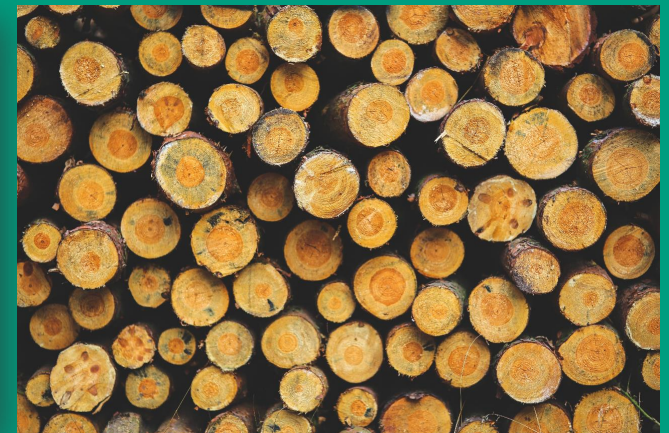
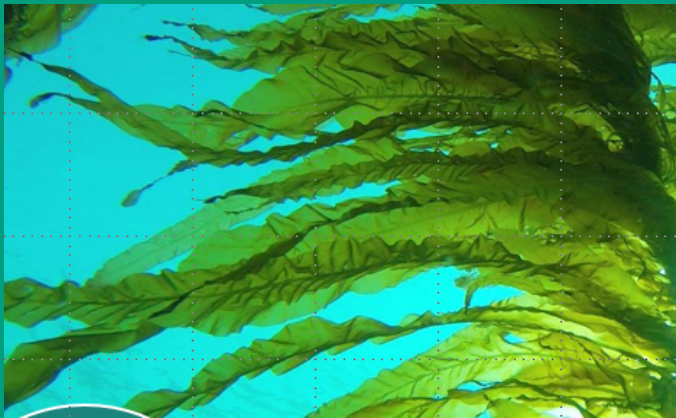


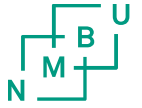
Foods of Norway – from wood to feed

Gro Steine, Norwegian University of Life Sciences



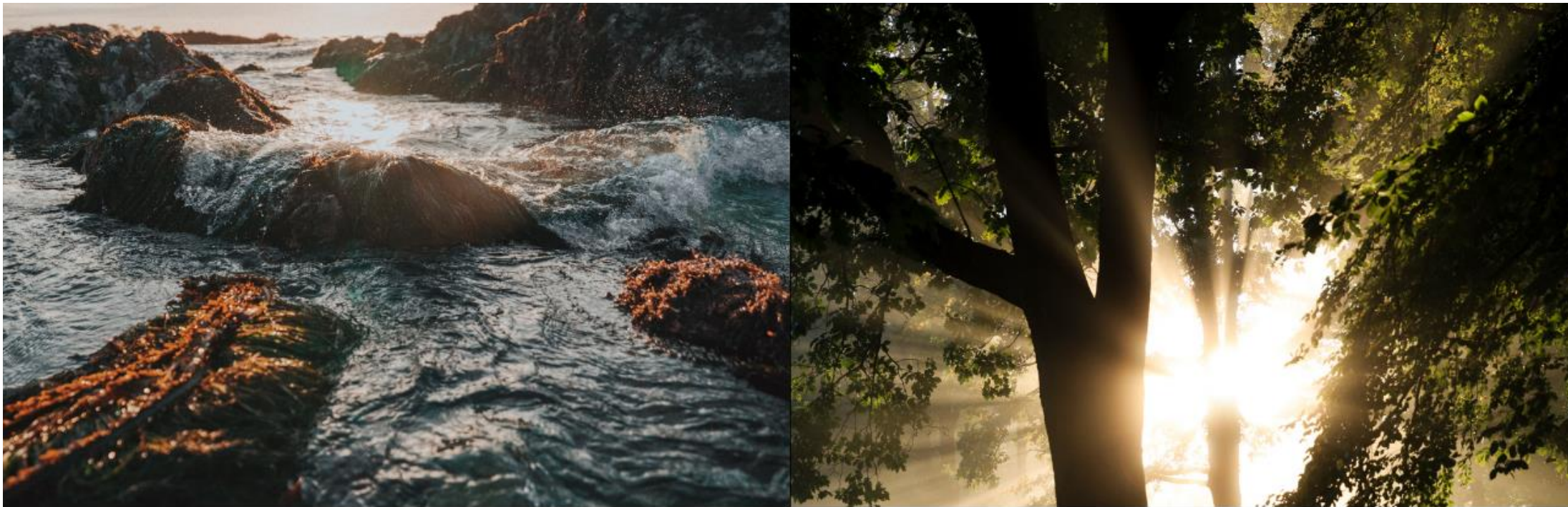
Barents Forest Forum 2019

Umeå, Sweden, 16 October, 2019



Outline

- **Short introduction and background of Foods of Norway**
 - Production of feed from wood
 - Results from feeding trials
 - Status and future perspectives
-



FOODS_FNORWAY aims to feed fish and farm animals using sustainable new ingredients

Duration: 2015-2024 Finance: € 21.5 Million

Industrial partners



Supporting partners



New partner



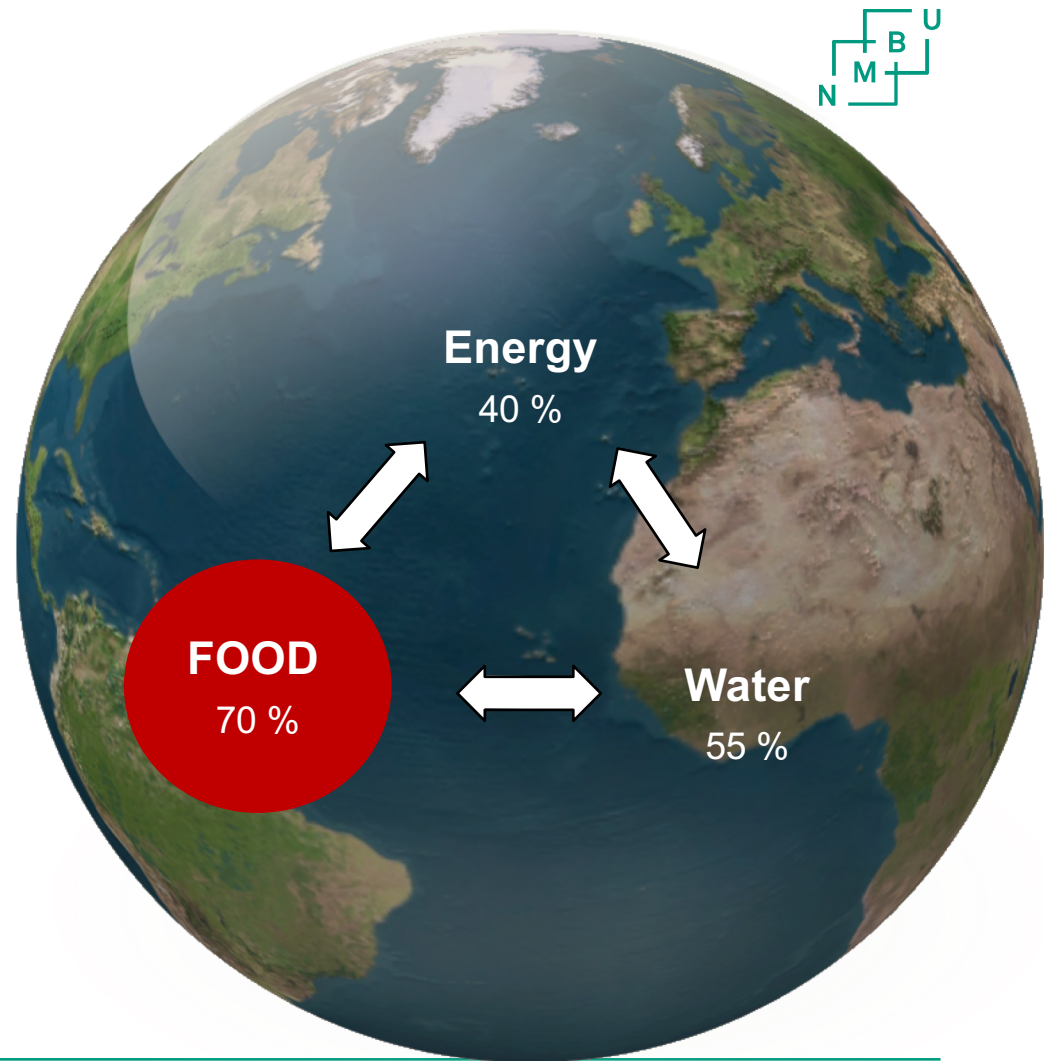
Academic partners and collaborators



Food security and climate

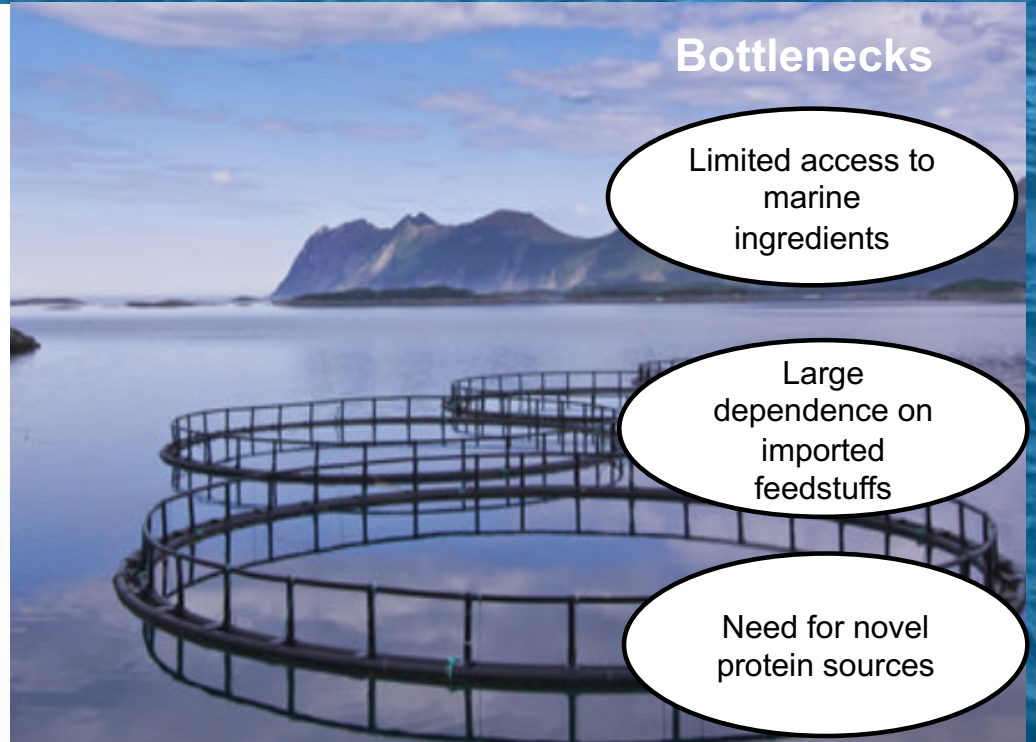
Challenges:

- 2050 ~ 9.7 billion people
- Climatic changes
- Political instability
- Disruption of feed supply chains
- Overreliance on imported feed resources



(FAO 2009; OECD 2012)

Constraints in the growth of the Aquacultural industry



Bottlenecks

Limited access to
marine
ingredients

Large
dependence on
imported
feedstuffs

Need for novel
protein sources



Outline

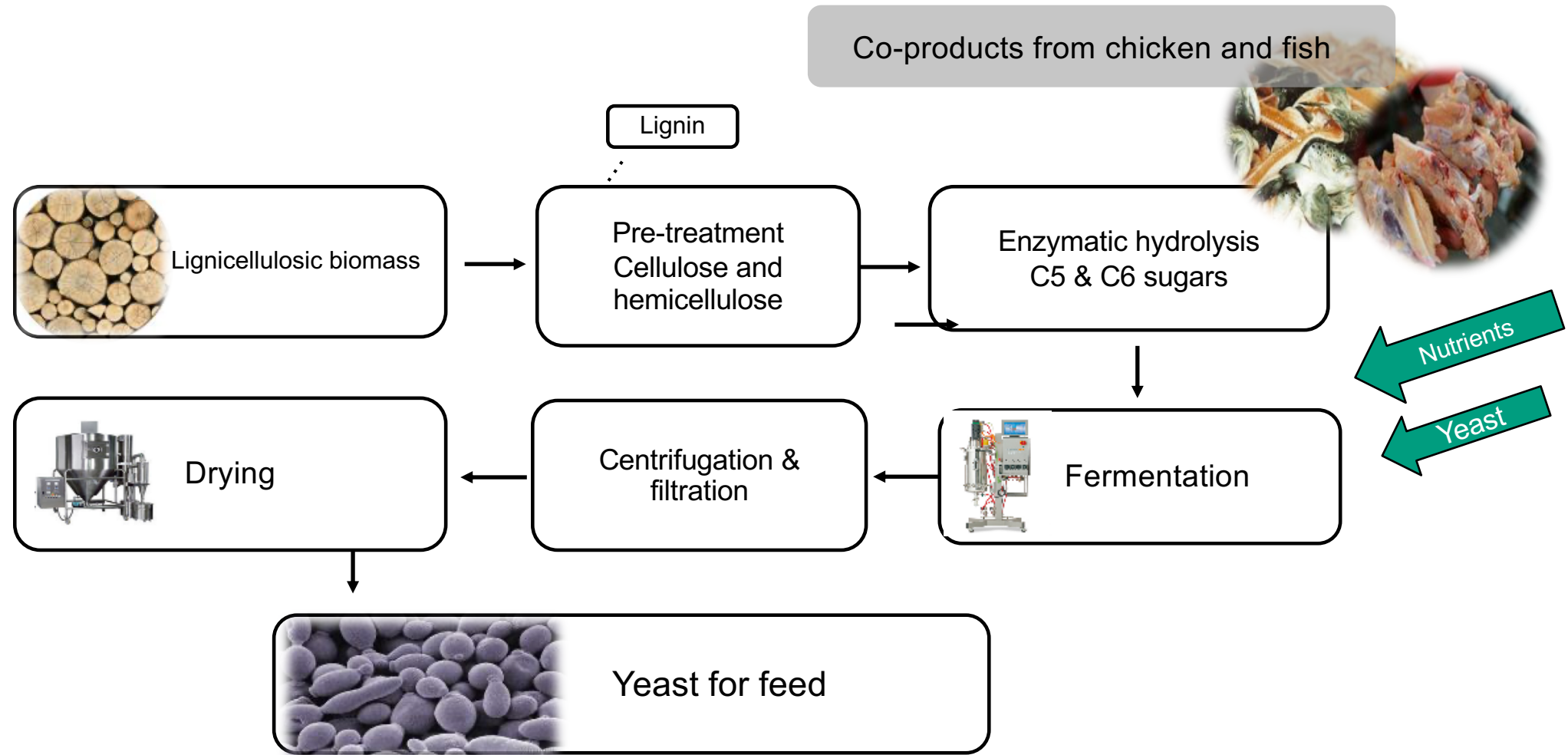
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Solutions

Trees as a feed resource



Flow chart of yeast production from lignocellulosic biomass



Yeast from trees as a feed resource

Protein source

Contains ~ 50-60% protein
Favorable amino acid profile
Good taste
Positive health effects



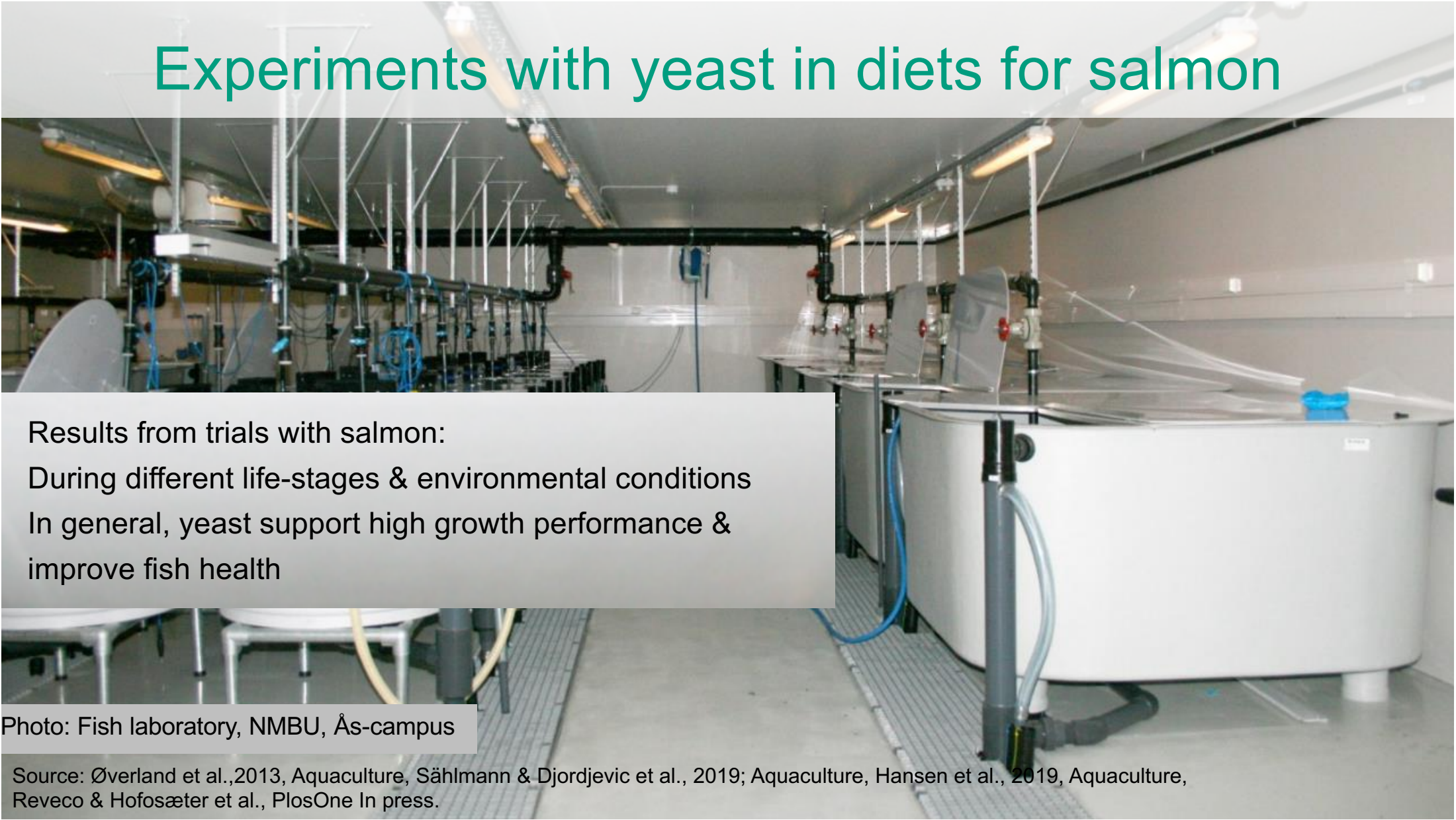
Source: Øverland & Skrede 2017, Review, J. Sci. of Foods & Agriculture



Outline

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Experiments with yeast in diets for salmon



Results from trials with salmon:
During different life-stages & environmental conditions
In general, yeast support high growth performance &
improve fish health

Photo: Fish laboratory, NMBU, Ås-campus

Source: Øverland et al., 2013, Aquaculture, Sählmann & Djordjevic et al., 2019; Aquaculture, Hansen et al., 2019, Aquaculture, Reveco & Hofosæter et al., PlosOne In press.

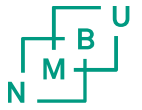
Yeast in diets for piglets after weaning



Feeding yeast has given:
High feed intake, growth rate and feed efficiency
Improved health, digestive function, & reduced diarrhea



Yeast as a protein source for dairy cows



Value chain from spruce trees
to ice cream





Outline

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-



Status of our research

- Wood by-products can be used as the main biomass to produce high quality yeast protein
 - The yeast is proven to be:
 - High quality protein source in feed for fish and terrestrials animals
 - A functional feed ingredient with positive health effects
-



Future perspectives

- The process must be optimized **economically**
 - input and output factors
- The **sustainability** of using yeast produced in Foods of Norway will be estimated



New industry
