

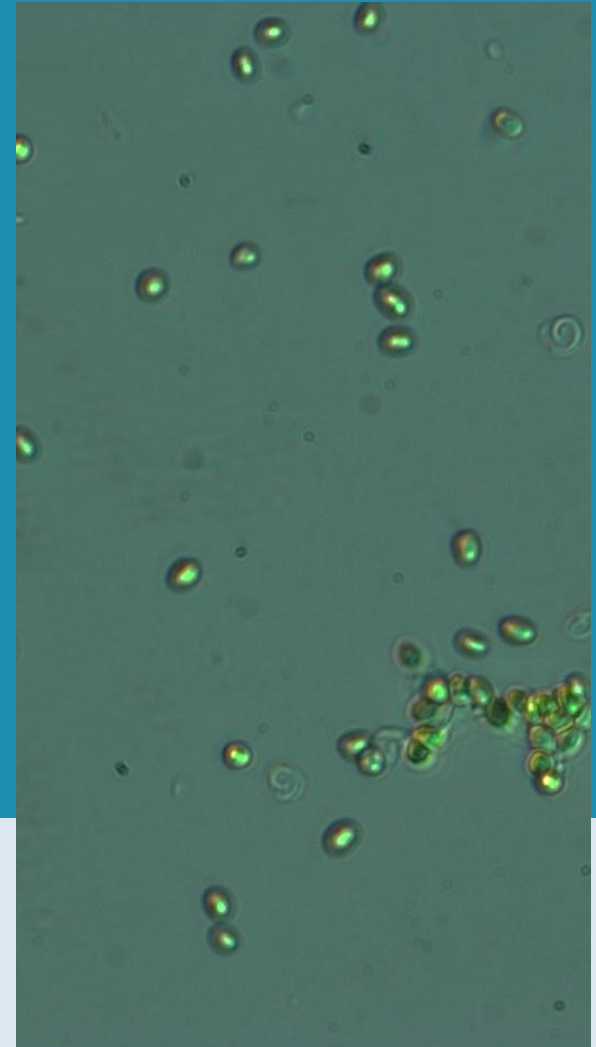
Cationic modified cellulose in downstream microalgae processing

An Verfaillie

Jonas Blockx

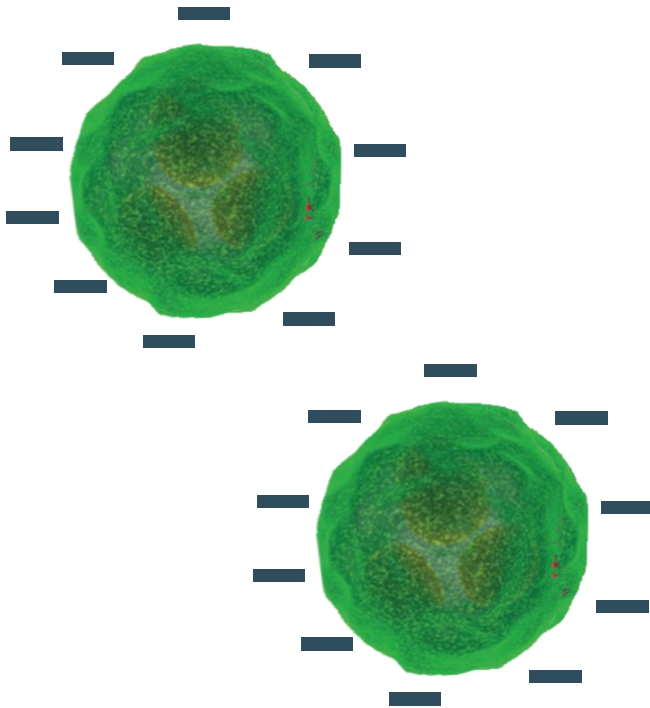
Dr. Praveen Ramasamy

Promotors: Prof. Wim Thielemans & Prof. Koenraad Muylaert

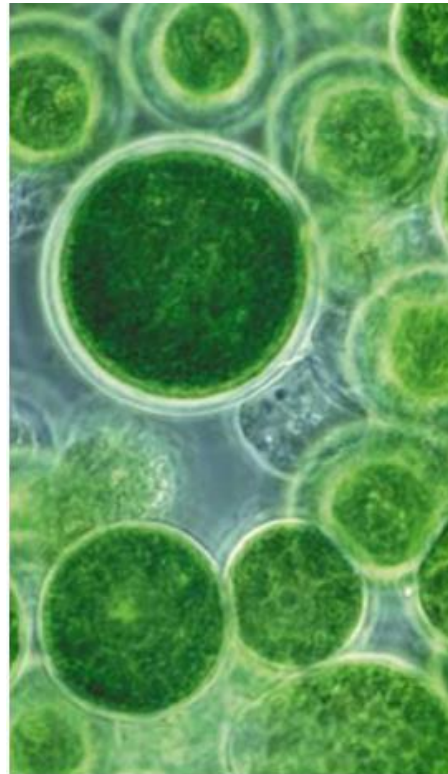


Bottlenecks in microalgae processing

1) Harvest



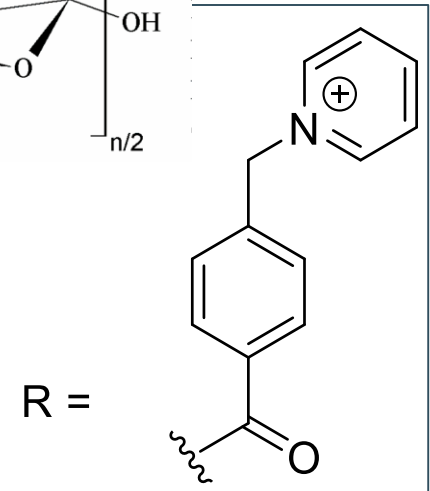
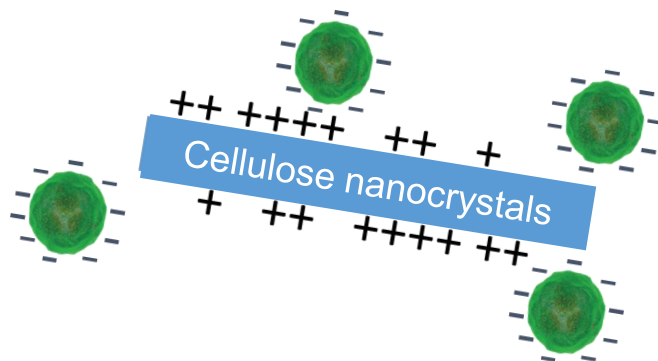
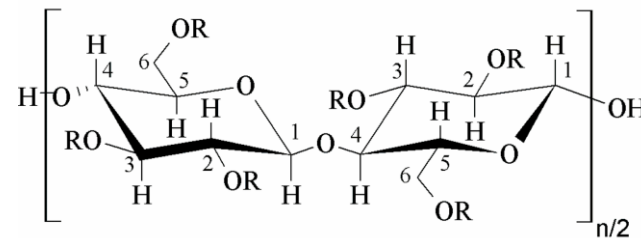
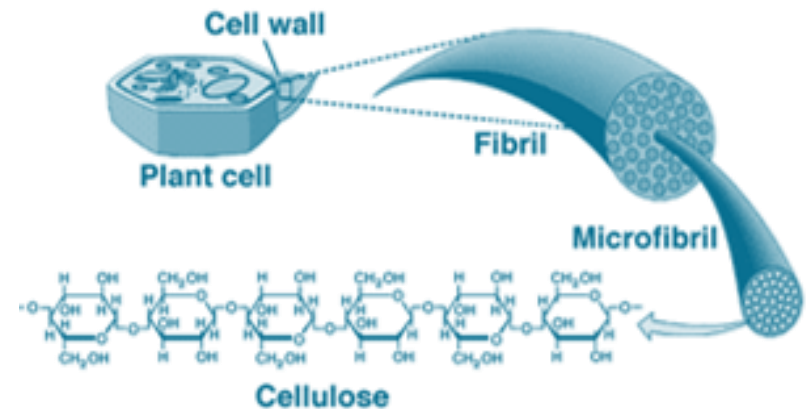
2) Cell disruption



↓ E => ↓ €

Bottlenecks in micro-algae processing

1) Harvest



Bottlenecks in micro-algae processing

1) Harvest

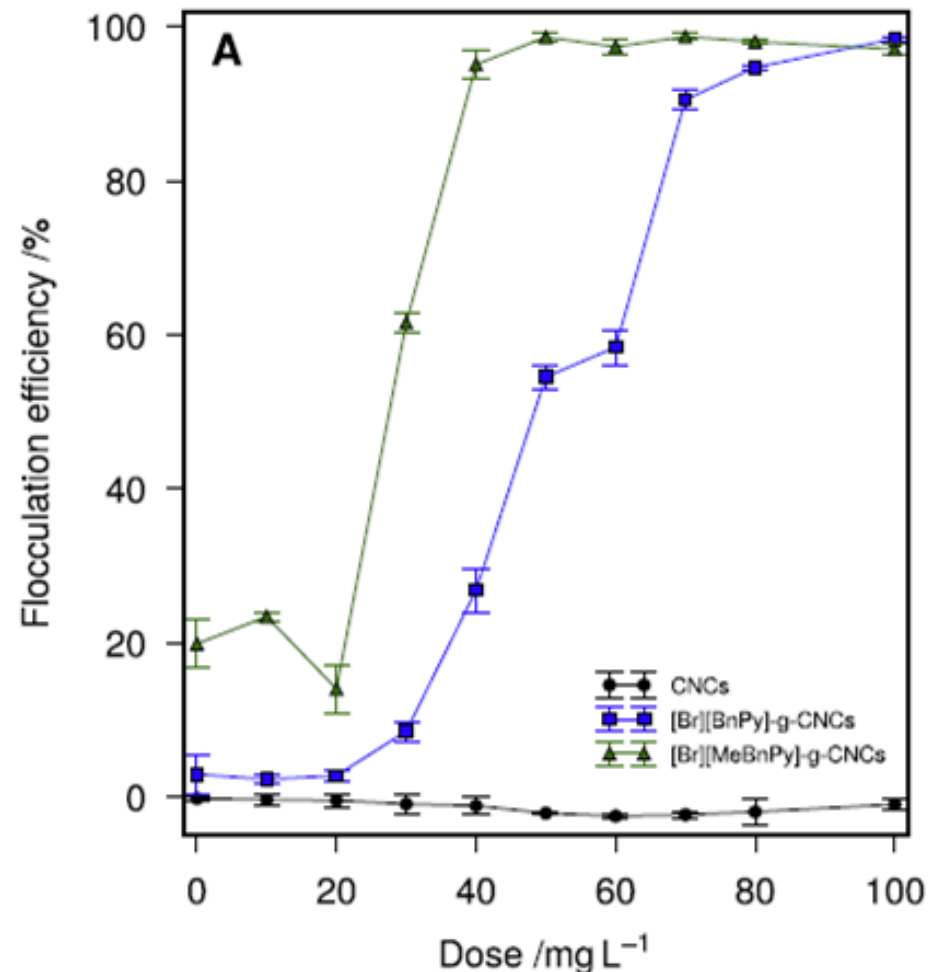


OD₀ OD_f

Degree of substitution

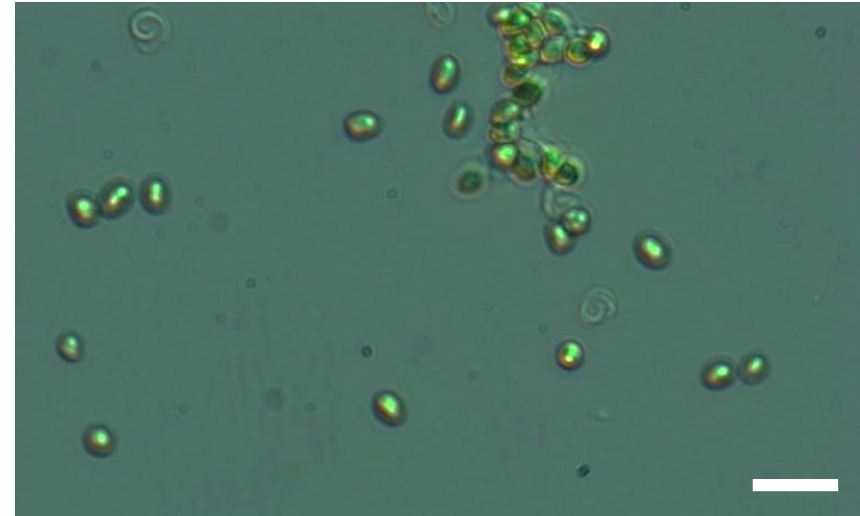
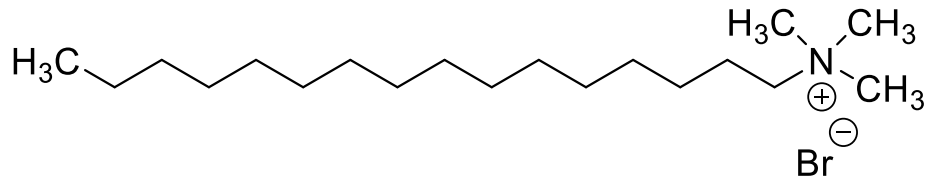
DS = 0.21 DS = 0.38

=> Optimise flocculation based on DS



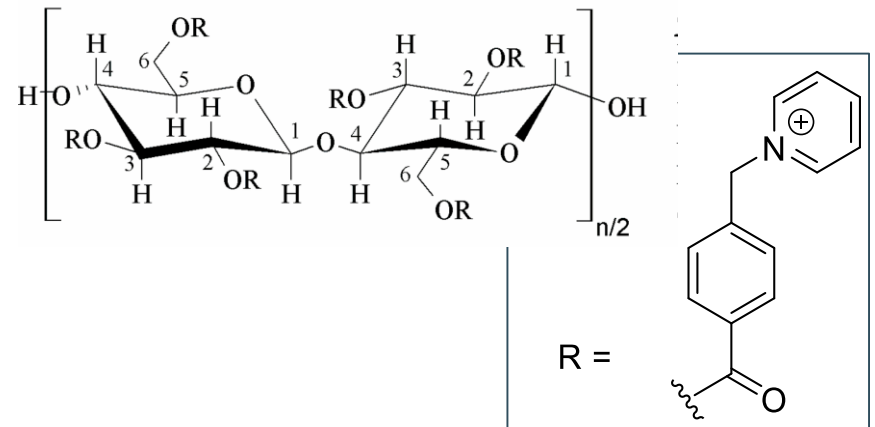
Bottlenecks in micro-algae processing

2) Cell disruption

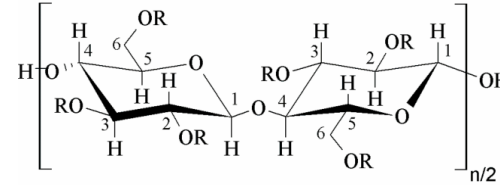
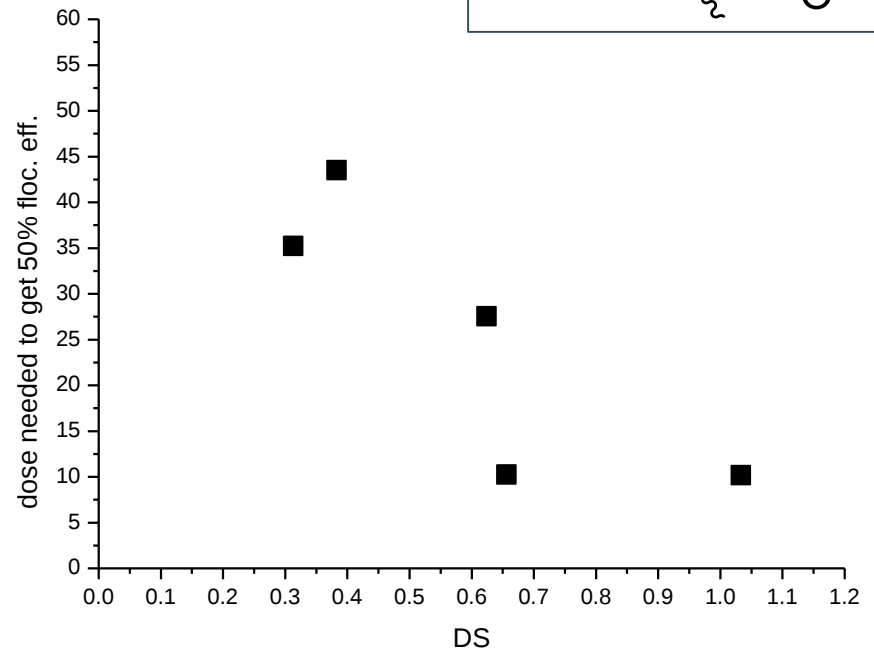
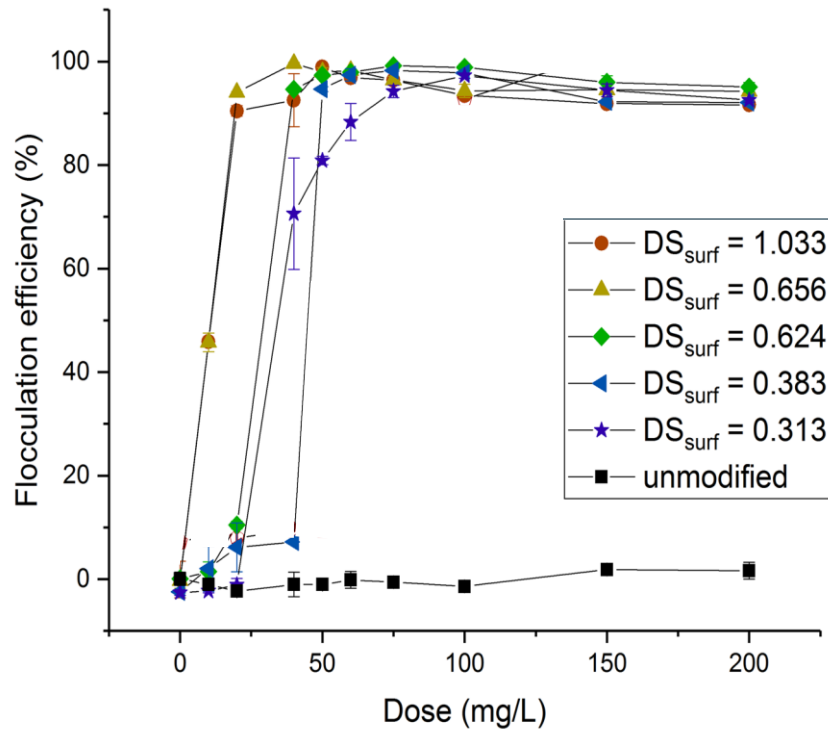


10 μ m

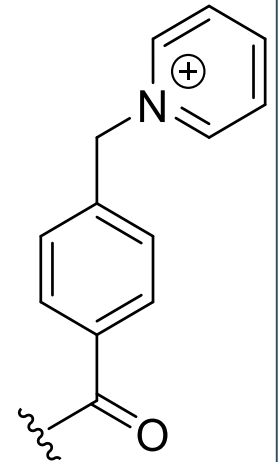
=> Able to disrupt cells?
Sytox GREEN
Mild lipid extraction



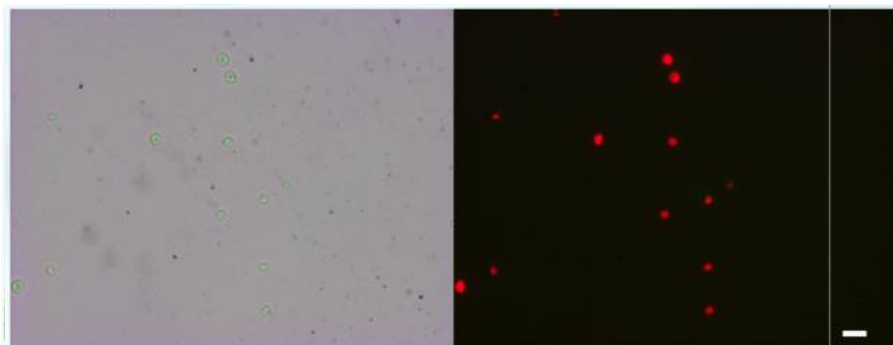
Harvest: effect of DS



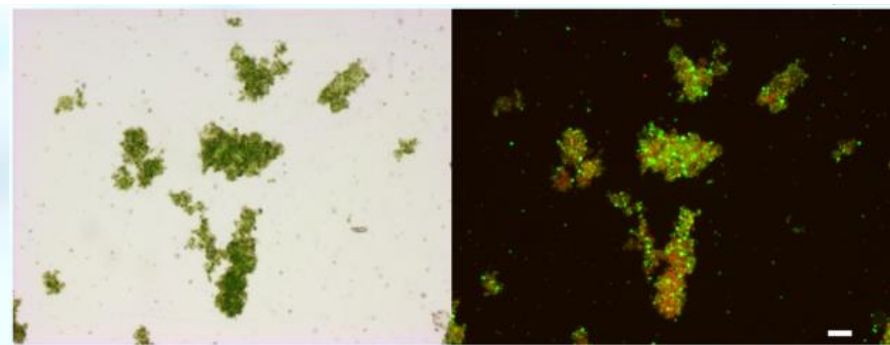
R =



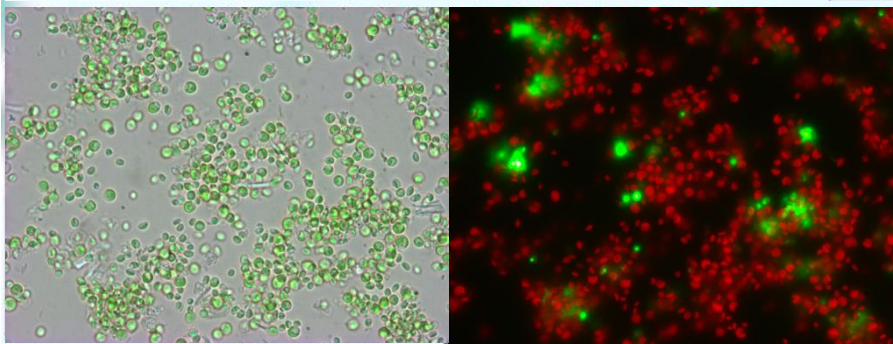
Cell disruption: visual check



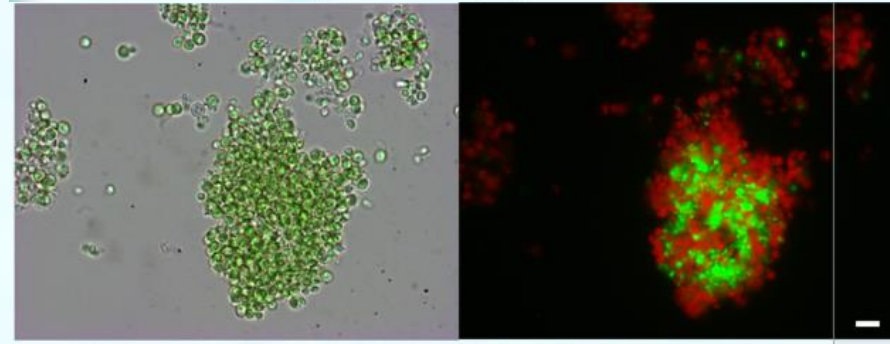
Control (scale: 20 μm)



CTAB harvested cells (scale: 100 μm)

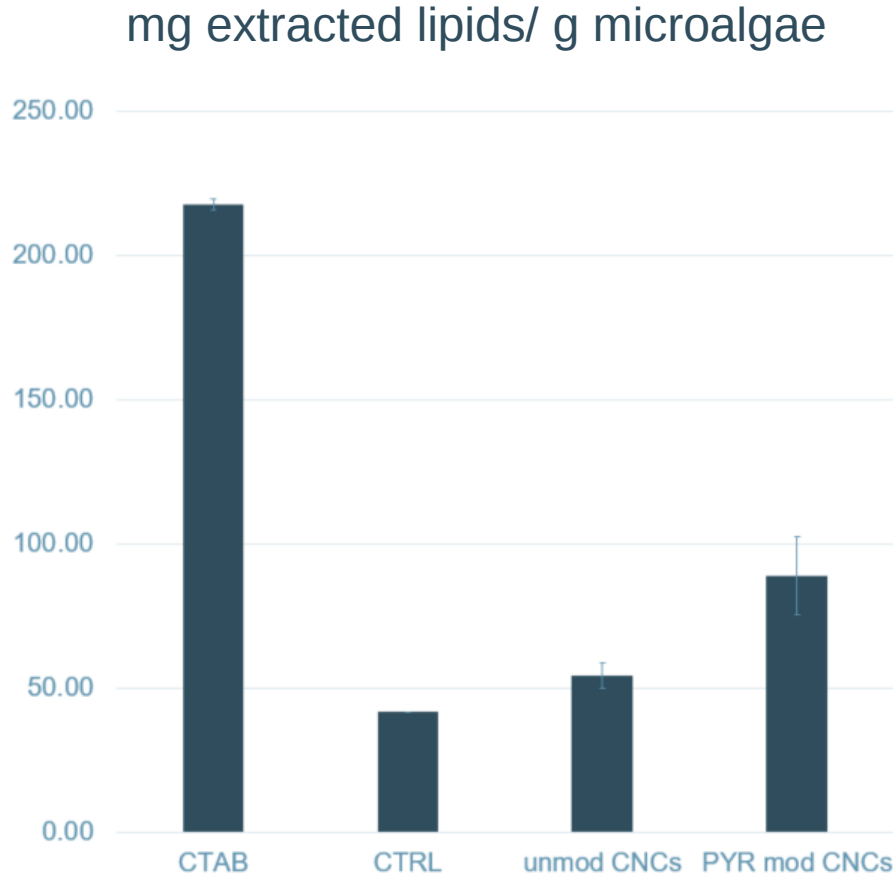


Cells harvested with unmodified CNCs (scale: 20 μm)



Cells harvested with PYR modified CNCs (scale: 20 μm)

Cell disruption: quantification



Lipid extraction
Hexane: isopropanol

Conclusion

- Higher DS = higher flocculation efficiency
- Cell disruption
- Further outlook:

