

Feed for salmon

- with focus on RAS

27.10.2021

Turid Mørkøre



Salmon feed. (Photo: Kjell Merok, Reidun Lilleholt/ Nofima)

Feed raw materials

development 1990 - 2016

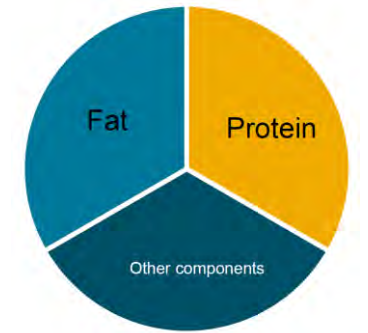
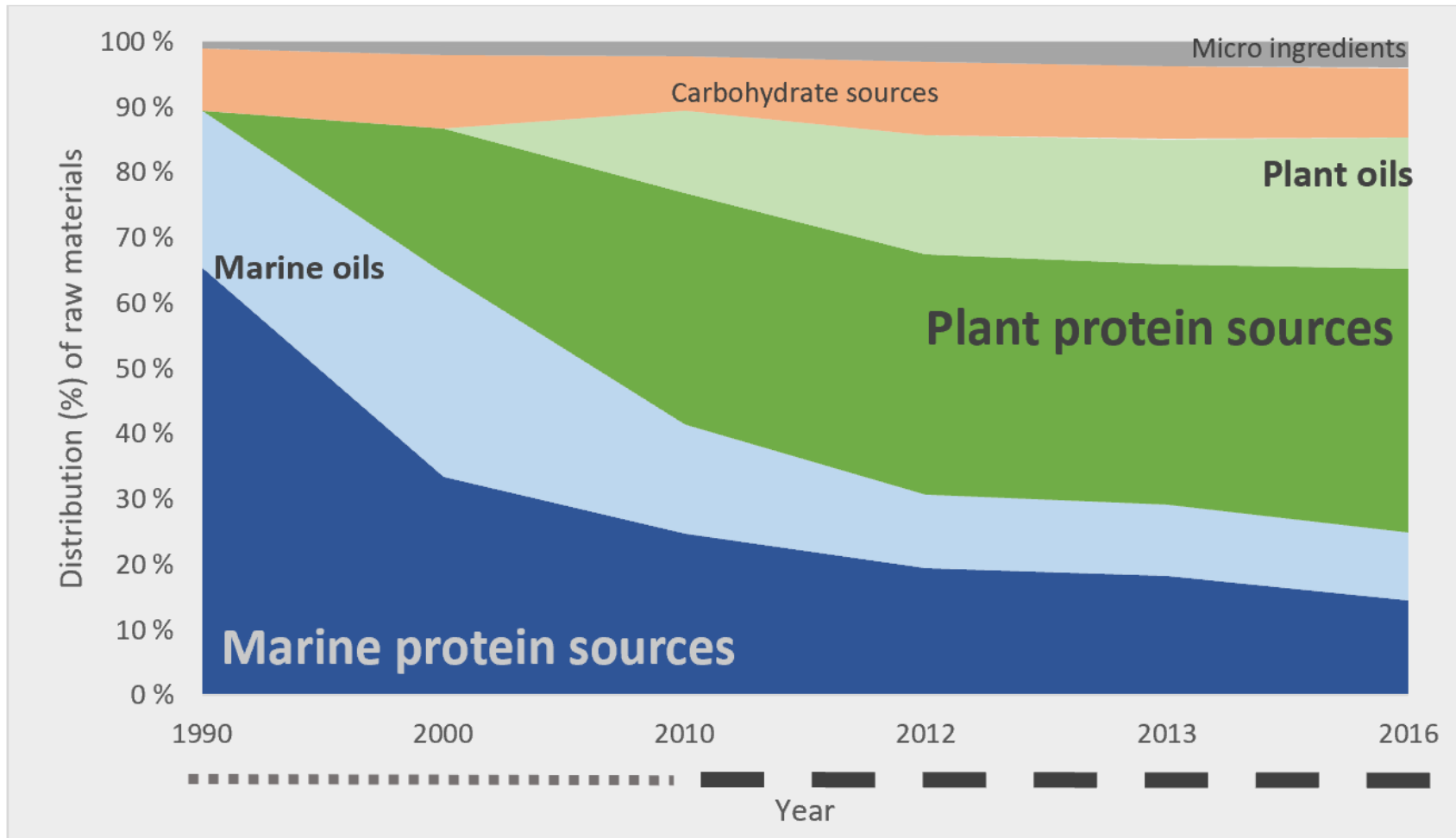
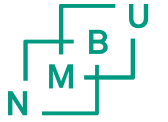
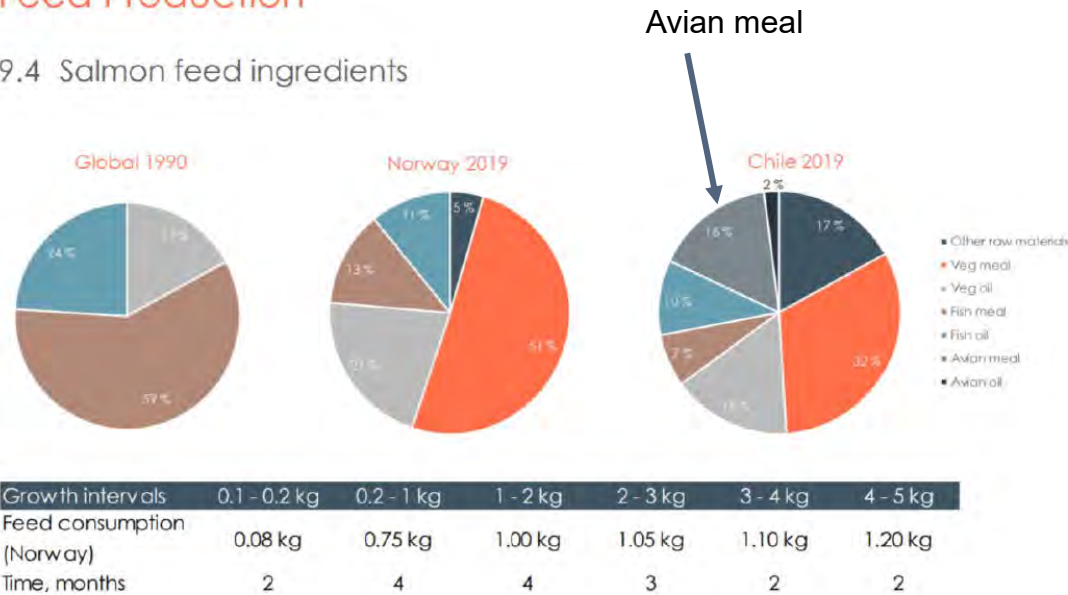


Figure 8: 100% Area chart showing the Norwegian development of raw material distribution (y-axis) of feed raw materials throughout selected years by the period of 1990-2016. Each of the coloured areas inside the diagram represents one source each. NB! Numbers are taken from uneven selected years, meaning that the interval between the years is smaller on the second half of the diagram, after 2010. The numbers are taken from (Aas et al., 2019)

Salmon feed ingredients

Feed Production

9.4 Salmon feed ingredients



Historically, the two most important ingredients in fish feed have been fish meal and fish oil.

The use of these two marine raw materials in feed production has been reduced in favour of ingredients such as **soy, sunflower, wheat, corn, beans, peas, poultry by-products** (in Chile and Canada) and **rapeseed oil**. This substitution is mainly due to heavy constraints on the availability of fish meal and fish oil.

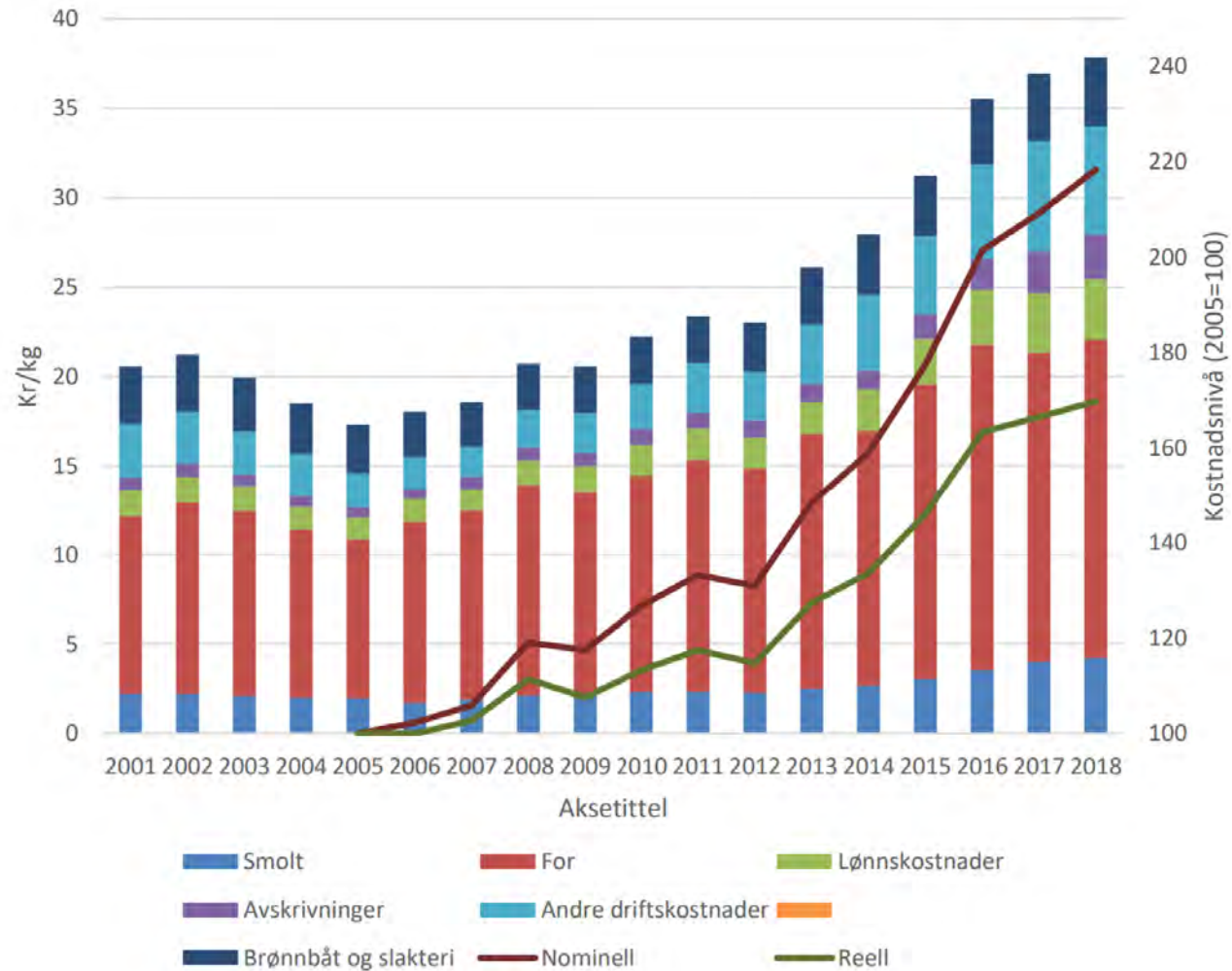
Feed and feeding strategies aim to grow a healthy fish fast at the lowest possible cost.



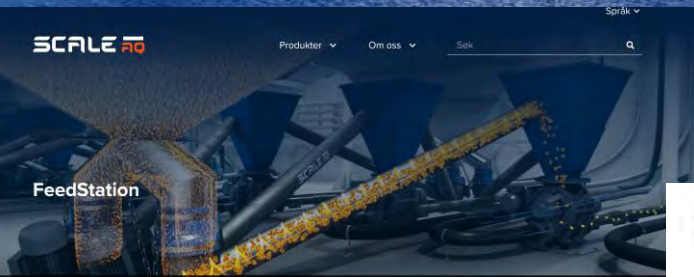
FEED RICH IN MARINE CONTENT

Vertical integration means that Bakkafrost has the expertise to decide to invest in salmon feed with substantially higher marine content. The natural diet for wild salmon is rich in marine resource. By keeping the Bakkafrost diet close to this, the Group is able to have one of the industry's best Feed Conversion Ratios (FCR) which is a key indicator of fish welfare and low production costs.

Produksjonskostnader i Norge, slaktet og pakket laks, 2001–2018. Løpende priser. (Kilde: Kontali, SSB)



Feeding



Ice Fish Farm velger AKVA group som leverandør av fôrflåter

Skrevet av [Joar Time](#) den 09. jul. 2021

[Tweet](#) [Del](#)

Det islandske



Flåte AC800PVDB

- Total tonnasje: 800t på fôrsiloer

oppdrettsselskapet Ice Fish Farm har valgt AKVA group som leverandør av to AC600VR fôrflåter som skal settes i drift på selskapets lokaliteter øst på Island. Dermed





Politiet i Sør-Vest
@politietsorvest

#Rennesøy, Vikevåg kl 0950: Melding om arbeidsulykke ved et fiskeoppdrett. En mann skal ha falt ned i en silo. Anlegget ligger i sjøen. Mannen er ved bevissthet. Nødetatene, samt SeaKing er på vei til stedet.



9:53 a.m. · 17. feb. 2020 · [Twitter Web Client](#)

Mannen som falt i en silo på en fôrflåte er brakt til sykehus. Har lettere skader.

17. februar 2020 10:44 OPPDATERT 17. februar 2020 13:40

Av [Ole Jacob Strønen Riise](#) i **Bergen**

Politiet i Sør-Vest meldte klokken 09.50 på Twitter mandag at en mann skal ha falt ned i en silo på et oppdrettsanlegg i Rennesøy.

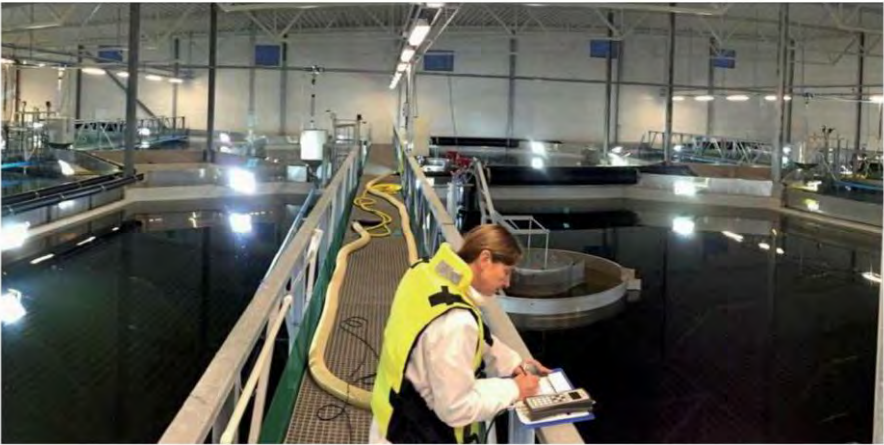
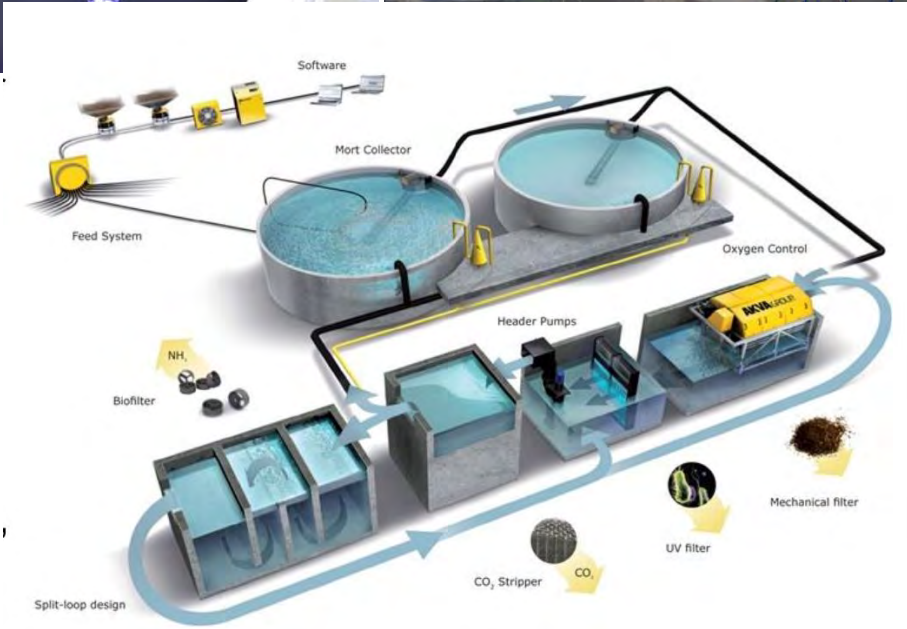
Falt fra stige

I en oppdatering klokken 13.11 opplyser Kristina Furnes, global kommunikasjonssjef i Grieg Seafood, at det var på deres anlegg Dale II i Rogaland, at ulykken skjedde.

Vedkommende falt ned fra en stige i en fôrsilo på en fôrflåte.

Nødetatene og Seaking-helikopter ble sendt ut til stedet da de ble varslet om ulykken i formiddag. Brann og helsepersonell sikret den skadde, samt ga førstehjelp på stedet. Planen var å heise opp vedkommende fra siloen av et SeaKing-helikopter.

Recirculating Aquaculture Systems (RAS)



RAS er ikke bare teknologi, det er også biologi

BioMar signs RAS feed deal with Quality Salmon

By Nestor Arellano

Topics

- Feeding and Nutrition
- Management



BioMar offers feed solutions that are especially developed for fish grown in recirculating aquaculture systems. (Photo: BioMar)

Salmon Evolution nets Cargill feed agreement, investment

By Jason Holland
October 13, 2021

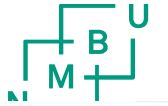
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Romsdal, Norway-headquartered land-based salmon farming company Salmon Evolution has entered into a strategic partnership agreement with Cargill, which will include an investment and an aquafeed supply contract.

The new partnership will see Cargill invest approximately USD 5 million (EUR 4.3 million) in the company through a private placement of new shares. These shares will have a subscription price of NOK 7.71 (USD 0.91, EUR 0.78) per share, which equals the average price for the 20 trading days leading up to the Cargill announcement on 13 October, 2021.

The proceeds from the private placement will be used for general corporate purposes including evaluation and development of future expansion opportunities. Through the private placement, Salmon Evolution will issue 5,541,374 new shares which will be subscribed for by Cargill's Norwegian subsidiary Ewos AS. The issue shares will be issued pursuant to the board authorization granted by Salmon Evolution's general meeting on 19 May, 2021, and is expected to be issued during October 2021. Upon issuance of the shares, Salmon Evolution will have a share capital of NOK 15.5 million (USD 1.8 million, EUR 1.6 million), consisting of 310,796,489 shares.



Salmon Evolution and Cargill enter strategic partnership for feed – Cargill invests USD 5 million in Salmon Evolution through a private placement



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Skretting > News and stories > Skretting wins global contract to supply Atlantic Sapphire in Denmark and USA

Skretting wins global contract to supply Atlantic Sapphire in Denmark and USA



RAS

26 November 2019

Skretting announces today that it has won the contract to supply Atlantic Sapphire with majority volumes from November 2019. The contract covers the majority of Atlantic Sapphire's feed requirement in Denmark and the USA.

RAS feed requirements



- A RAS feed must not only satisfy the fish's nutritional needs, but also have physical properties that minimize contamination of the water.
- Both pellets and faeces must be solid so that they can be removed efficiently by the mechanical filter
- Pellets must be firm and durable so they can withstand the friction that occurs in feeding and transport systems – hence dust that pollutes the water and damages the gills is minimized
- The pellet should sink slowly, so that the fish have time to catch the feed
- High water stability means that uneaten feed is removed by the mechanical filter without affecting the water quality.
- Loose stools, dust and pellets that dissolve have negative effect of the bacteria in the biofilter so that they cannot do their job (feeding must be reduced).



Feed and faeces: the challenges of RAS production

Low feed quality and issues with faecal matter are two of the key challenges to running a successful RAS farm, according to a leading expert.



Ys 25.10.2021



Leakage from the feeds

- 6 hours storage at 20 degrees





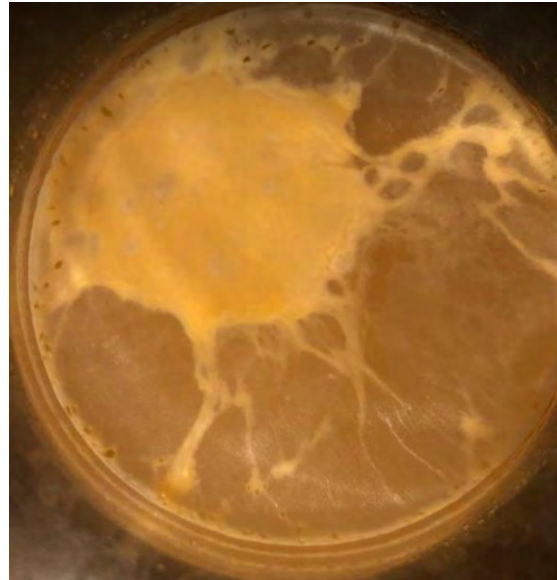
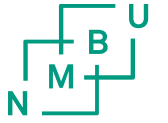


After stirring for 2 min

Pellets after 6 hours in water



24 hours after the pellets were removed from the water



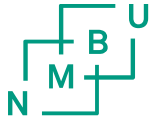
Rainbow trout sampled September 2021



Problematic fat leakage.
Pictures are from the
stomach



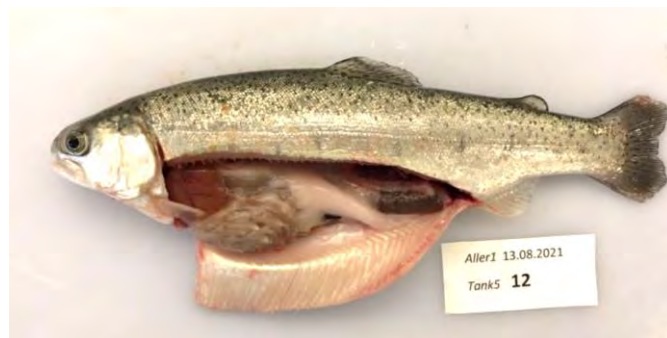
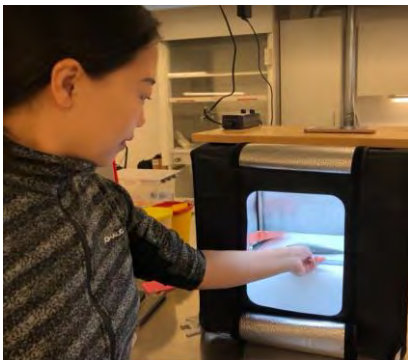
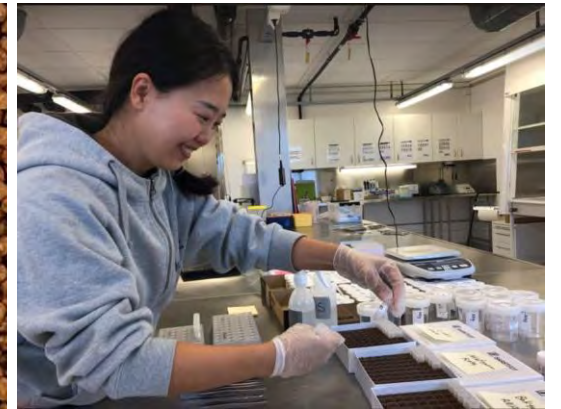
Center for Sustainable Aquaculture



NMBU lanserer master i RAS og landbasert oppdrett



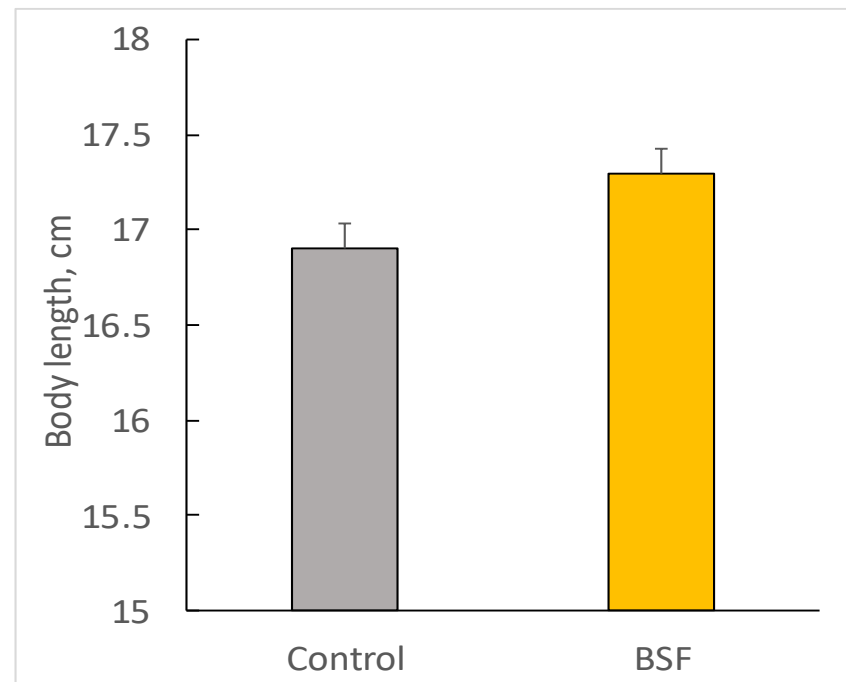
Førsteamanuensis Odd Ivar Lekang og professor Turid Mørkøre ved NMBU sier det fra i år vil utvikles et opplegg som gjør at akvakulturstudenter ved NMBU får muligheten til å spesialisere seg innen RAS og landbaserte anlegg. Bildet er fra «Fiskelabben»; Senter



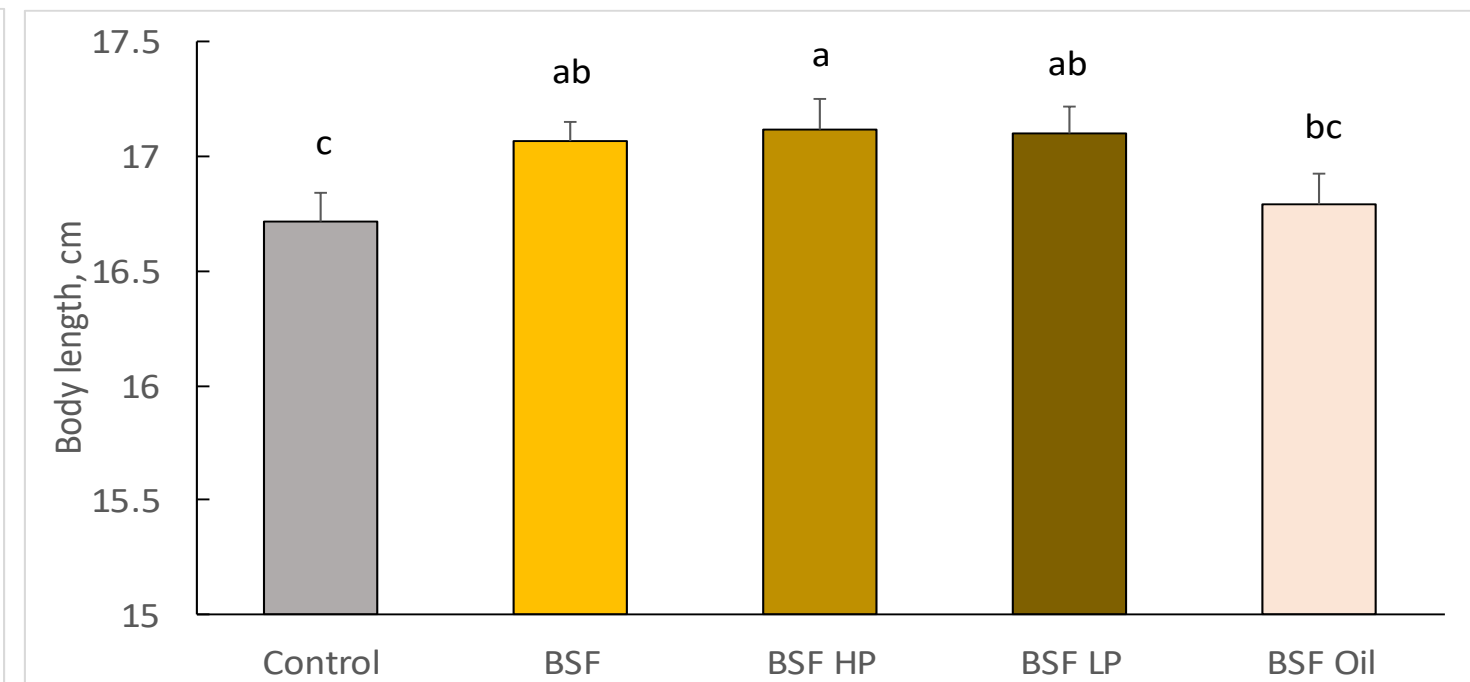
Body length

Supplementation of whole BSF and BSF protein resulted in increased body length of Atlantic salmon.
The same tendency was observed for rainbow trout (whole BSF)

Rainbow trout

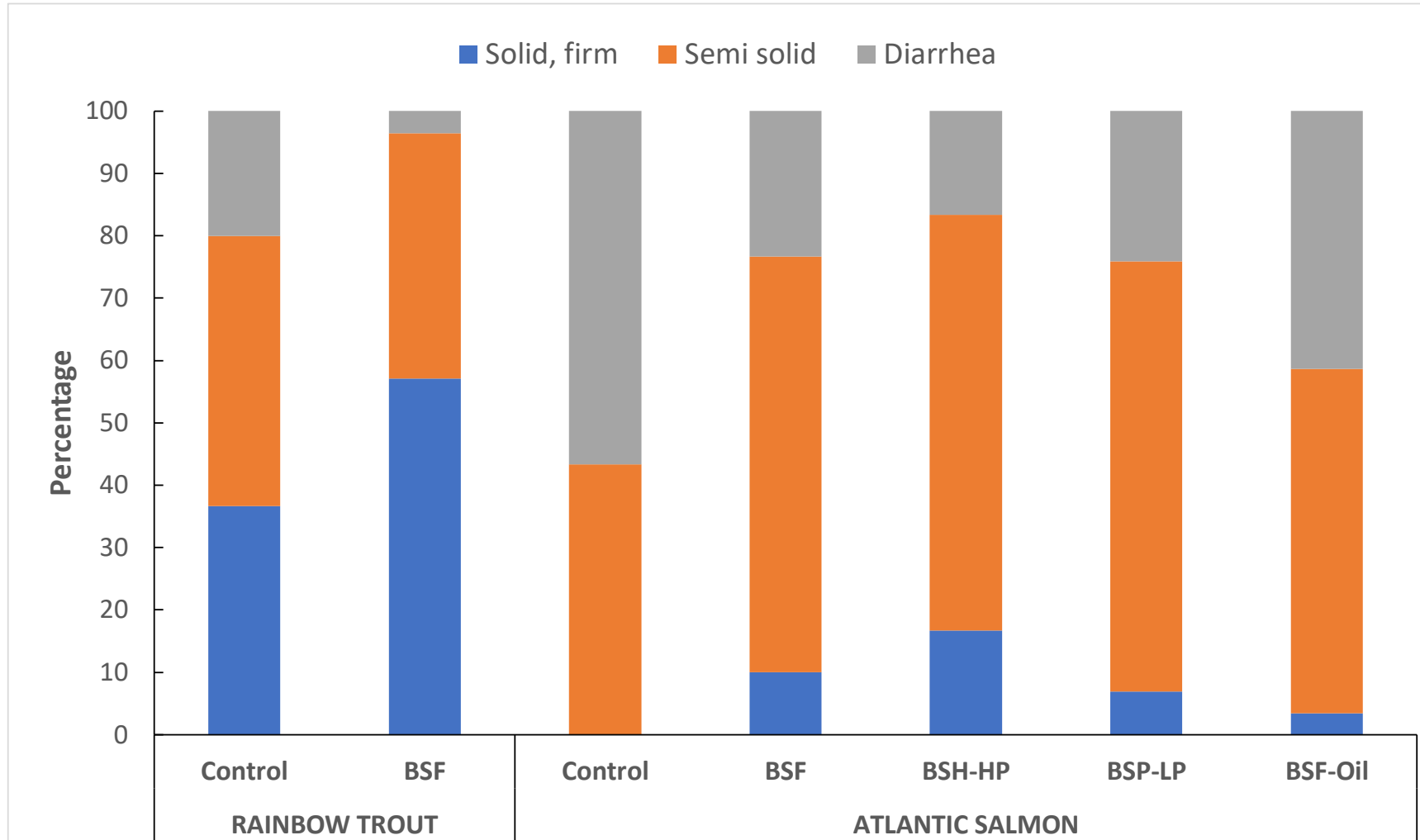
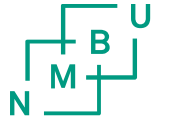


Atlantic salmon



Faces, score

Supplementation of BSF decreased the relative number of fish with diarrhea



Thank you !

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