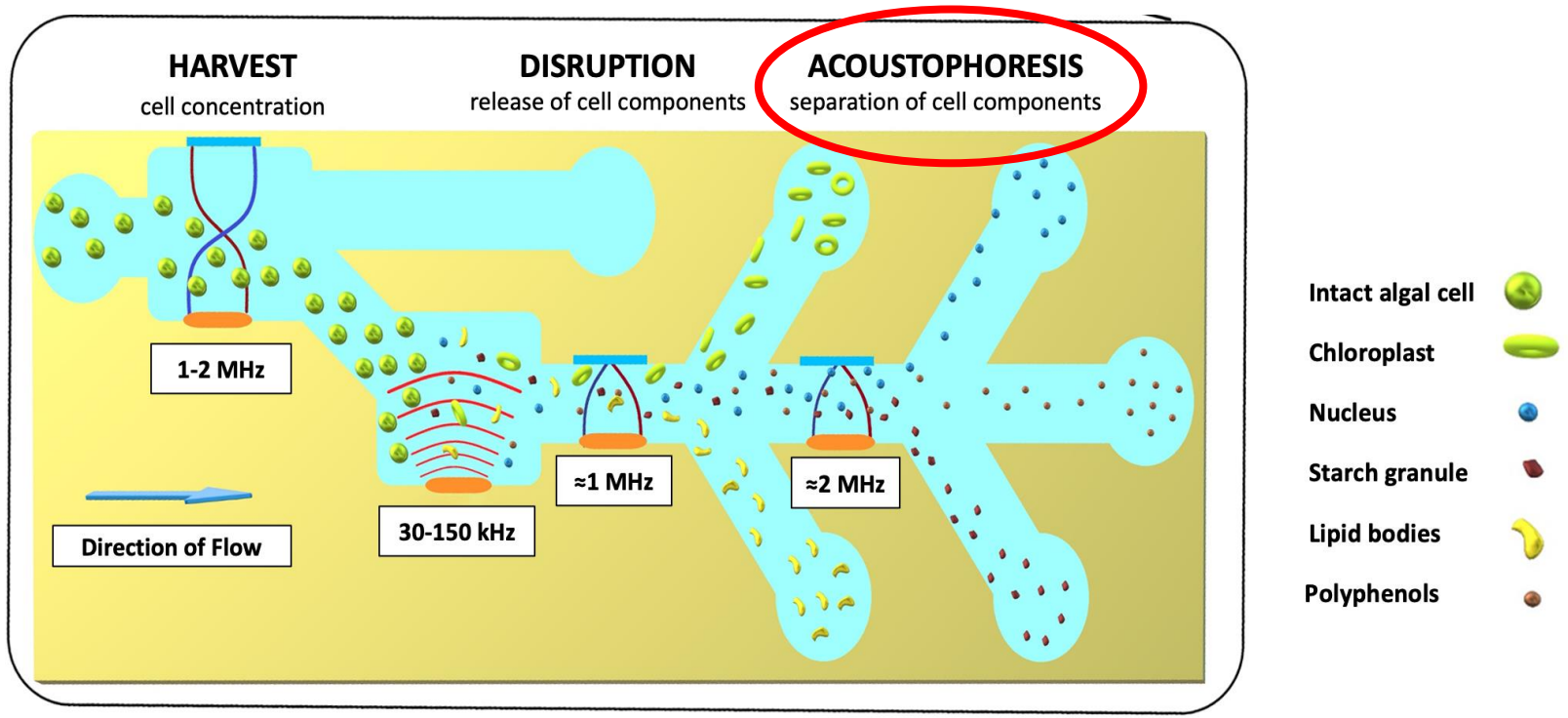
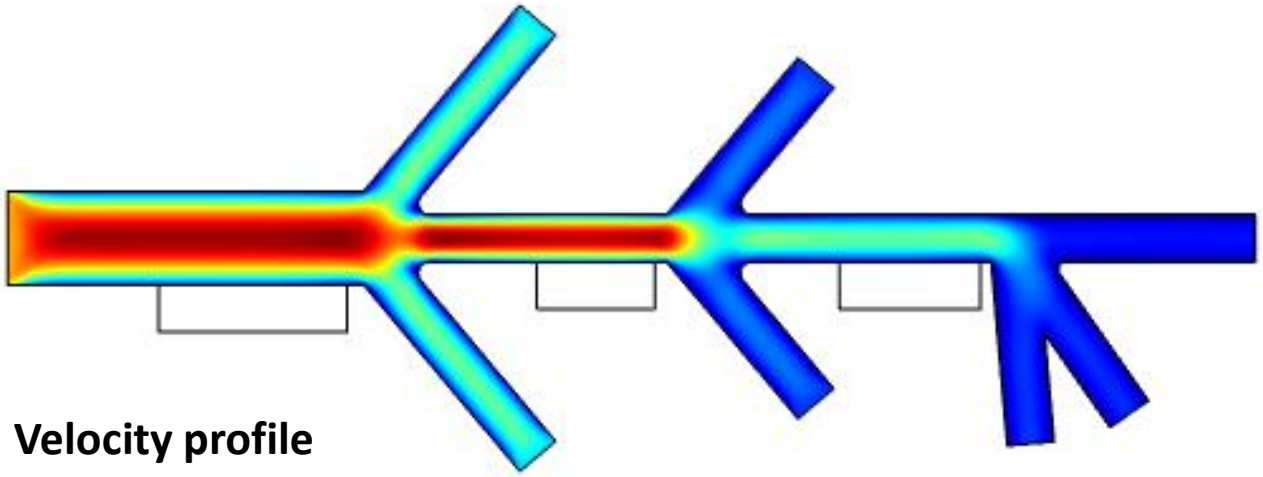


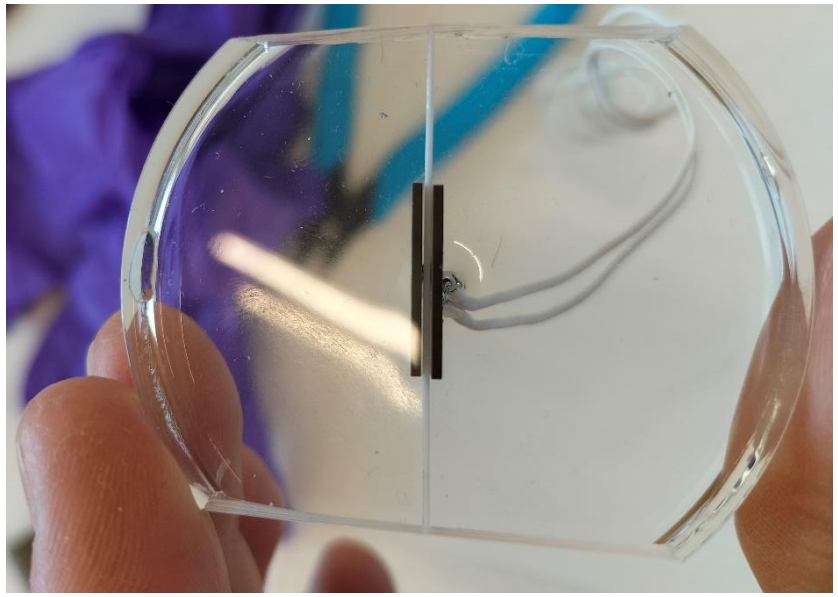
Fractionation of cell components



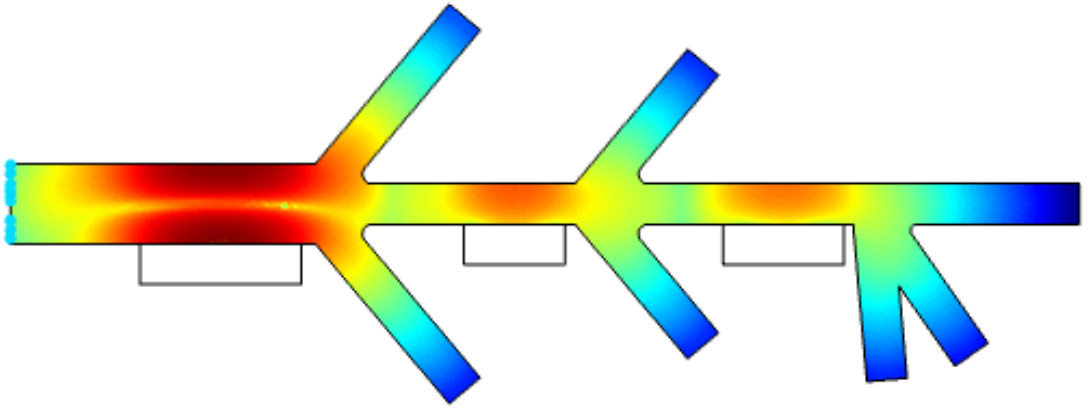
Fractionation of cell components



Velocity profile



Separation chip: Height (focussing domain) = 248 um ; Length (focussing domain) = 1000 um ; Height (separation domain) = 124 um ; Length (separation domain) = 2300 um ; Frequency = 3200 kHz



Acoustic profile + acoustophoresis cell components

MARIE CURIE ACTIONS

NWO

WAGENINGEN UR

European Commission













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