

Aquaculture Europe, Donostia–San Sebastián 14-17.September 2014

BIOREFINERY FOR INCREASED VALUE OF CULTIVATED SEAWEED

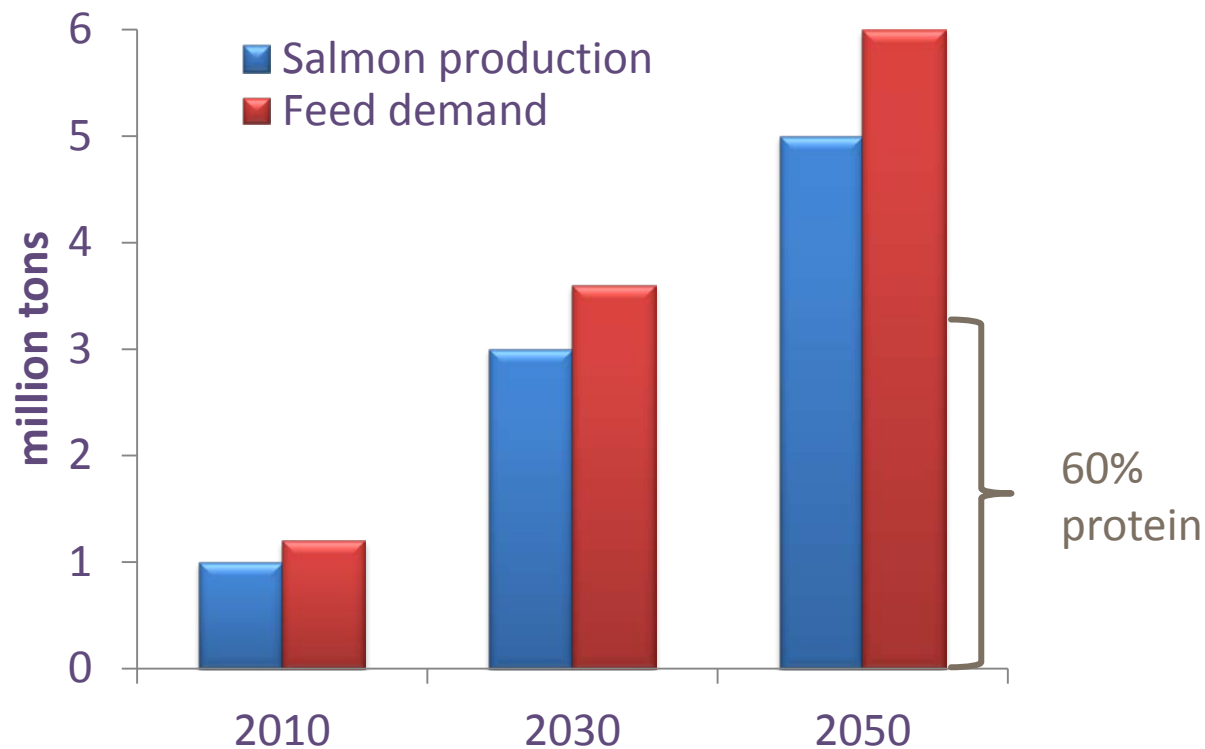
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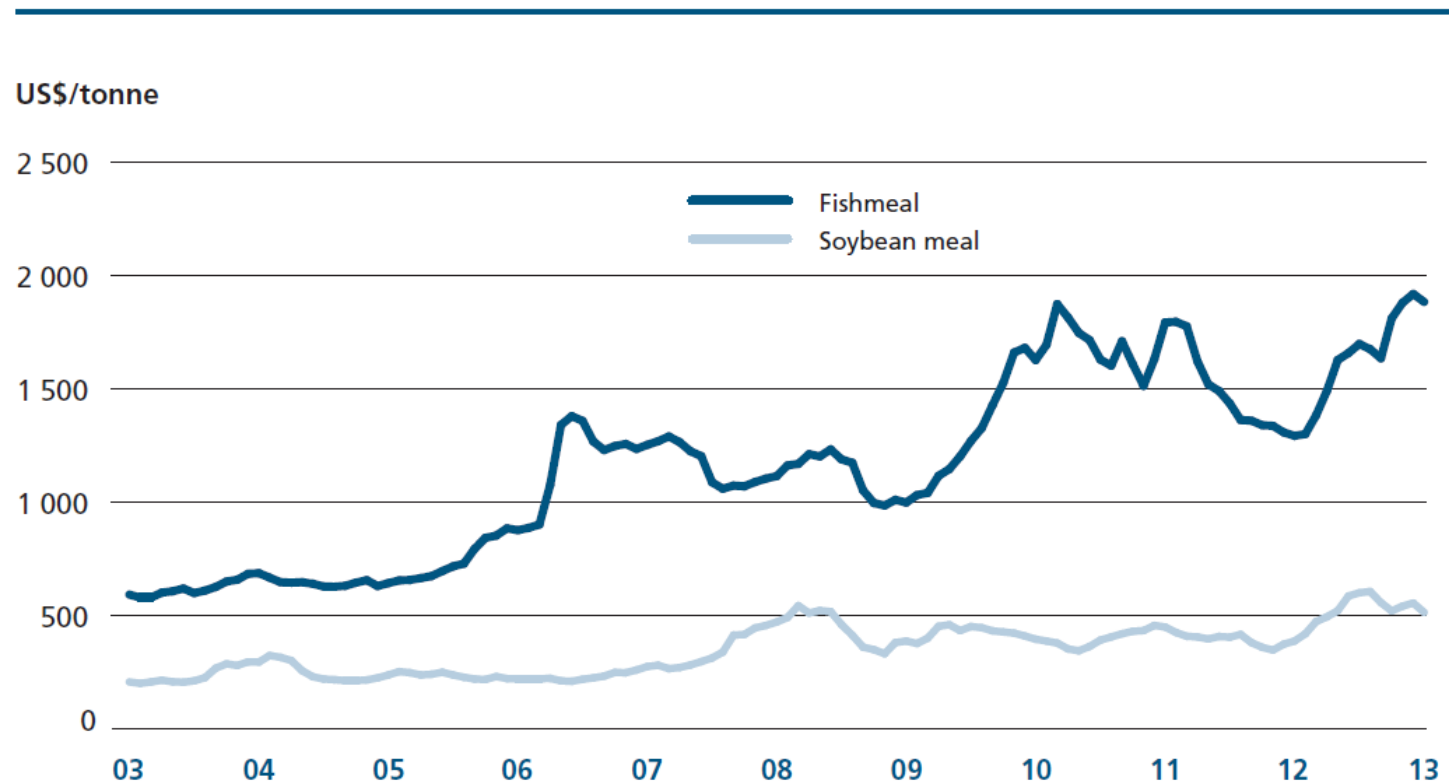
Expected growth in Norwegian salmon production – and in feed demand



DKNV/NTVA (Olafsen et al., 2012)



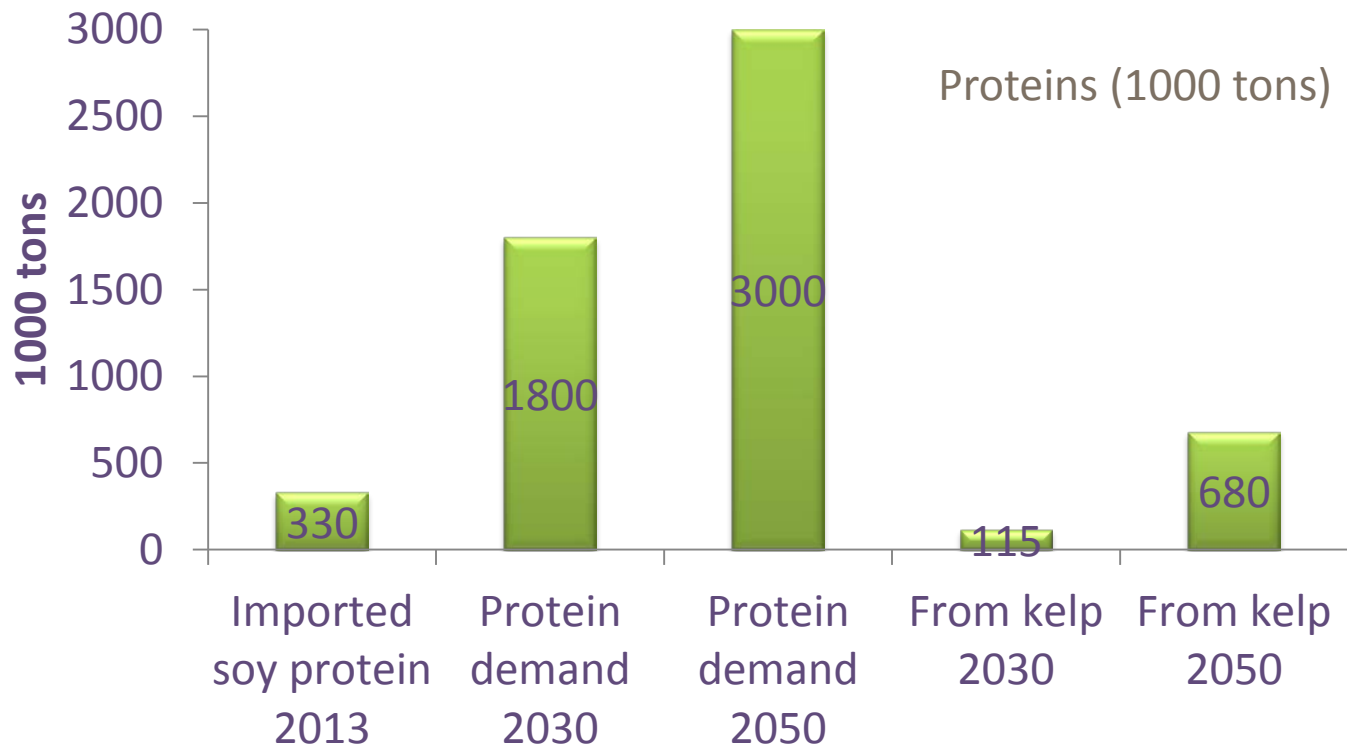
Trends in the price of fishmeal and soybean meal



Source: FAO. 2013. FAO Fisheries and Aquaculture Information and Statistics Branch. Rome.

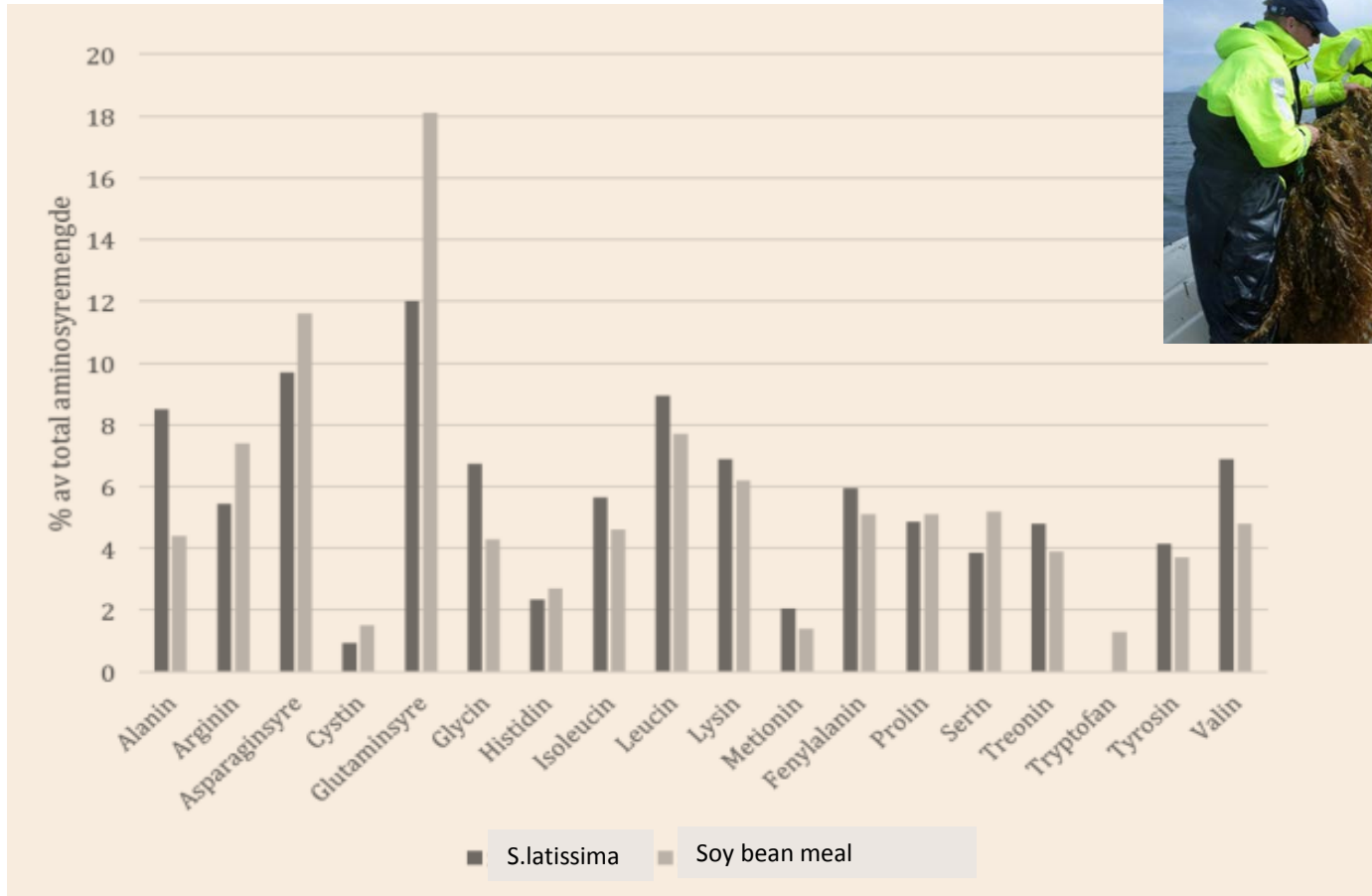
Feed production potential from seaweeds

- 680.000 tons protein from **20 million tons** of seaweed
- Sustainable production
- Increase the degree of self-sufficiency



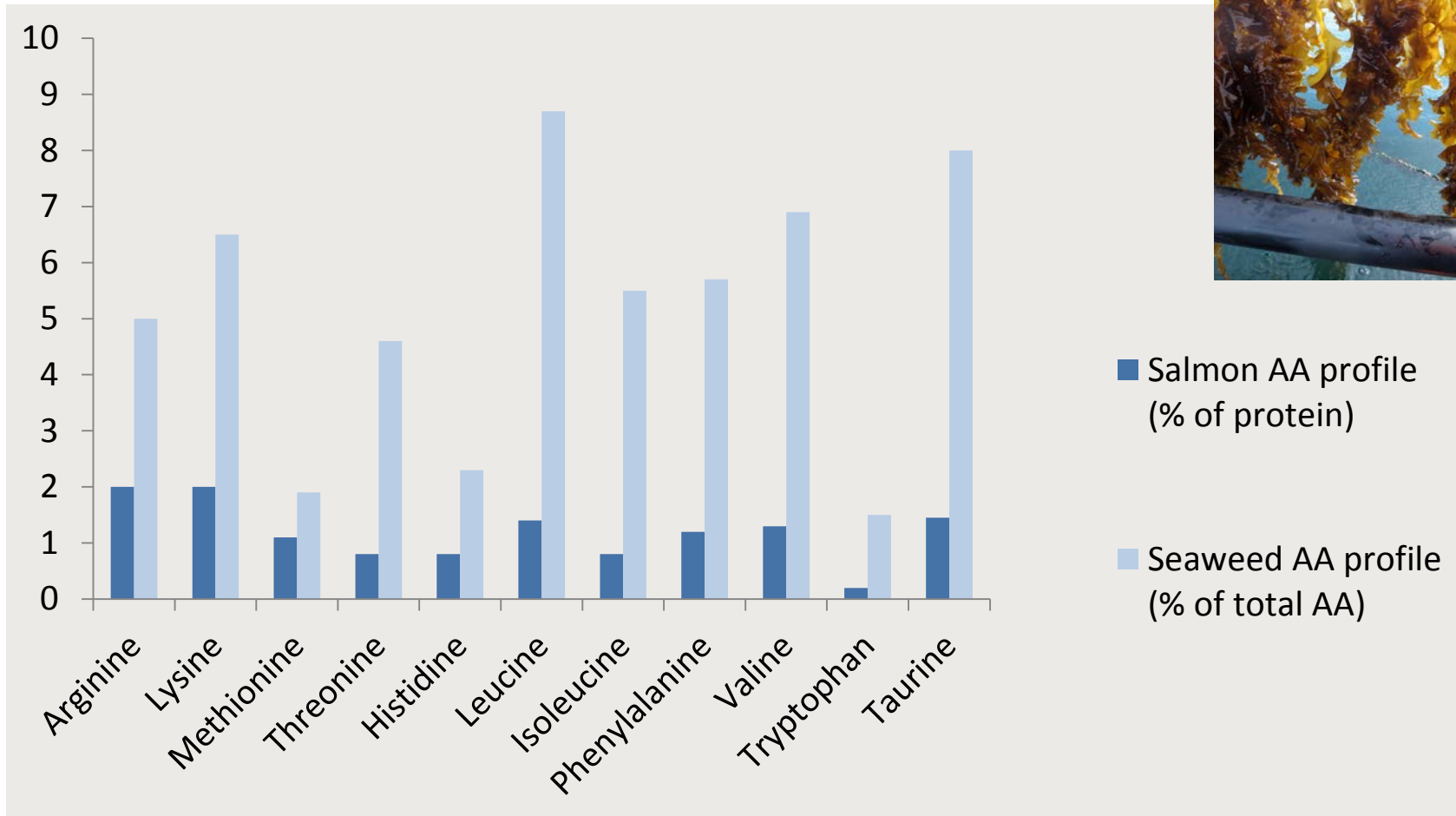
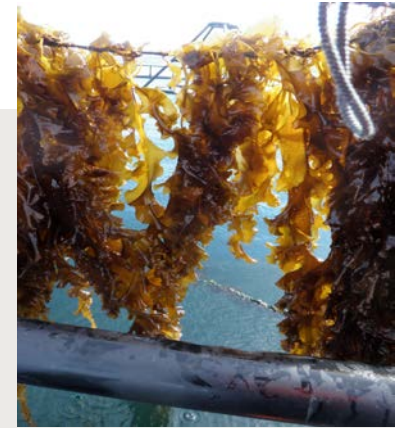
PS: Kelps cultivated in IMTA grow faster, have a higher N content and more protein

Amino acid profiles in seaweed and soy bean meal



Source: Holdt&Kraan, 2011; Experts in Team, NTNU, 2014

Sugar kelp as protein source for salmon feed



Saccharina latissima:
170 tons biomass ha⁻¹ year⁻¹

(Broch et al., 2013)

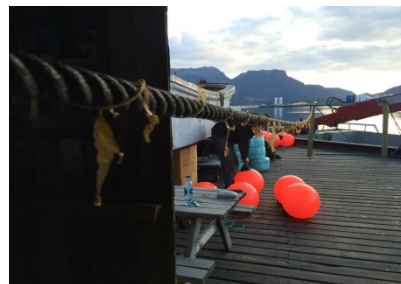
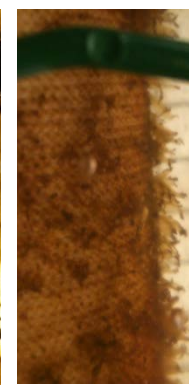
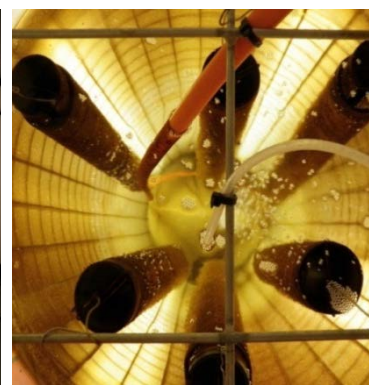
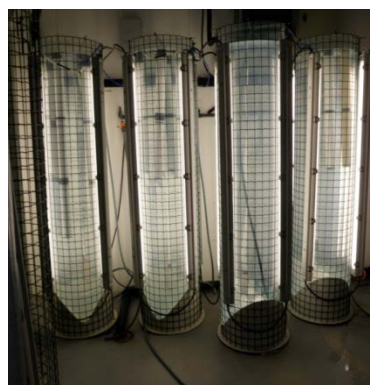
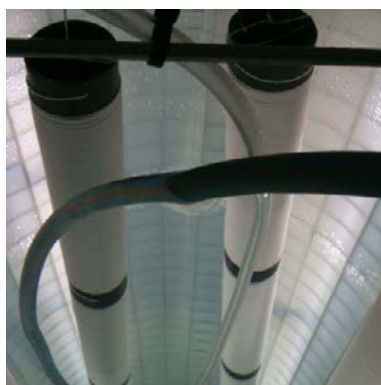
Area needed for cultivation
of 20 million tons:

1 200 km²



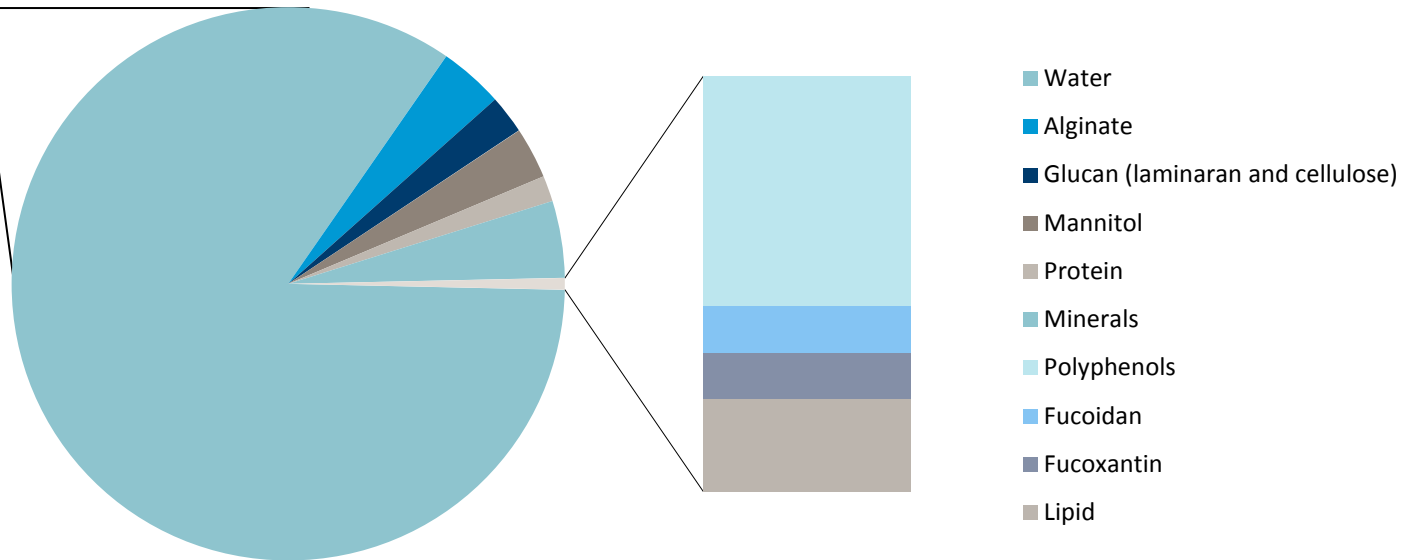


From spores to biomass



Low-tech

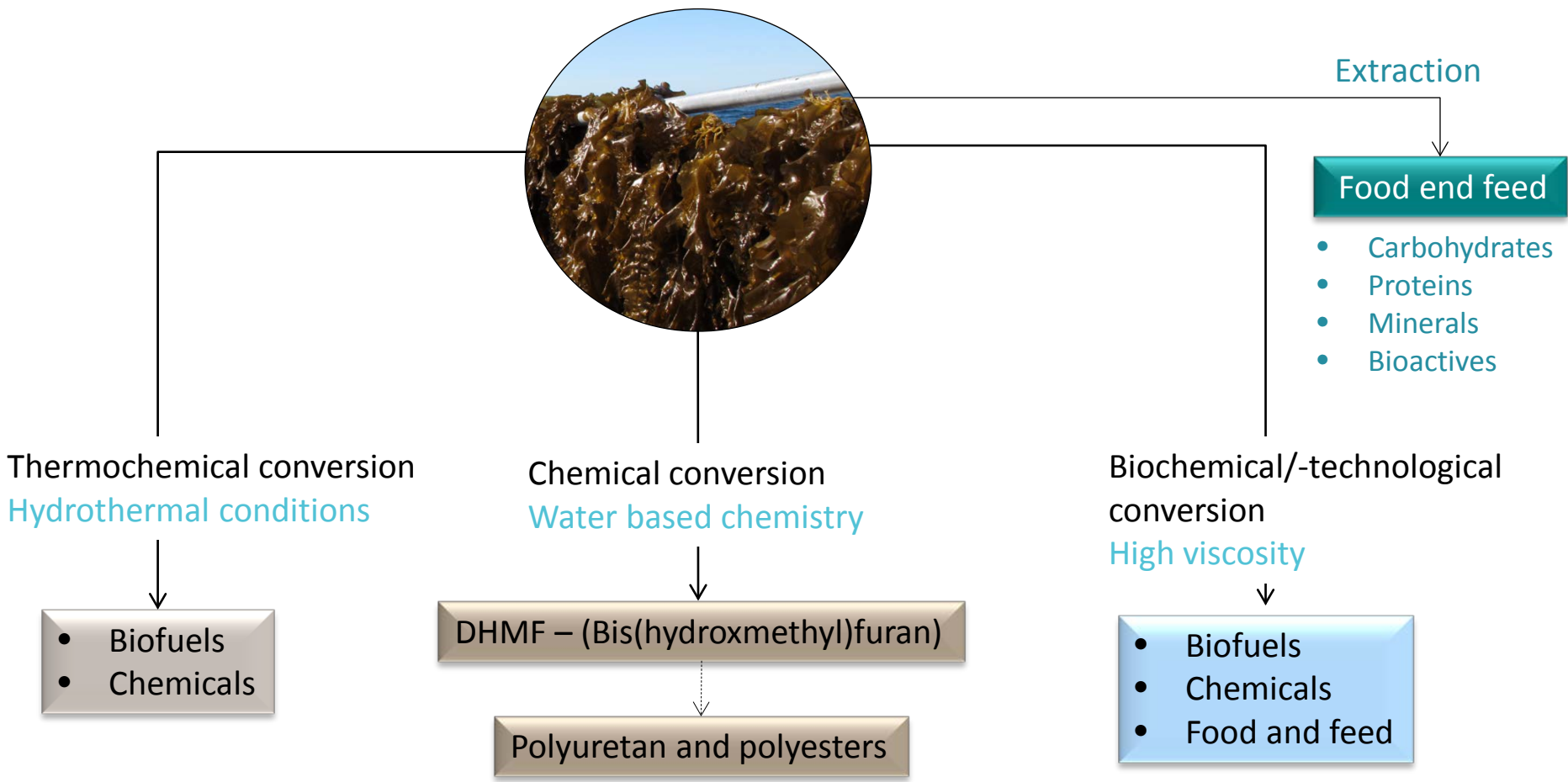
Cultivated macroalgae as feedstock (example: *Saccharina latissima*)





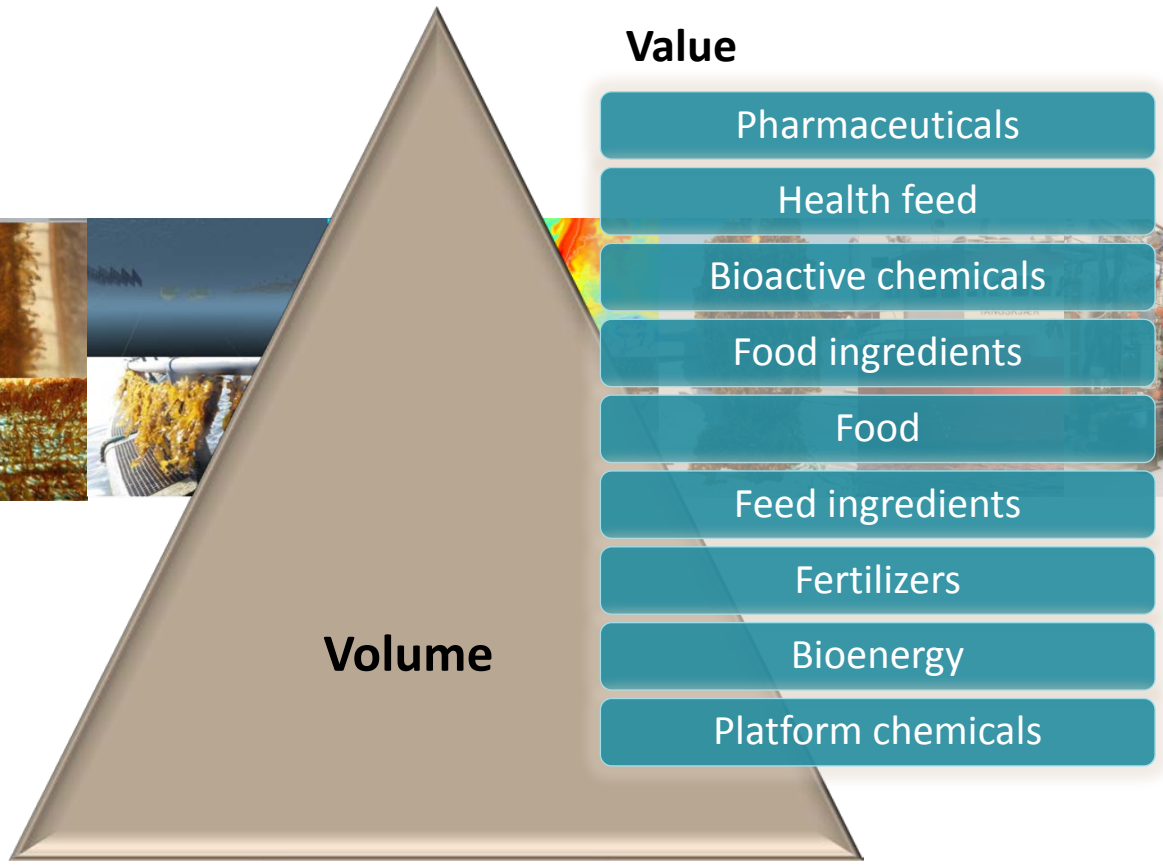
Biorefinery

"Biorefinery is a sustainable processing of biomass into several products and energy"



Value chain biorefinery: ~300 Billion \$ in 2020

(The World Economic Forum)



Challenges


Industry:

- Marked pull
- Immature technology

Research:

- Large variations in production (volumes)
- Large variations in chemical composition
- Footprints





Thanks to SINTEF for the priority project 'Biobased products from sustainable sources (seaweed)'

Thank you 😊