

# TURNING CONTAMINATION INTO OPPORTUNITY

## Combining low-cost harvesting of microalgae with green extraction methods

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### Global challenge

Nowadays a transition towards green and renewable sources of chemicals is needed. Microalgae can be a fine solution, but on industrial scale microalgae biorefineries need to reduce the costs in the process using cheap and harmful chemicals.

### Towards a sustainable future

In this research we develop green process methodologies while at the same time turning undesired contaminations, caused using cheap chemicals, into valuable products with downstream applications.



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### Cultivation



Our target biomolecule **lutein** is a pigment with light-filtering and anti-oxidant properties. Downstream applications are feed or food related products or treatment for vision-, skin- and neurodegenerative disease.

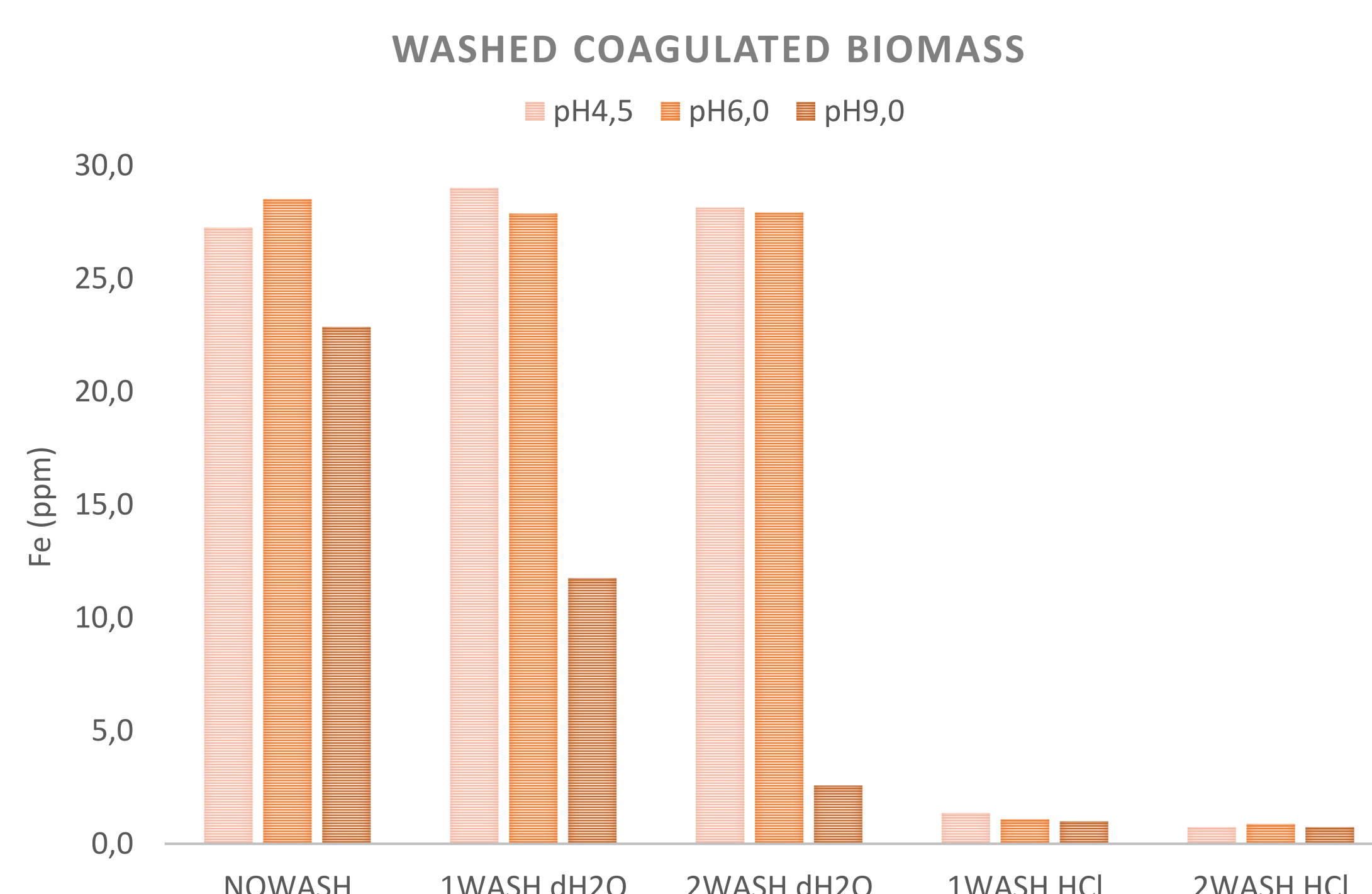
Specific cultivation parameters should be optimized to ensure an enhanced lutein production in our *Chlorella sp.* microalgae.

Using metal salts as coagulant for flocculation, we aim to develop **metal-doped biochar and activated carbon** from the metal-polluted residual biomass.

### Harvesting



Coagulation of *Chlorella sp.* with  $\text{FeCl}_3$   
+  
washing of the biomass with water or acid  
=  
difference in Fe retention



Instead of using harmful standard solvents, we use solvents with sustainable properties as a green extraction method: **natural deep eutectic solvents (NADES)**.

### Extraction



Coagulation of *Chlorella sp.* with  $\text{FeCl}_3$   
+  
treatment of the biomass with hydrophobic or hydrophilic DES  
=  
difference in Fe affinity

