

# THE POTENTIAL OF ALGAE AS AN AQUAFEED INGREDIENT

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# Awaken New Depths

7 JUNE 2024

UN World Oceans Day 2024 is hosted by the Division for Ocean Affairs and the Law of the Sea of the Office of Legal Affairs (DOALOS) in partnership with and made possible by Oceanic Global.

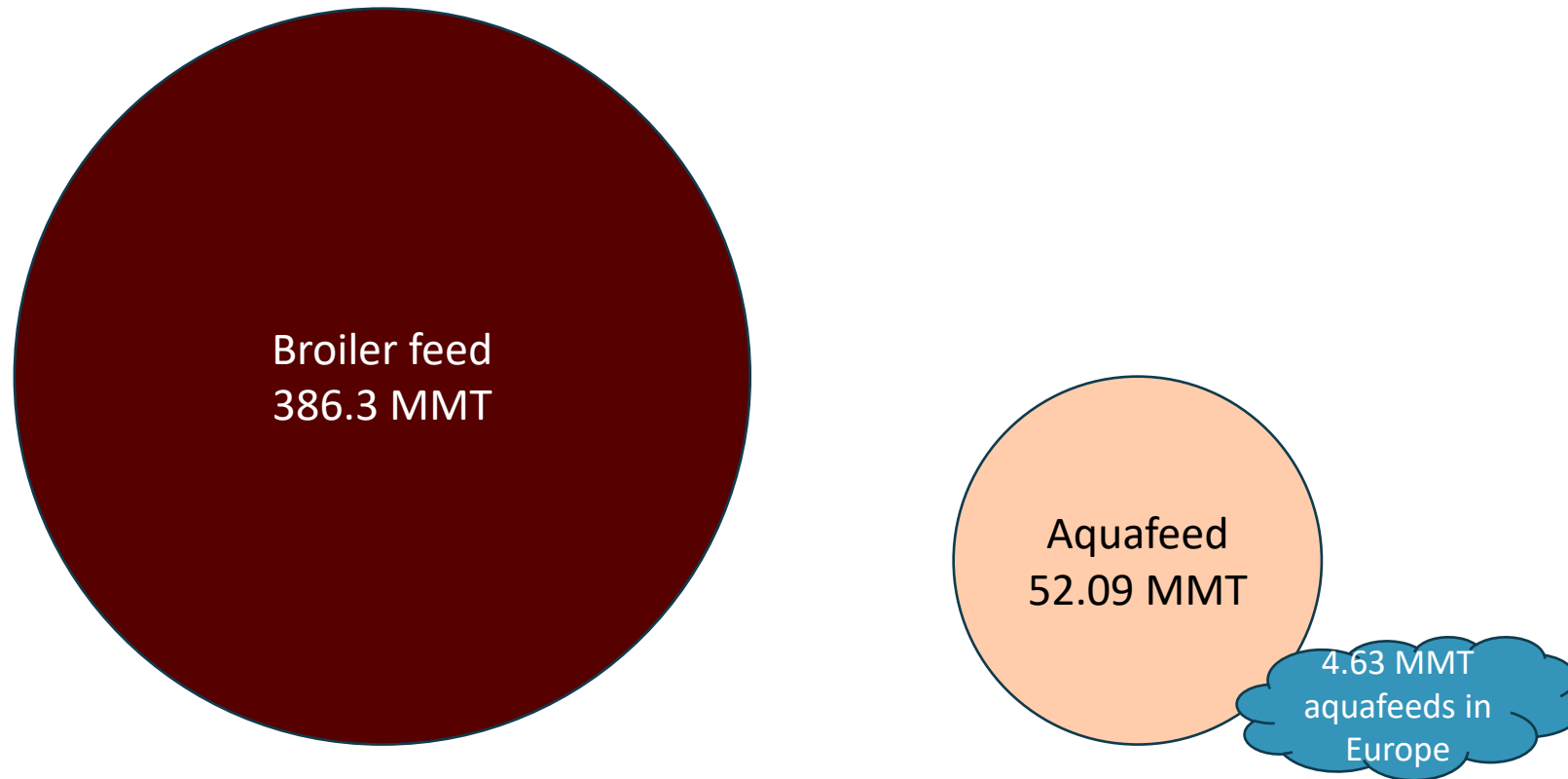


We don't have time for **"out of sight out of mind."**  
If the world is numb to numbers, motivating momentum will require opening minds, igniting senses, and inspiring possibilities to protect our planet's beating heart. We need to **awaken new depths** within our own.

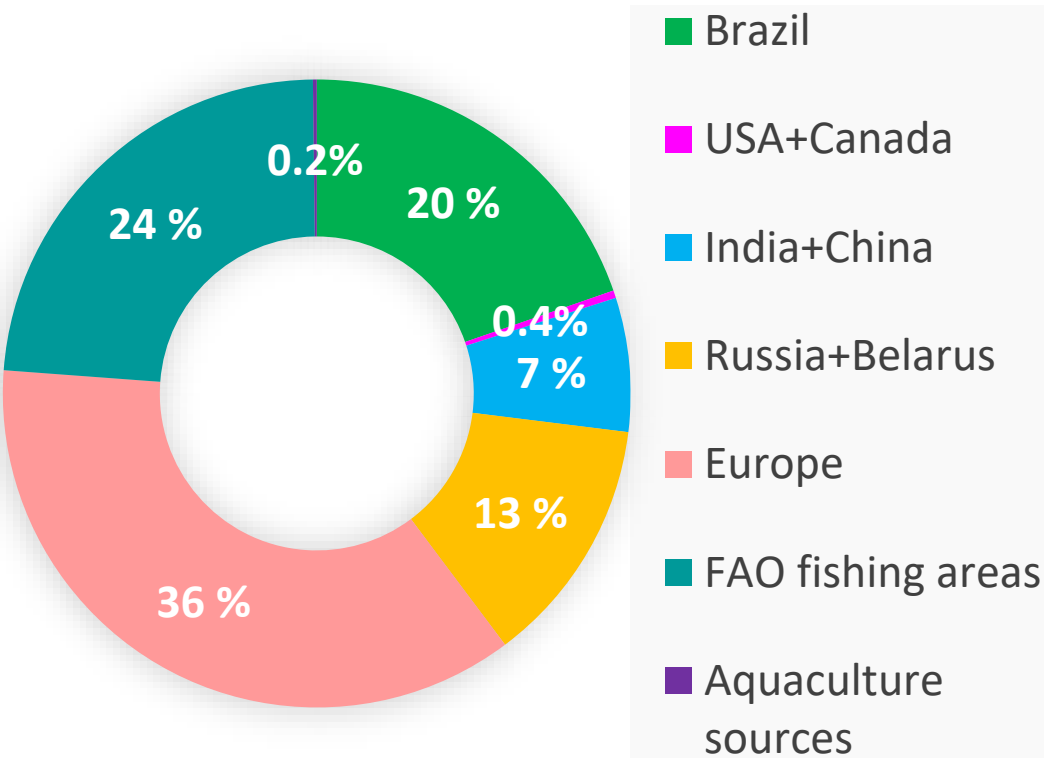
## Sustainability



# Aquafeed production compared to broiler feeds



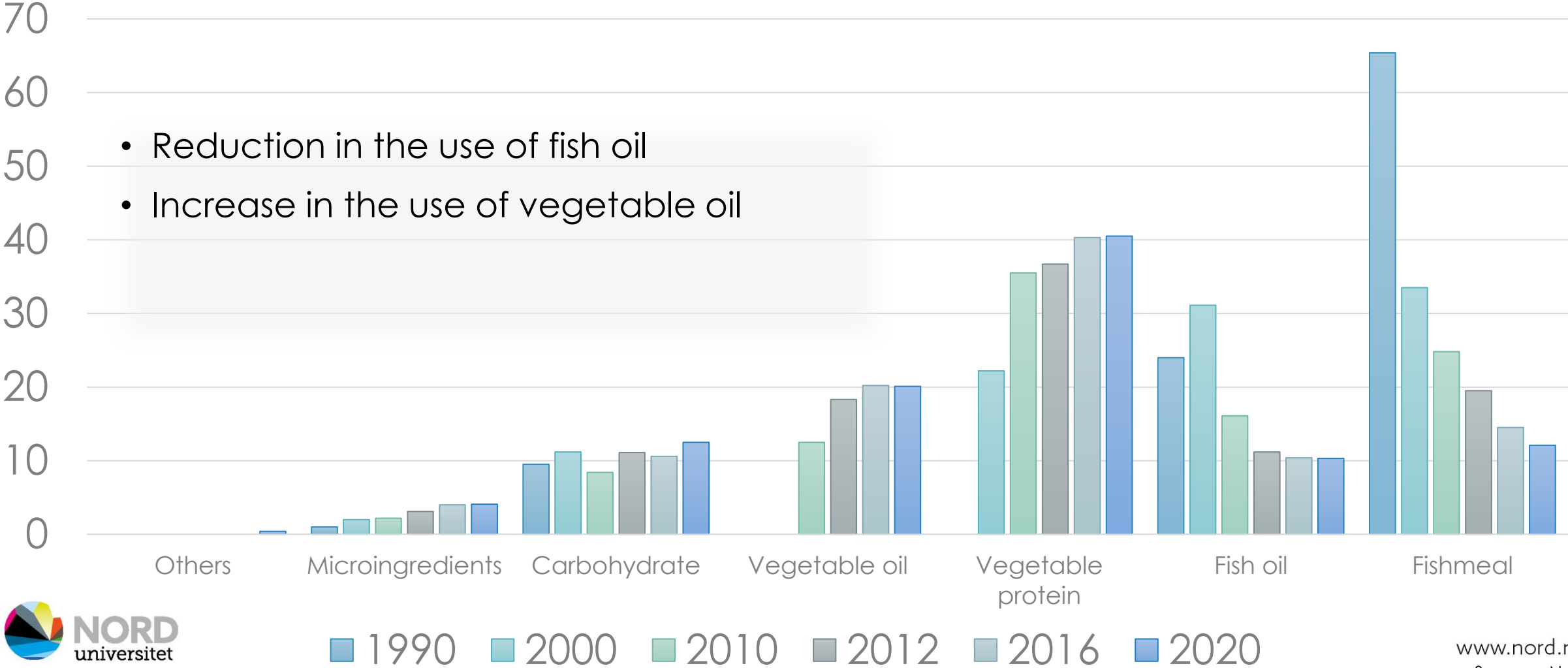
# The path to sustainability – low trophic, locally sourced ingredients



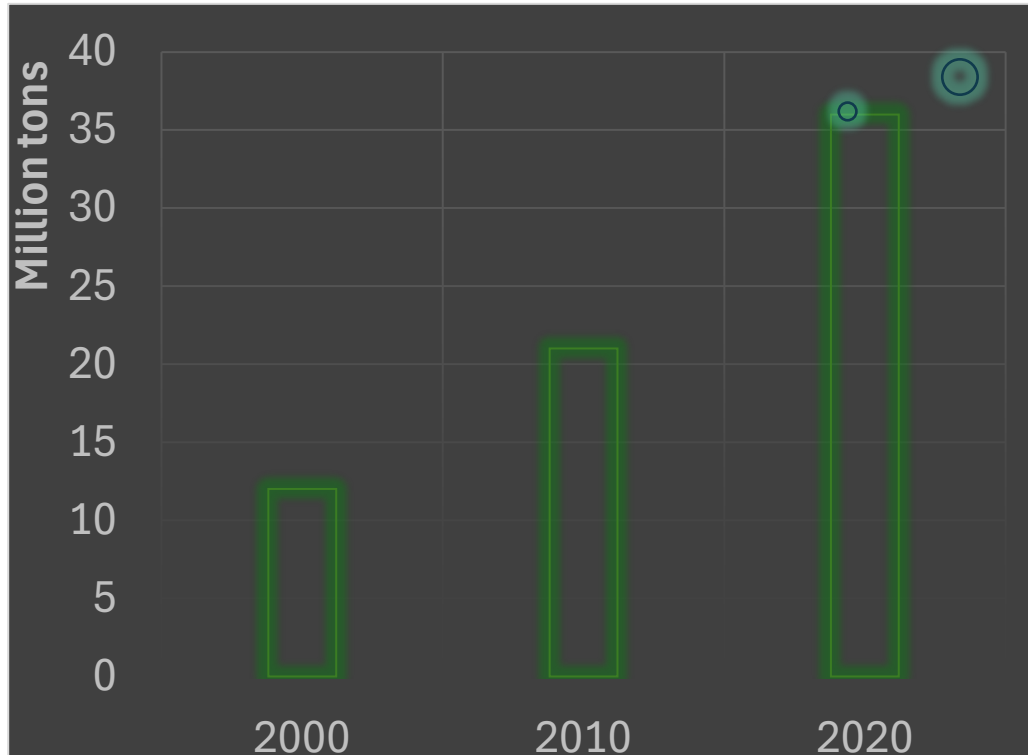
In 2020, 92% of ingredients were imported to produce 1.8 MT of Norwegian salmon feed



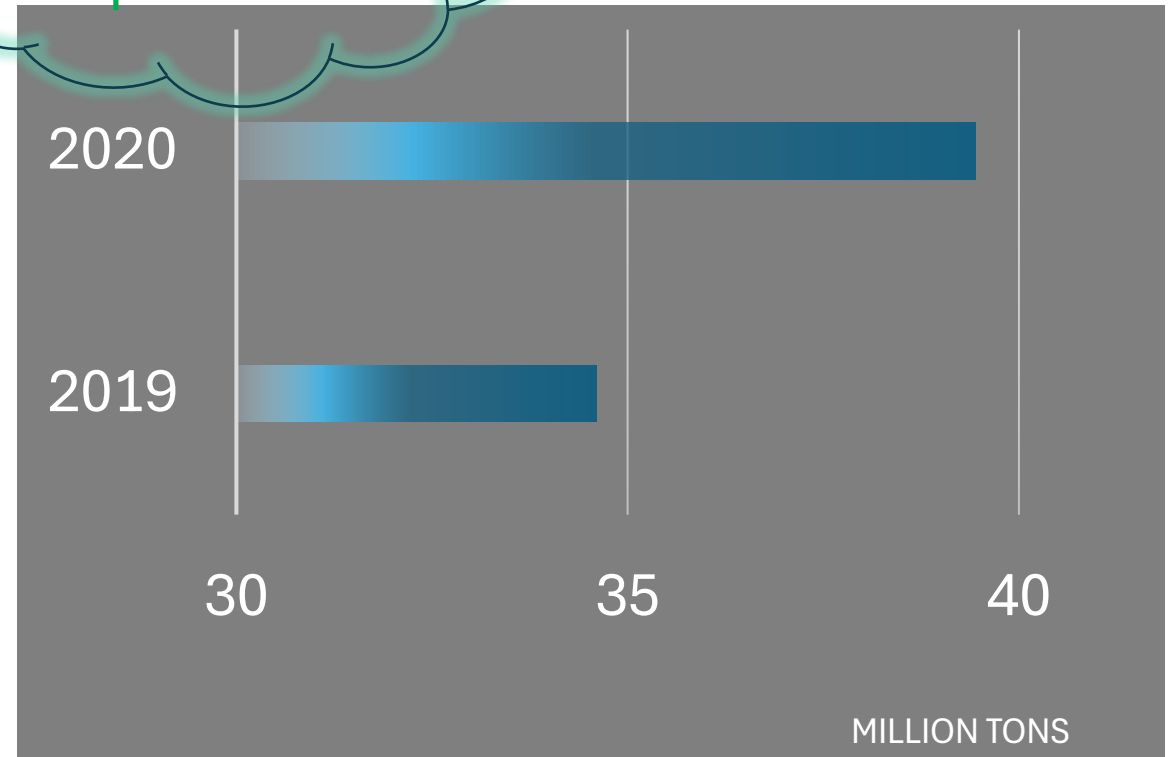
# Shift in constituents of salmon feeds



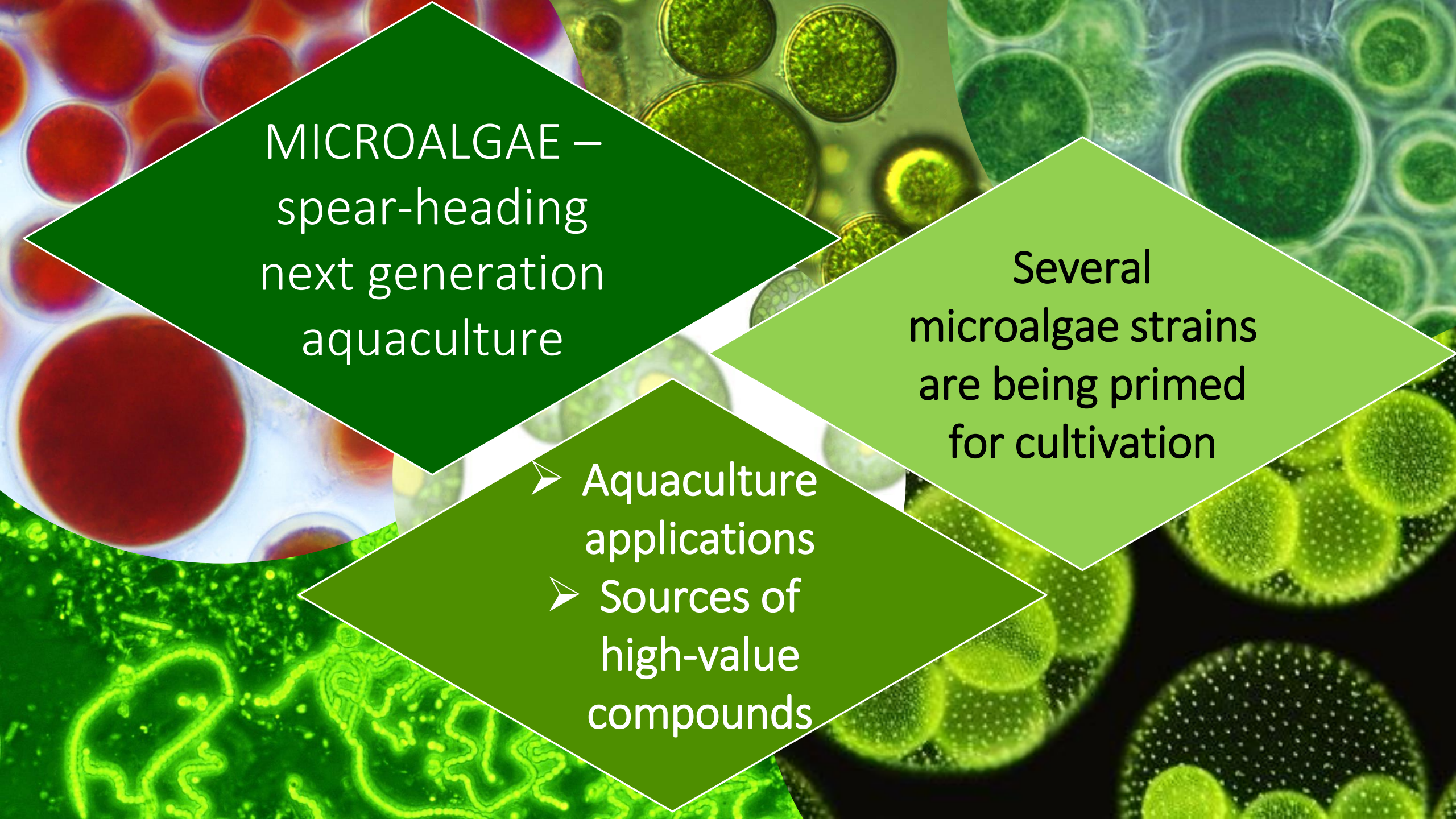
# Global algal production



97% from aquaculture







MICROALGAE –  
spear-heading  
next generation  
aquaculture

Several  
microalgae strains  
are being primed  
for cultivation

- Aquaculture applications
- Sources of high-value compounds



# Microalgae in aquafeeds



Pacific white shrimp



Atlantic salmon



Common carp



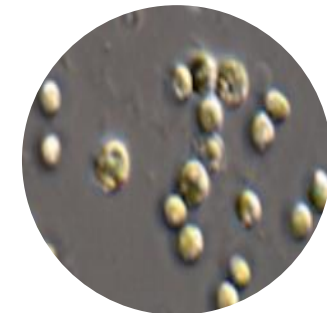
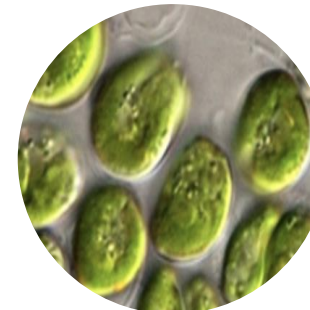
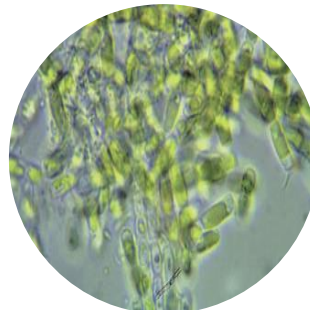
Wolffish



Red sea bream



European seabass





# Microalgae considered for use in aquafeeds

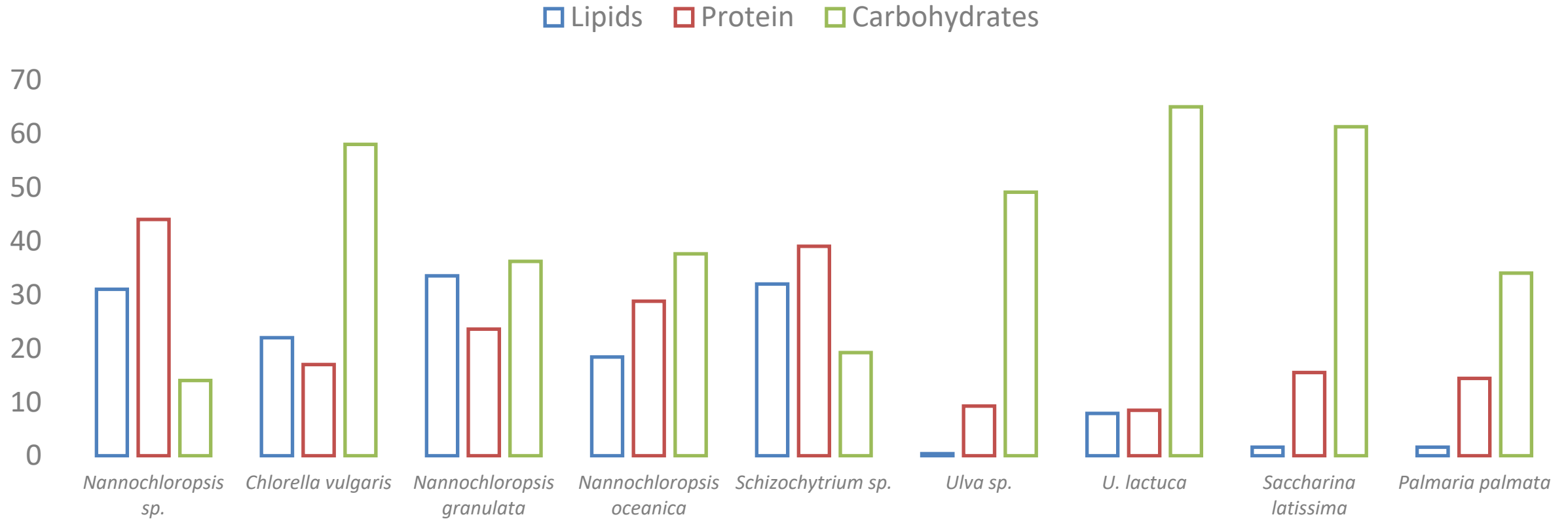
## Whole algae - No prior processing

- *Nannochloropsis oceanica*
- *Phaeodactylum tricornutum*
- *Scenedesmus* sp.
- *Chlorella* sp.
- *Tetraselmis chuii*

## Processed algae – defatted, broken, extruded

- *Nannochloropsis* sp.
- *Nanofrustulum* sp.
- *Desmodesmus* sp.
- *Tetraselmis* sp.

# Nutrient content in selected species of micro- and macroalgae tested in aquafeeds

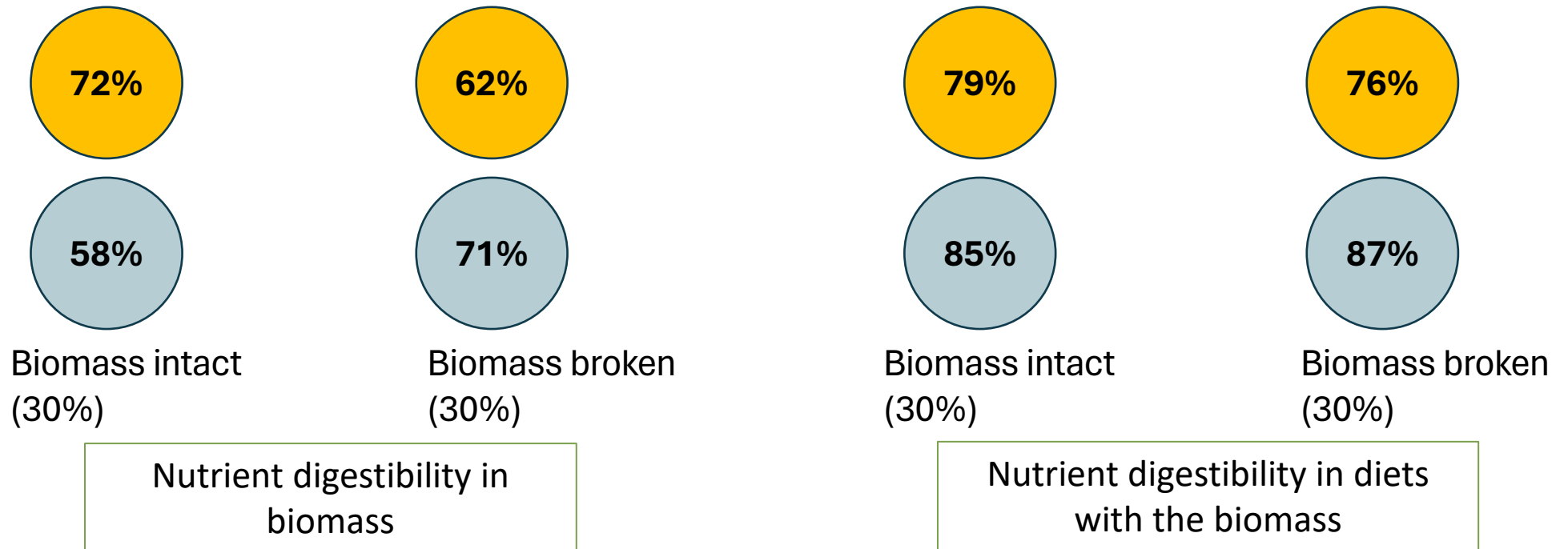


# Microalgae in salmon feeds



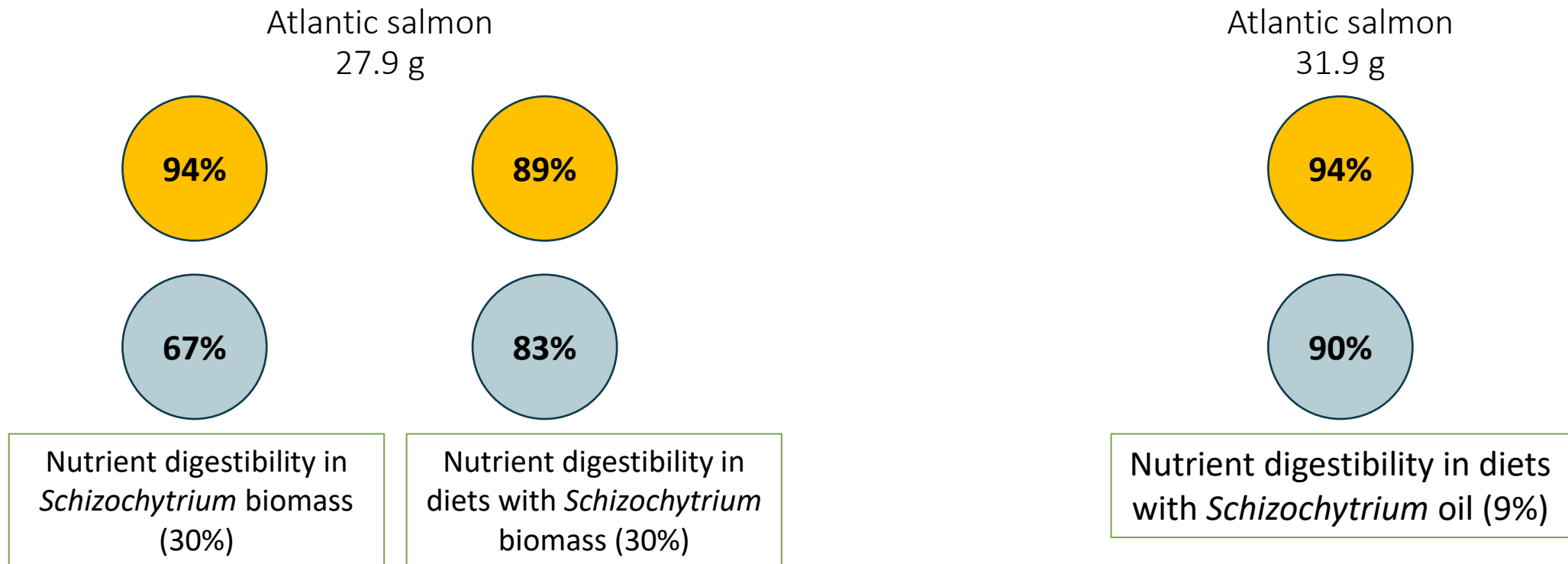
# Digestibility of macronutrients from *Phaeodactylum tricornutum*

Atlantic salmon (315 g)





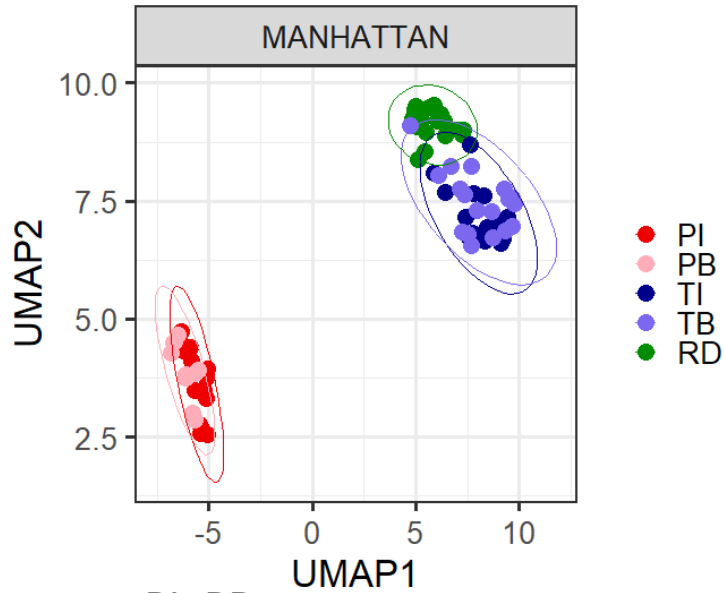
# Digestibility of macronutrients from *Schizochytrium* sp.



# Microalgae as a source of bioactive compounds

- Phytochemicals capable of regulating metabolic functions and leading to beneficial effects; or having therapeutic potential
- Effects – antioxidant, anti-inflammatory, antimicrobial or modulating metabolic processes
  - Polyunsaturated fatty acids
  - Carotenoids
  - Polyphenols
  - Glucans

# *Phaeodactylum* sp. in salmon feeds improves pigmentation



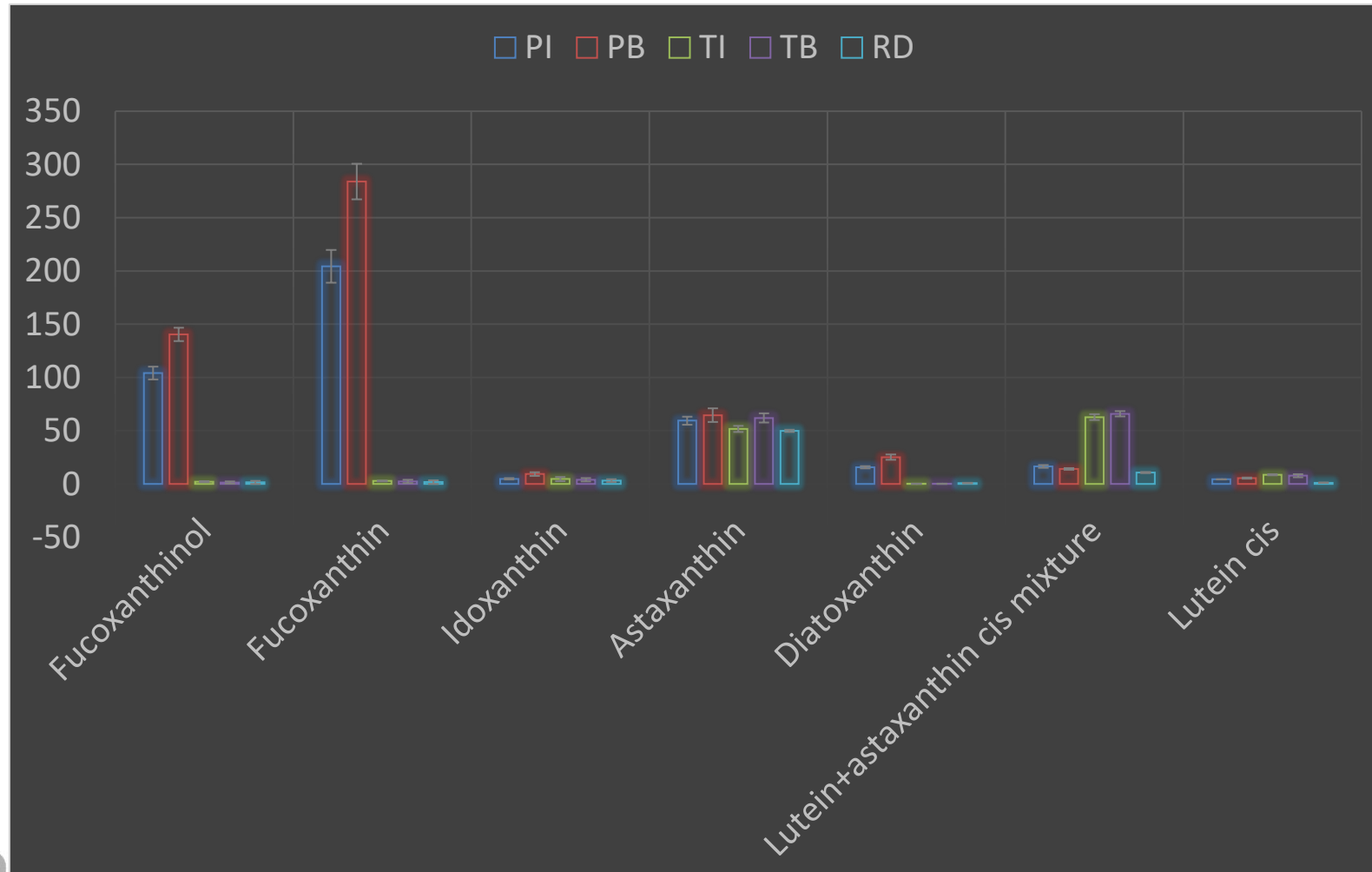
PI, PB:  
*Phaeodactylum* fed  
groups  
TI, TB: *Tetraselmis*  
fed groups  
RD- Reference diet  
fed group

- Skin and flesh colour of salmon fed a reference diet (left) or a *Phaeodactylum tricornutum* broken (right) diet.



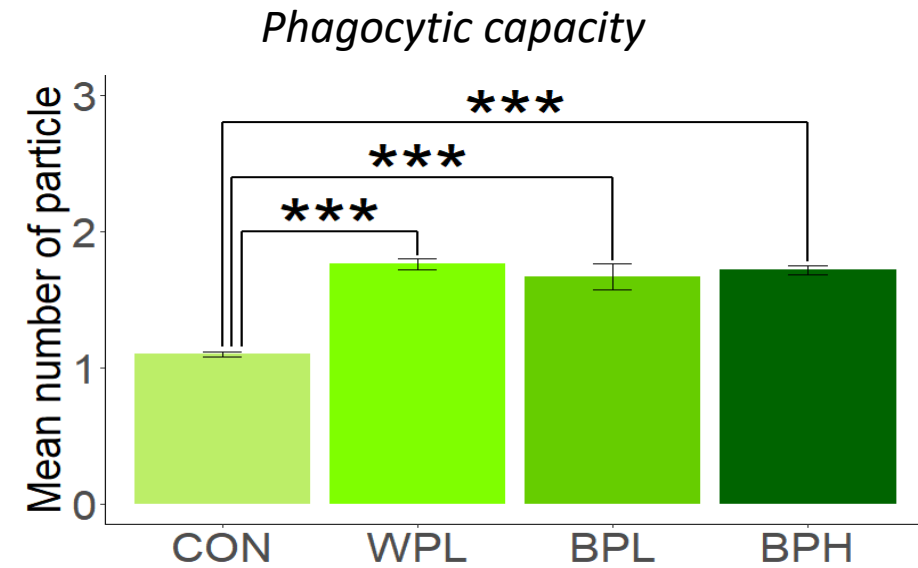
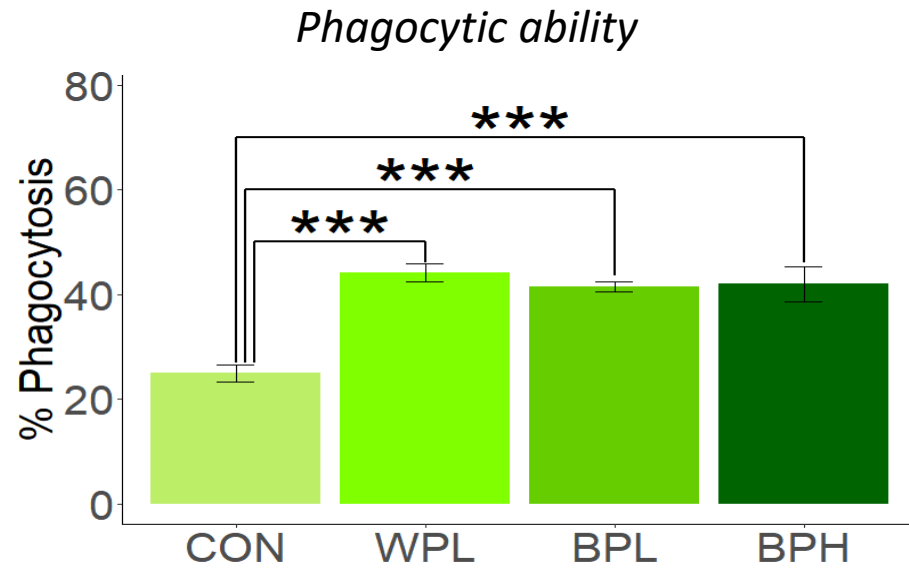


# *Phaeodactylum tricornutum* - Pigment accumulation in salmon flesh

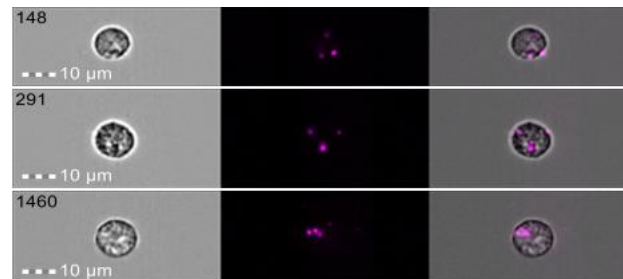




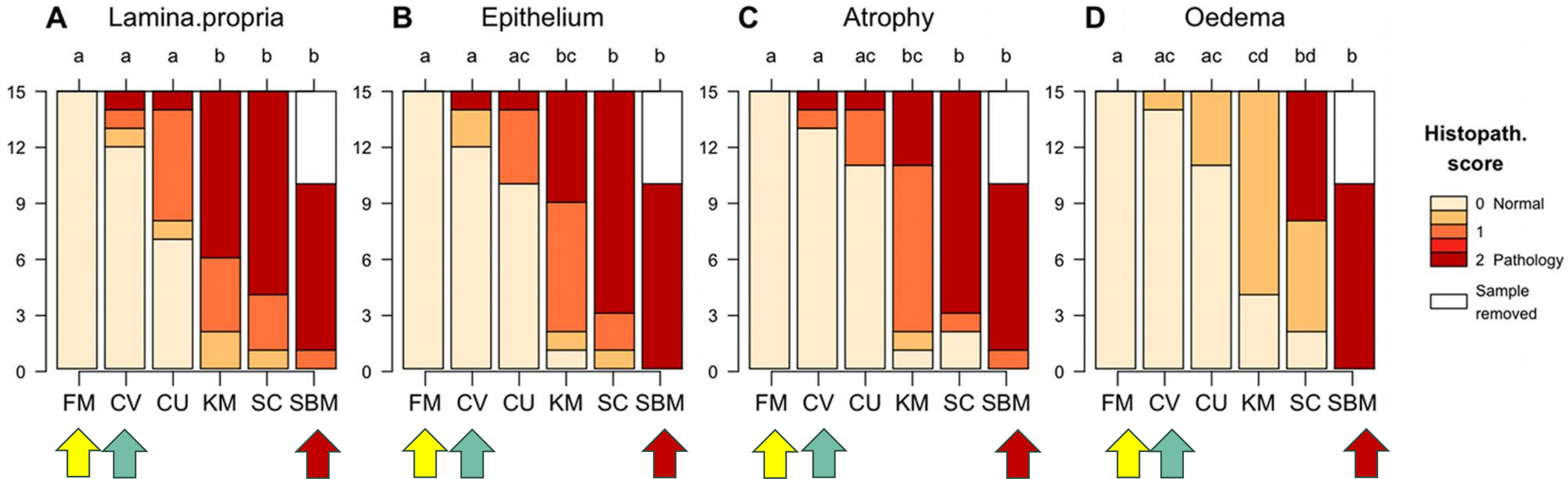
# *Phaeodactylum* sp. in salmon feeds – enhancing immune cell functions



Feed without algae: CON; *Phaeodactylum* containing feeds: WPL, BPL, BPH



# *Chlorella vulgaris*: to counter intestinal inflammation in Atlantic salmon



# Algae in aquafeeds

Microalgae and macroalgae biomass as ingredients  
Extracts/derivatives as functional components

Bottlenecks – volumes available and prices

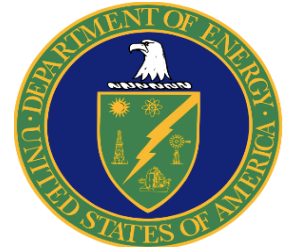
EU's initiative to promote algae as an aquafeed ingredient.

# Thank you

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**2017-2021:** Marine Algae  
Industrialisation Consortium



**2017-2021**



**2016-2020:** MARINALGA4Aqua  
(Alger4laks)

