FUTURE EU AQUA

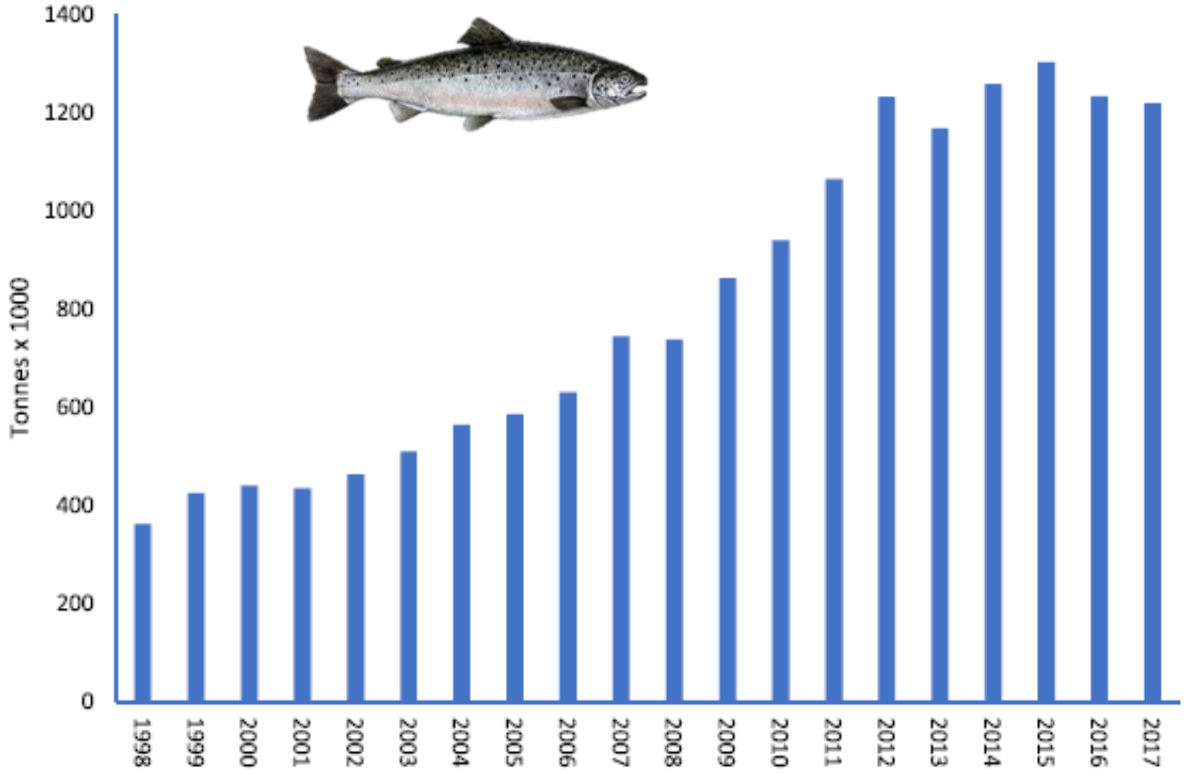
On The Horizon
EATiP Aquaculture Project Dissemination Service

POTENTIAL OF NOVEL AND CIRCULAR BASED ECONOMY RAW MATERIALS AS MAIN INGREDIENTS IN SALMON DIETS

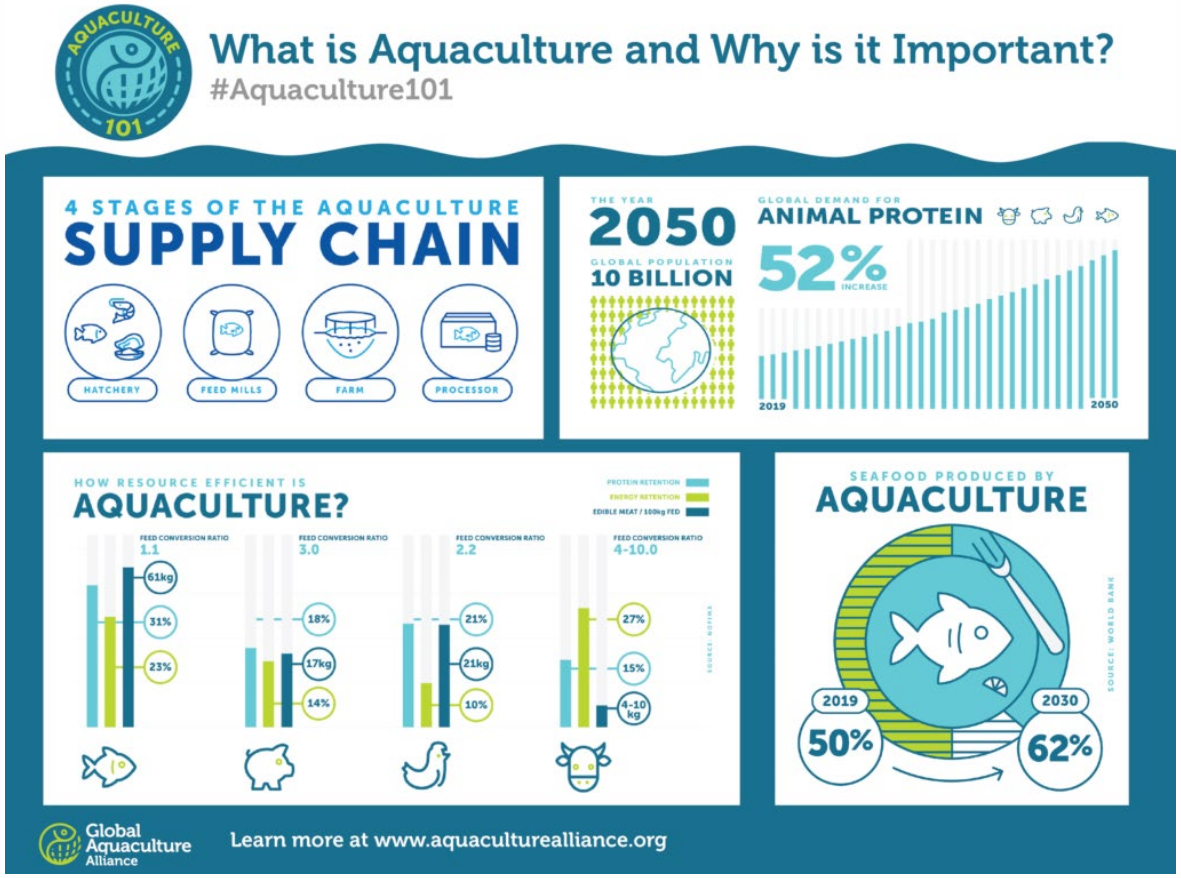
29 September 2021

Katerina Kousoulaki, Nofima

AQUACULTURE NEEDS NEW SOURCES OF HIGH QUALITY PROTEINS AND Ω3 FATTY ACIDS TO GROW IN A SUSTAINABLE WAY

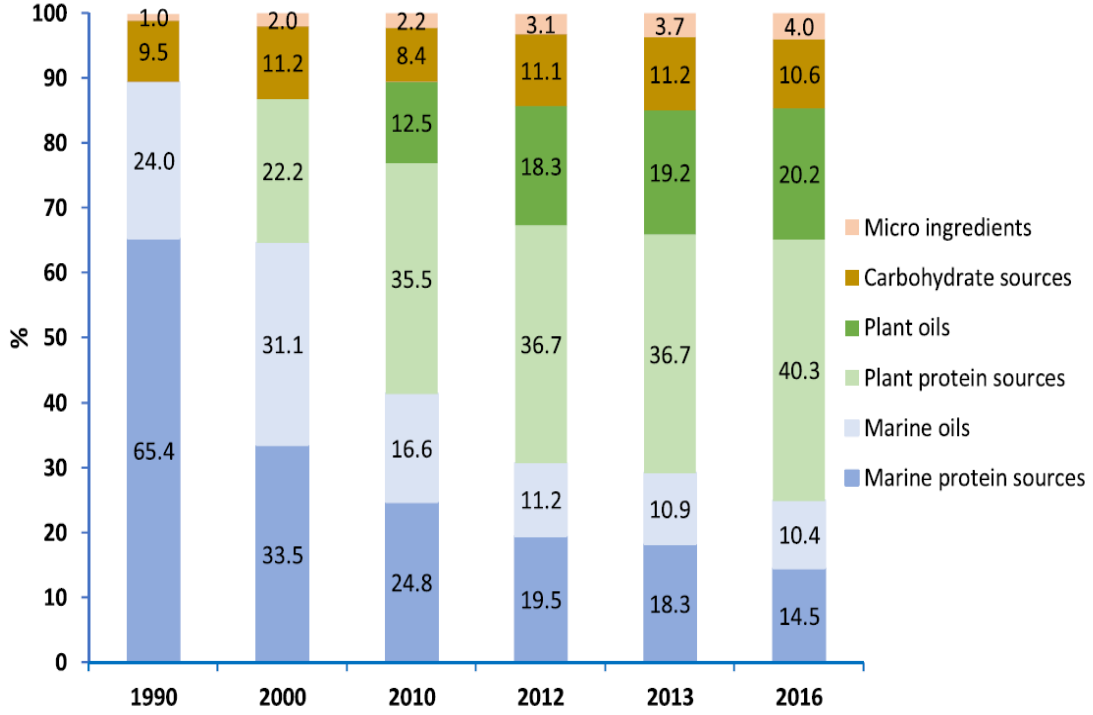


The annual sale of Norwegian farmed salmon (tonnes x 1000) from 1998 to 2017 (Statistics Norway, 2017).



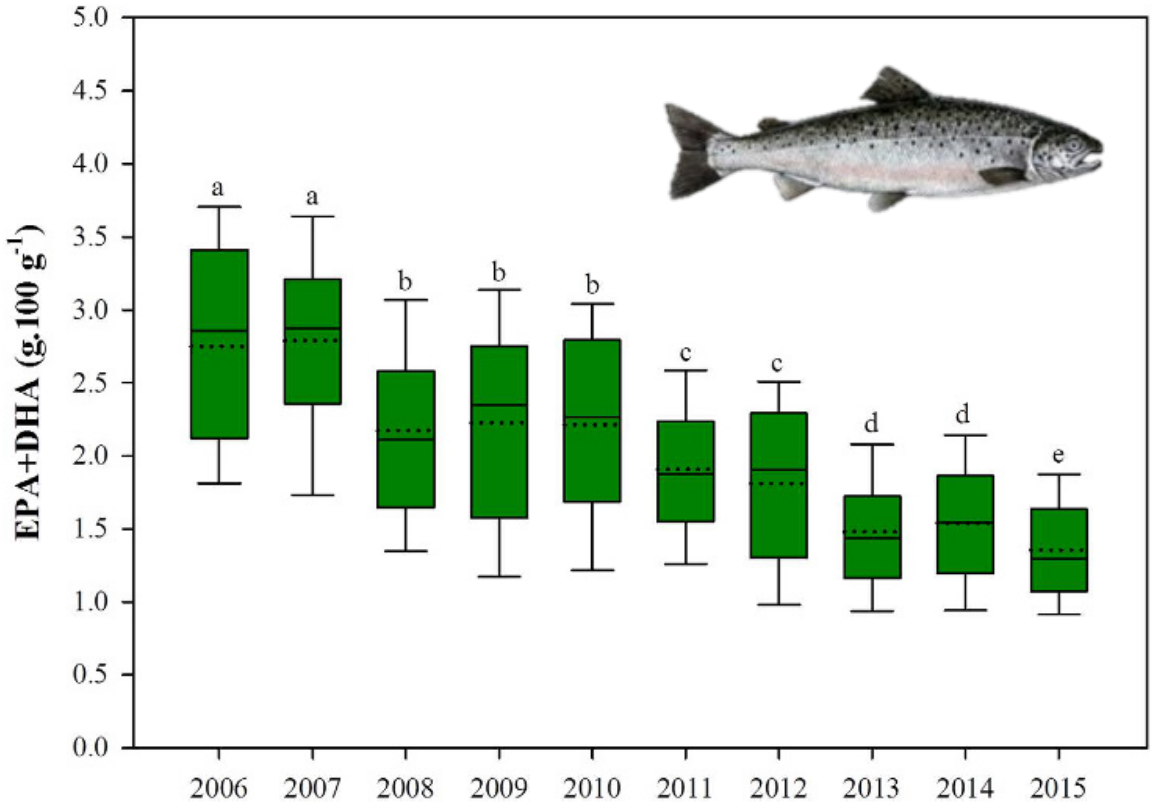
AQUACULTURE NEEDS NEW SOURCES OF HIGH QUALITY PROTEINS AND Ω3 FATTY ACIDS TO GROW IN A SUSTAINABLE WAY

Aquaculture Reports 15 (2019) 100216



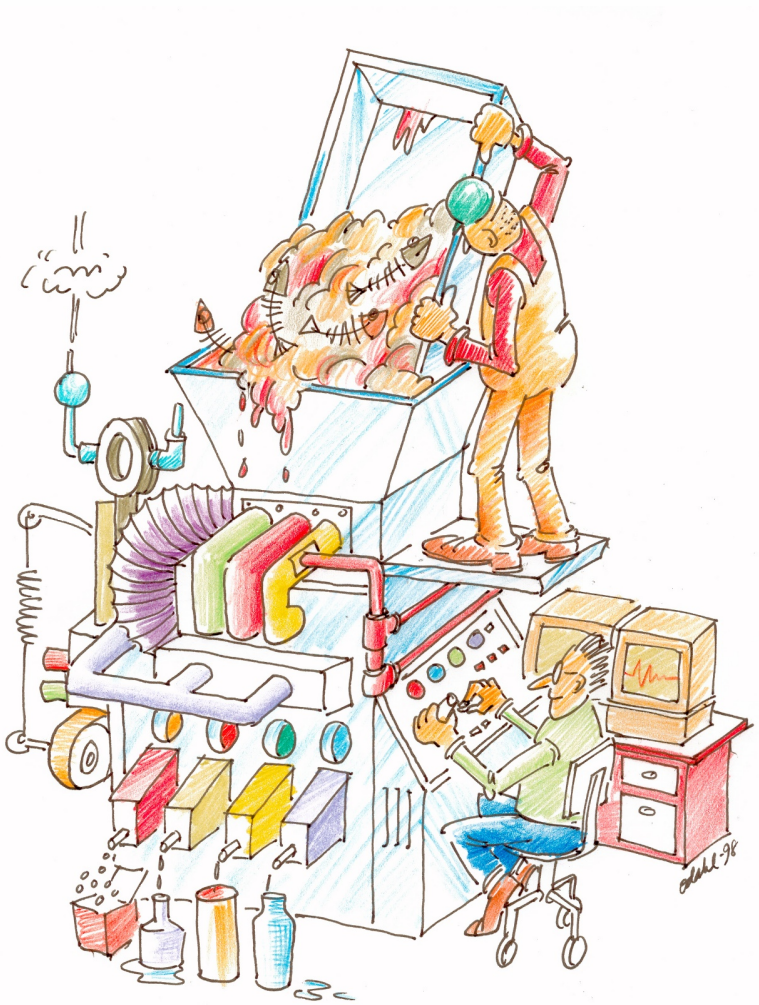
Ingredient sources (% of feed) in Norwegian salmon feed in 2016 compared to previous years, which were given by Ytrestøyl et al., 2015.

DOI: 10.1038/srep21892



WHAT DOES NOT APPEAR TO BE THE SOLUTION?

WHAT CAN BE PART OF THE SOLUTION?



Low trophic species such as krill etc.

WHAT CAN BE PART OF THE SOLUTION?

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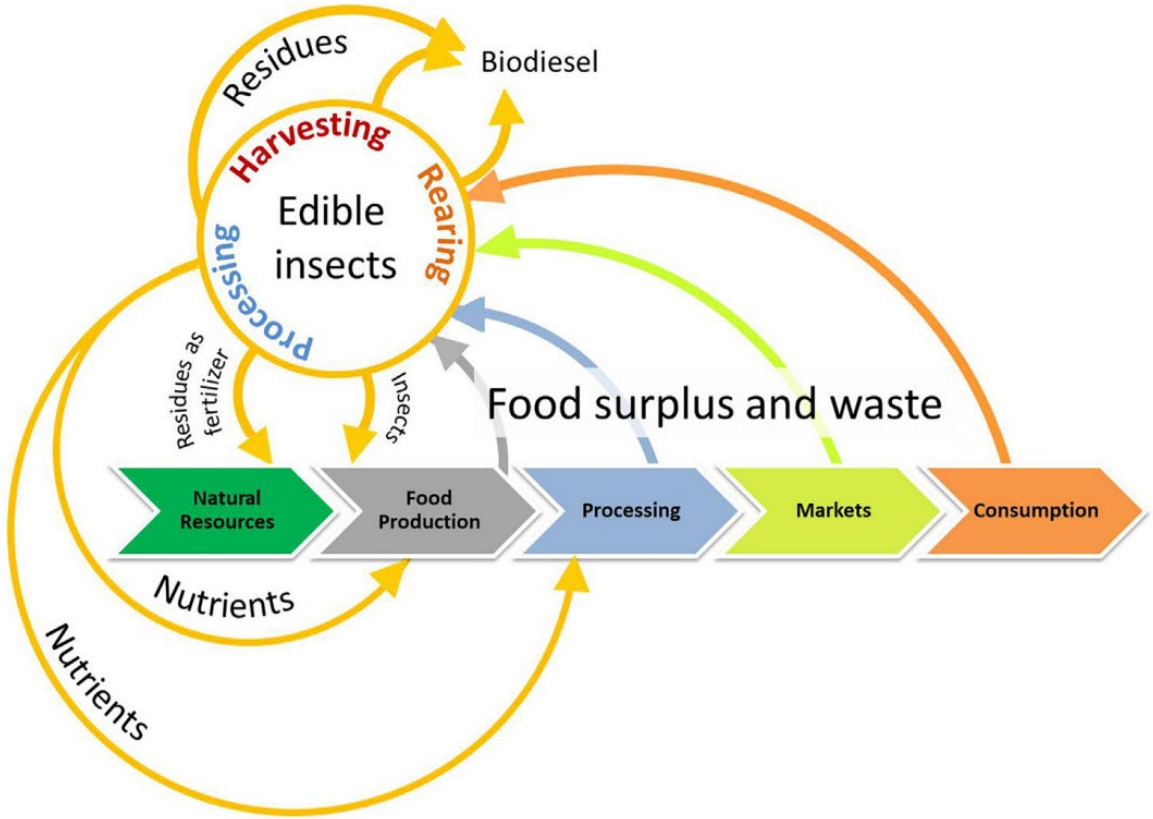

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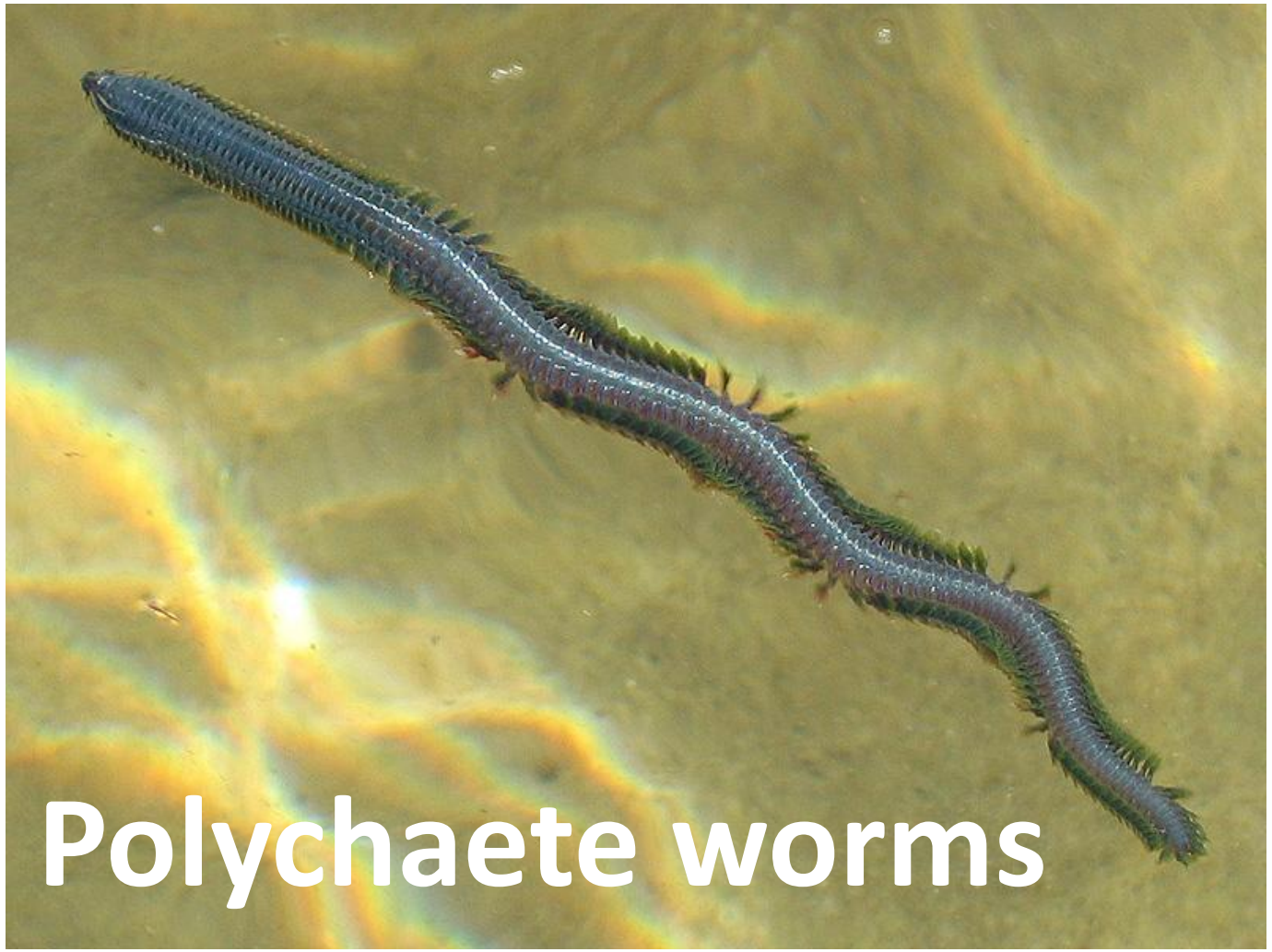
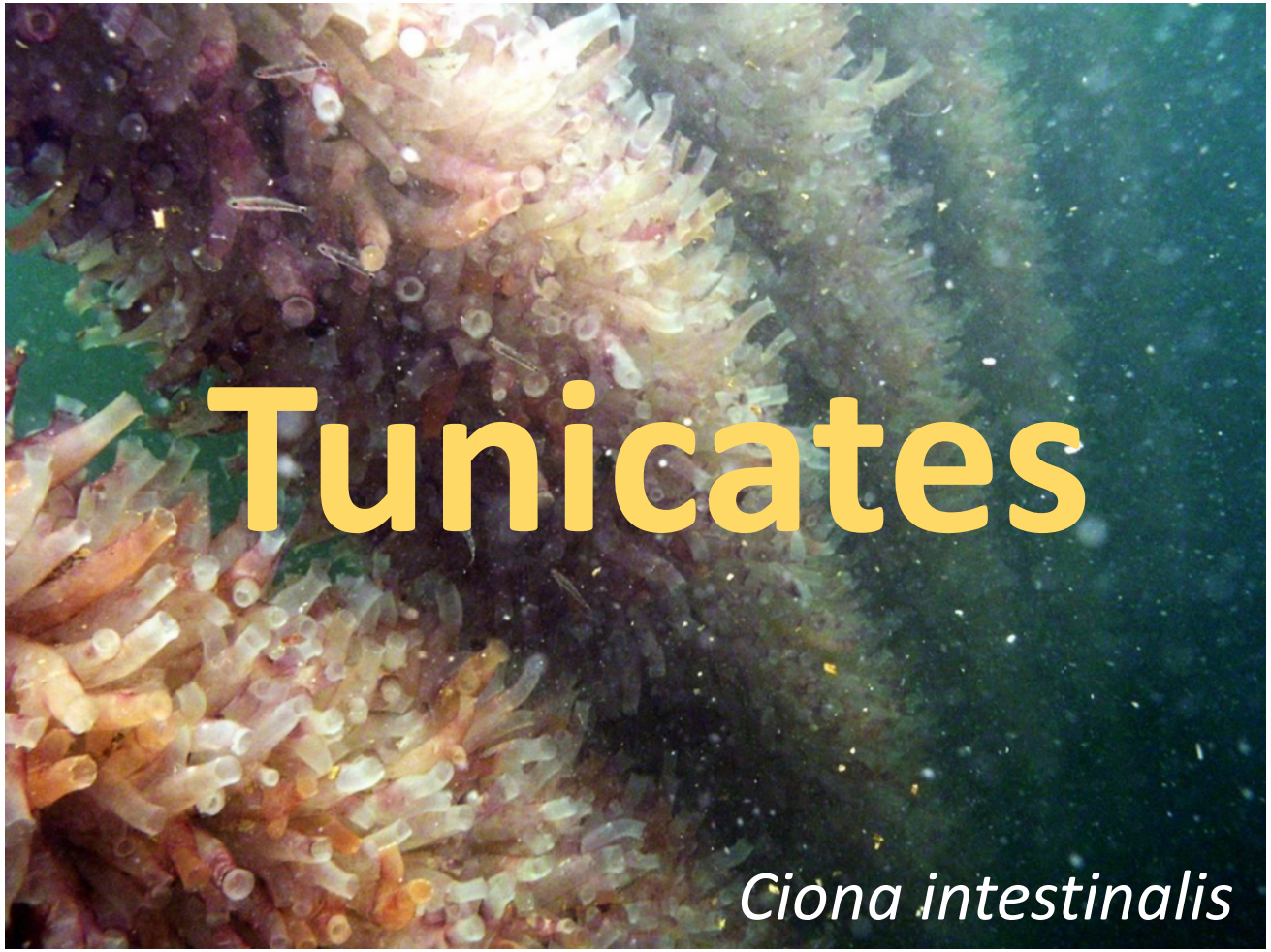
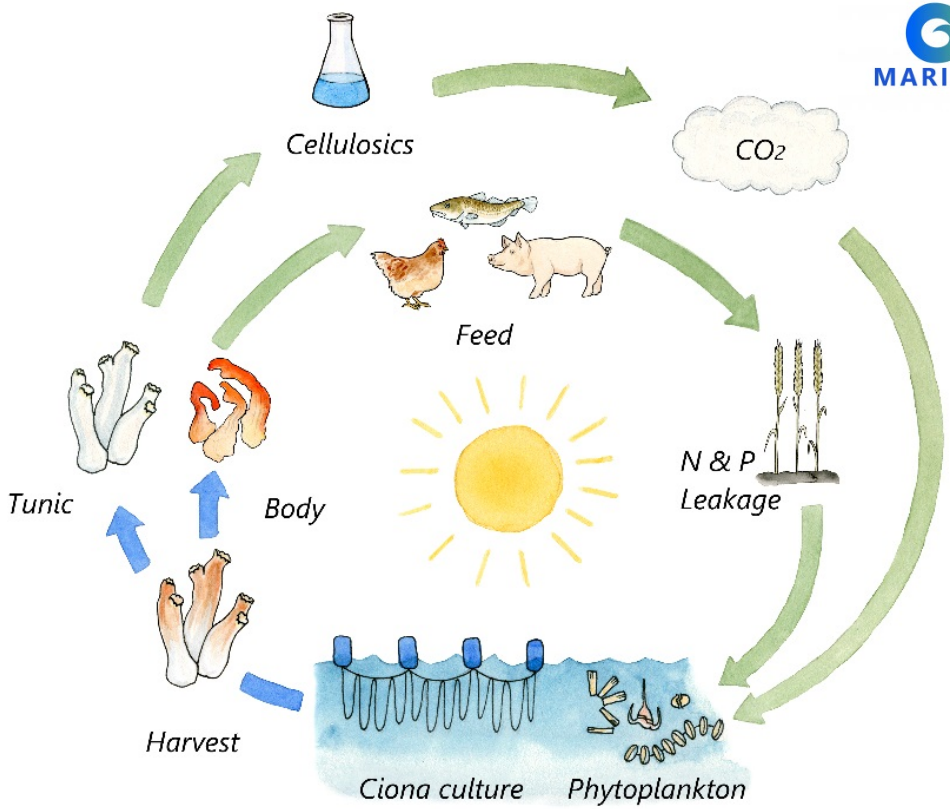


Feed on waste

WHAT CAN BE PART OF THE SOLUTION?





WHAT CAN BE PART OF THE SOLUTION?

National Algae pilot CO2Bio

AQUAFEED TECHNOLOGY CENTRE-ATC

NORCE

LGem

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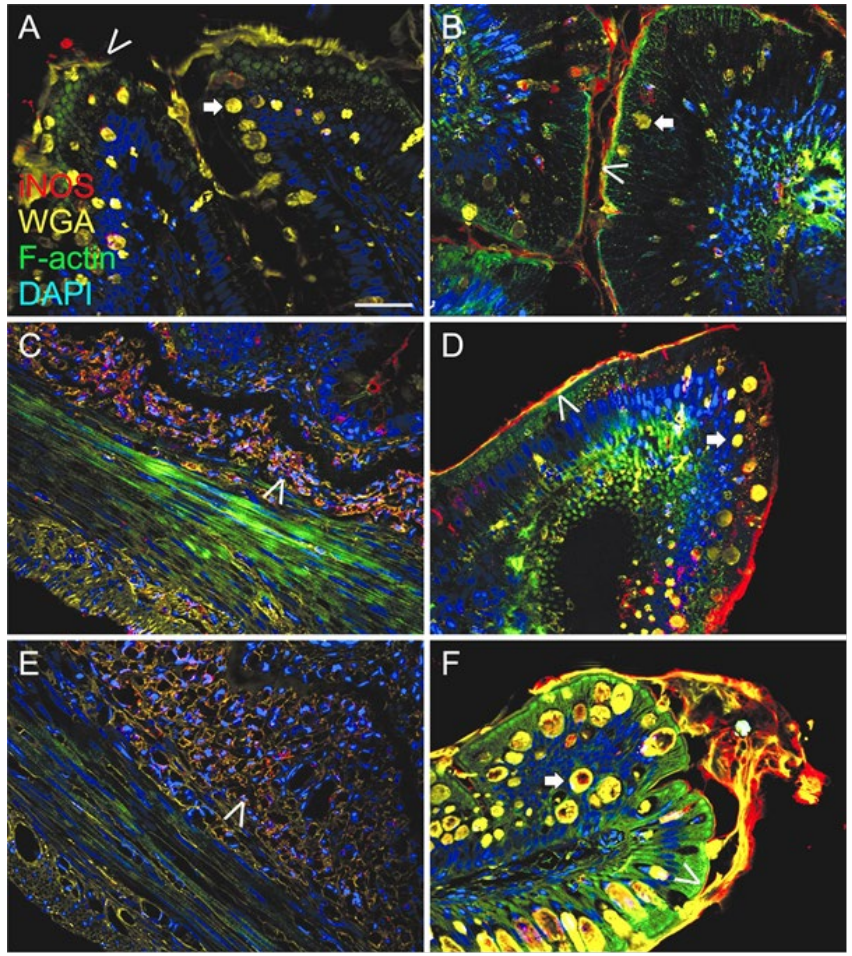
WHAT CAN BE PART OF THE SOLUTION?

UNDERLYING MAGIC



frontiers in Marine Science

ORIGINAL RESEARCH
published: 14 February 2020
doi: 10.3389/fmars.2020.00057

Check for updates

Microalgal *Schizochytrium limacinum* Biomass Improves Growth and Filet Quality When Used Long-Term as a Replacement for Fish Oil, in Modern Salmon Diets

Kousoulaki Katerina[1], Gerd Marit Berge[1], Mørkøre Turid[1], Krasnov Aleksei[2], Baeverfjord Grete[1], Ytrestøyl Trine[1], Carlehög Mats[3], Sweetman John[4] and Ruyter Bente[1]*

[1] Department of Nutrition and Feed Technology, Nofima – Norwegian Institute of Food, Fisheries and Aquaculture Research, Fyllingsdalen, Norway, [2] Department of Fish Health, Nofima – Norwegian Institute of Food, Fisheries and Aquaculture Research, Ås, Norway, [3] Department of Consumer and Sensory Sciences, Nofima – Norwegian Institute of Food, Fisheries and Aquaculture Research, Ås, Norway, [4] Alltech Inc., Springcroft, Mosshill, Brora, United Kingdom

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UNDERLYING MAGIC

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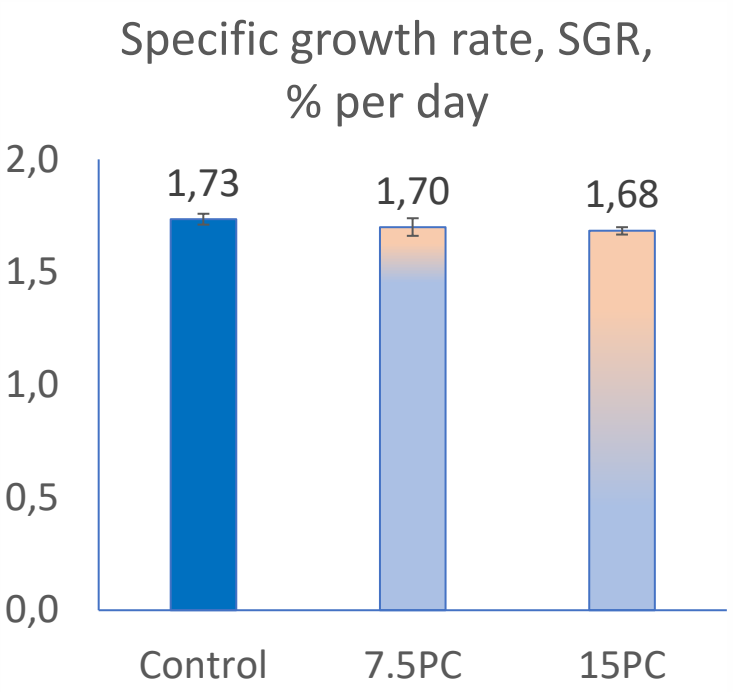

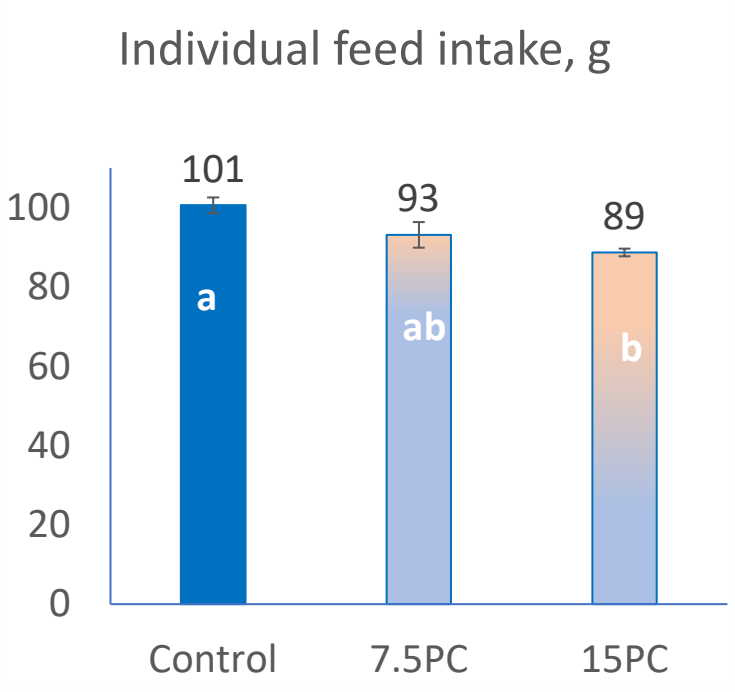

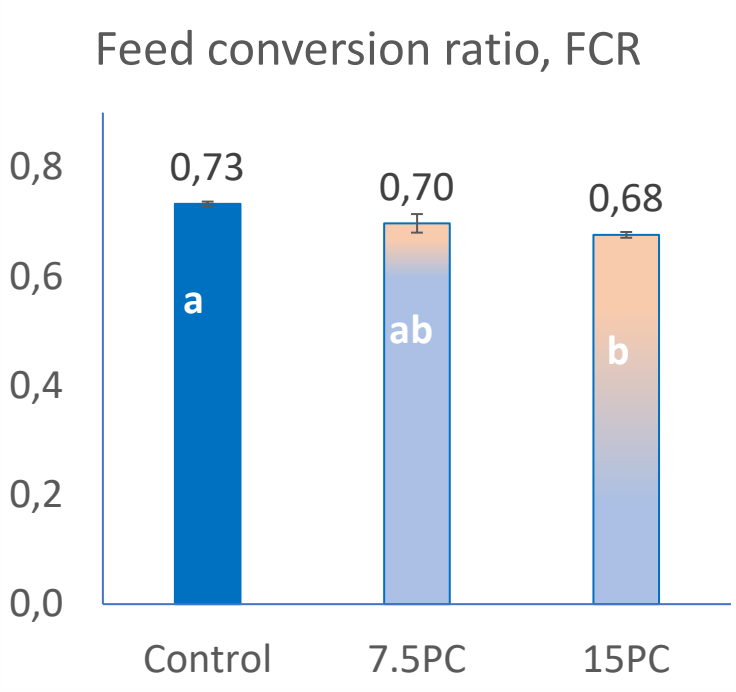

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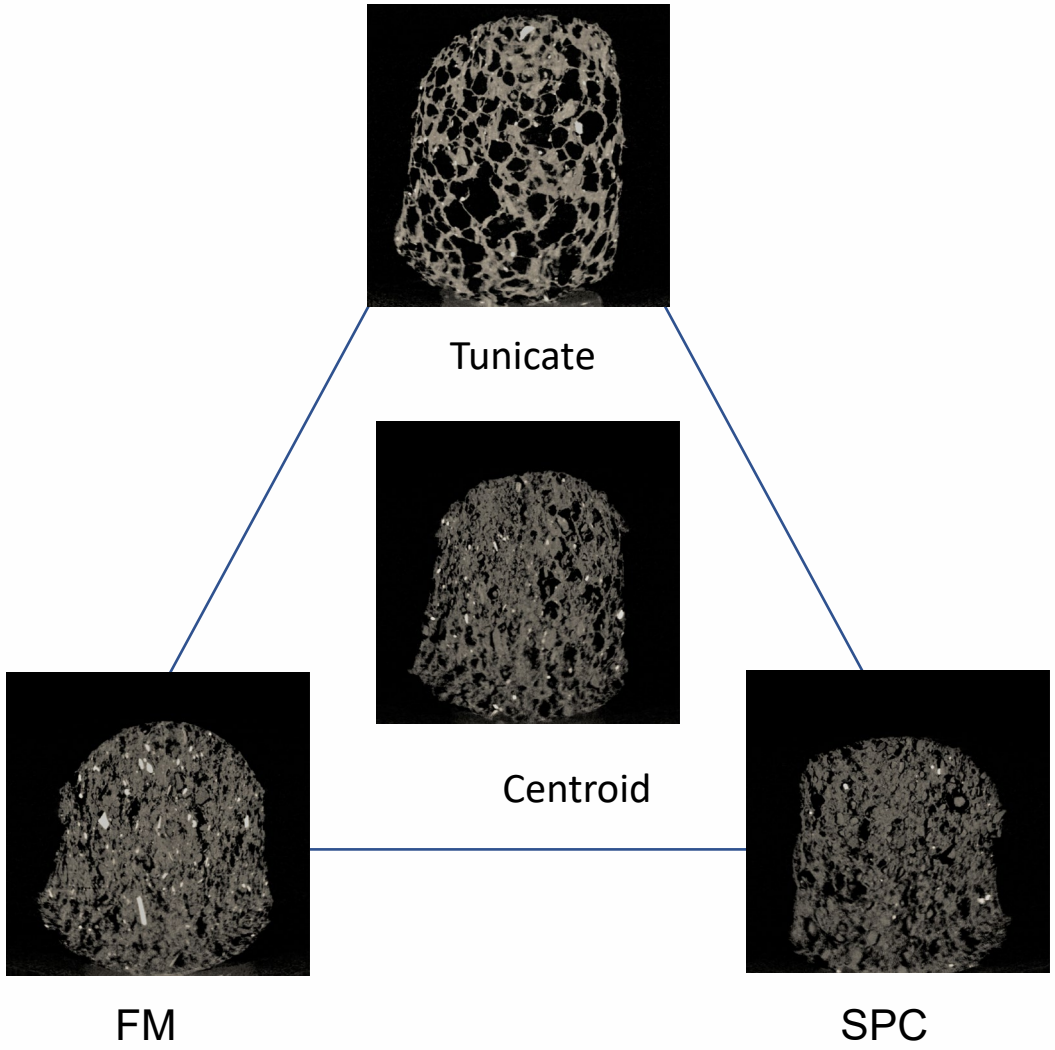
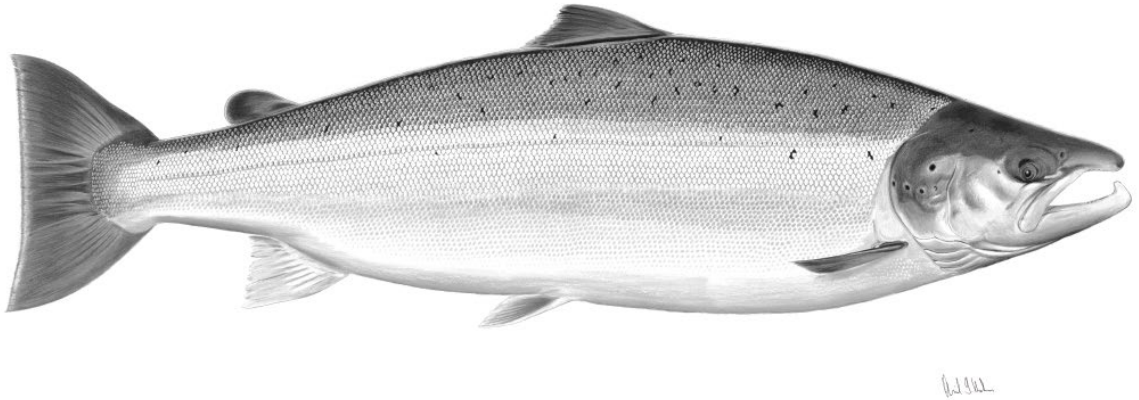
UNDERLYING MAGIC

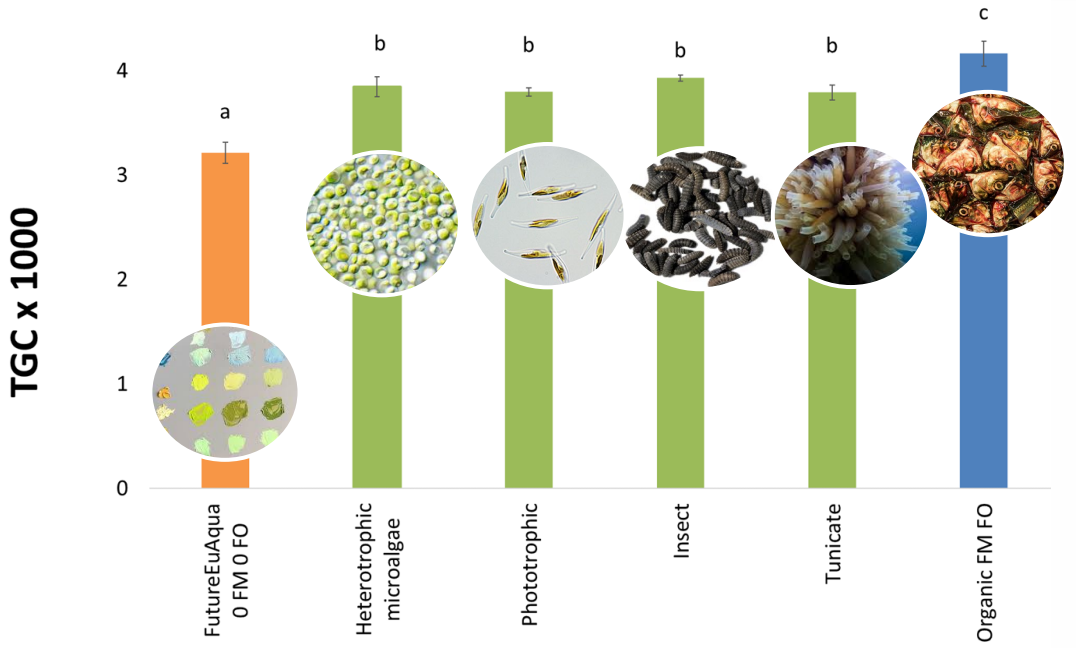


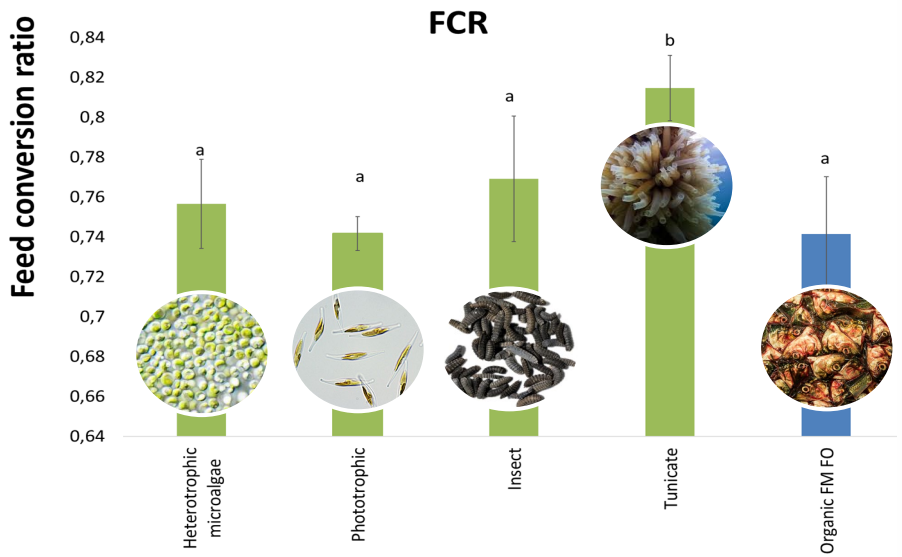
Replacement of fishmeal or SPC by **tunicate meal** in extruded feeds impact pellet expansion and fat adsorption capacity

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the BBI grant agreement No 790956

TARGET MARKET: salmon farming







Nofima

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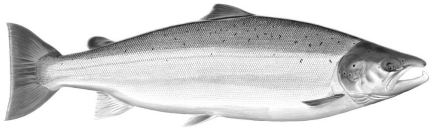
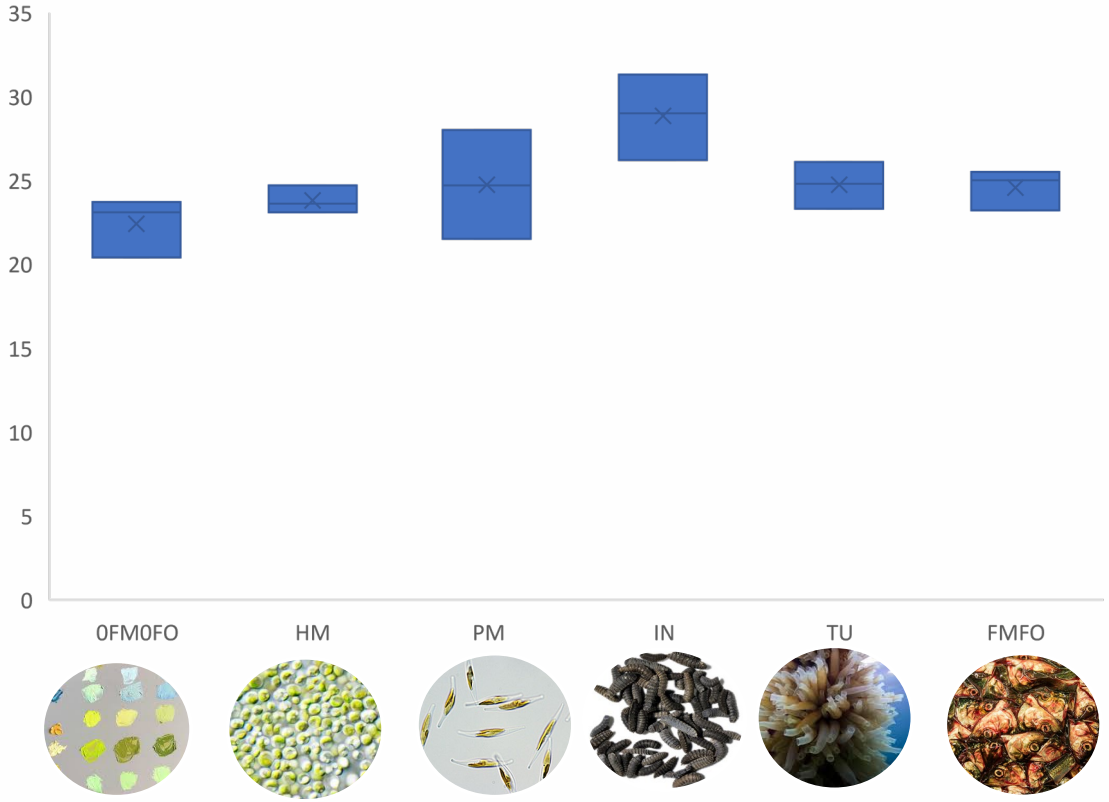
RESULTS and IMPACT

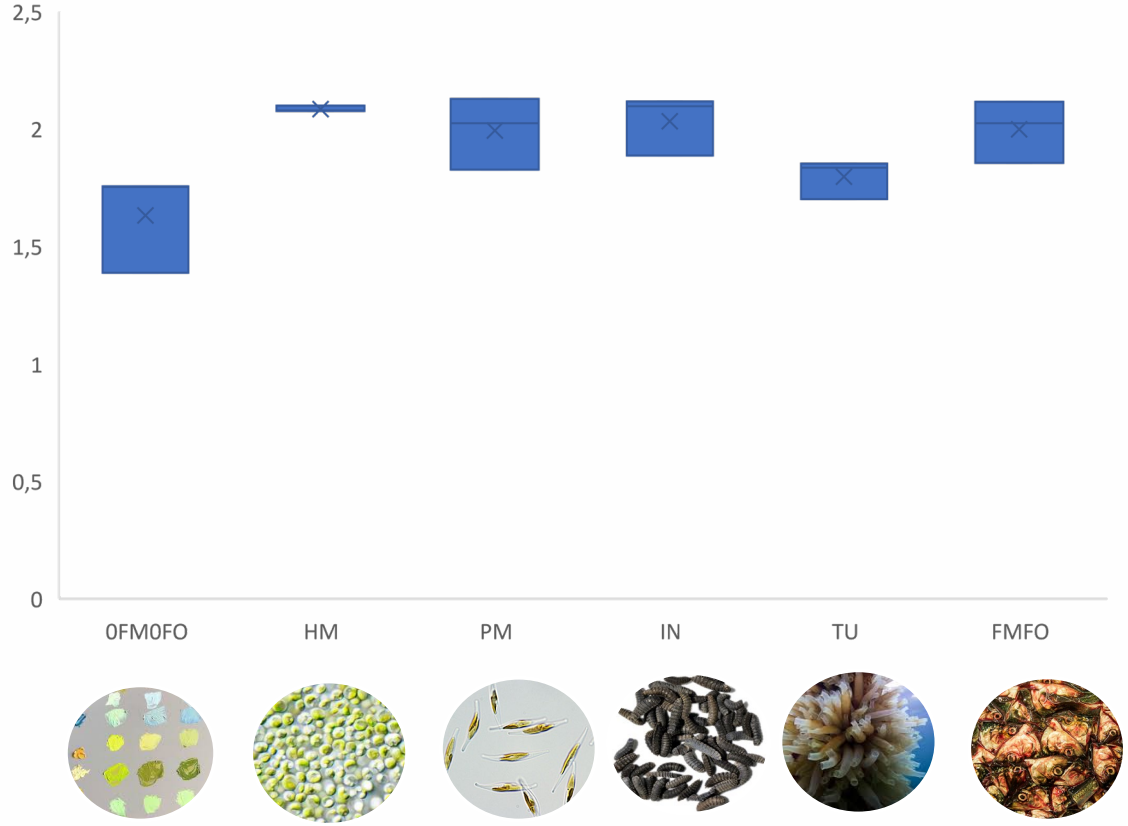
TANK TRIAL



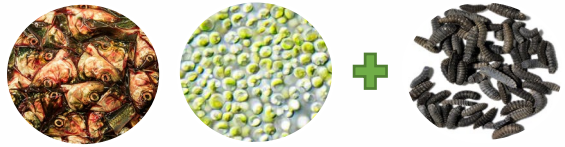
FILLET LIPIDS %



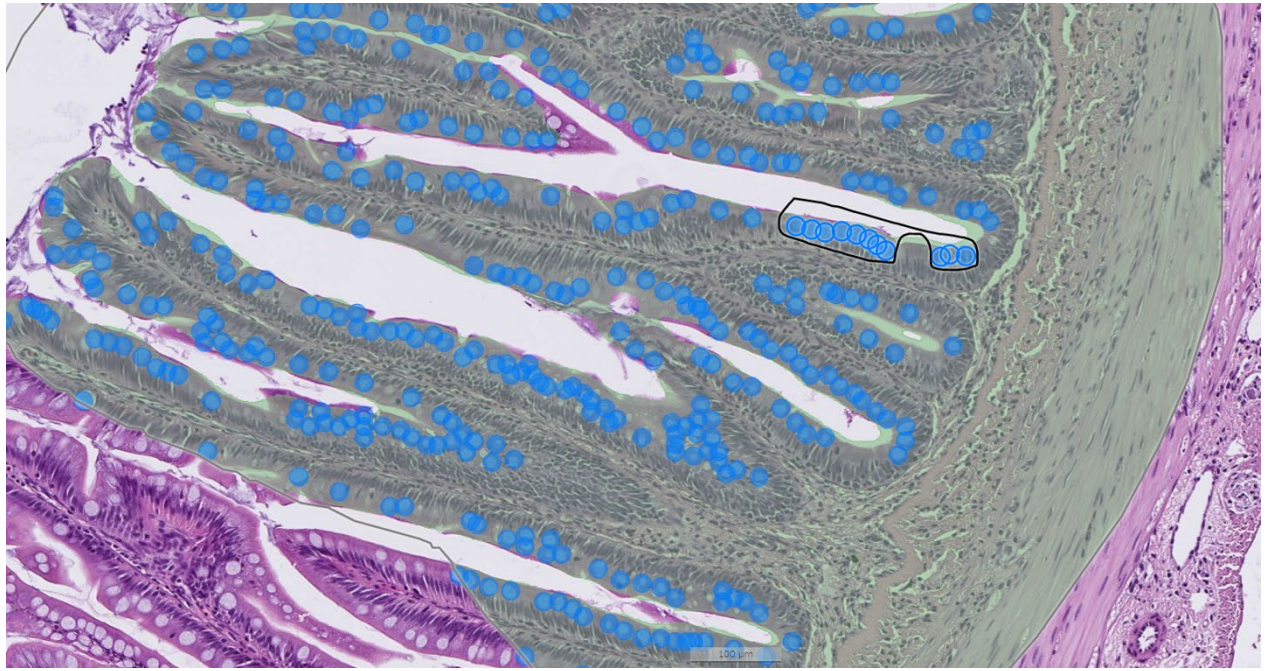
EPA+DHA G/100G FILLET



SEA CAGE TRIAL



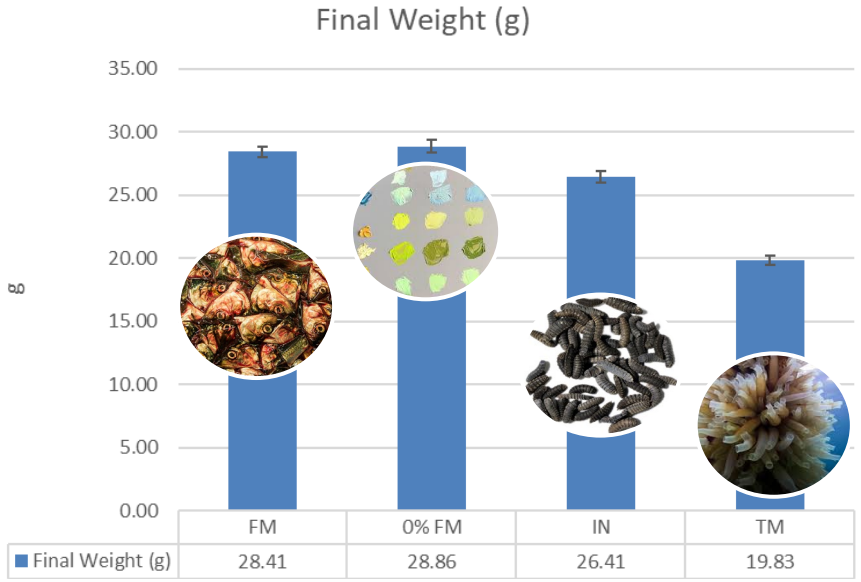
GUT HISTOLOGY

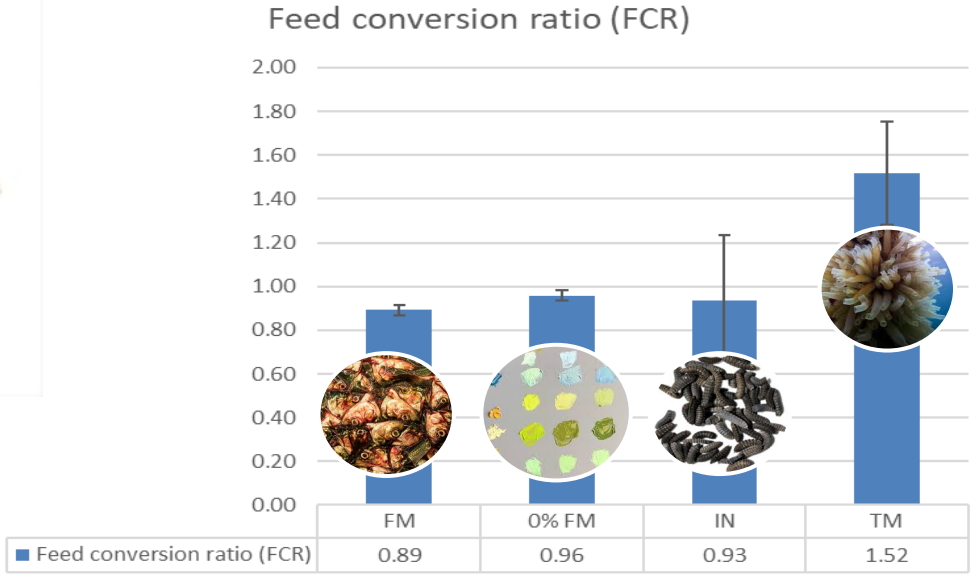


GUT GLOBAL TRANSCRIPTOMICS

Gene	Locus	Fut Ctr all	Fut Ctr B	Fut Ctr S
Lipid & steroid metabolism				
Delta-6 fatty acyl desaturase	fadsd6	2.02	1.98	2.06
3-keto-steroid reductase	LOC106568727	1.76	1.52	2.05
7-dehydrocholesterol reductase 1	dhcr7	1.57	1.42	1.74
7-dehydrocholesterol reductase 2	tm7sf2	1.62	1.57	1.68
7-dehydrocholesterol reductase 3	tm7sf2	1.61	1.62	1.60
Acetyl-CoA acetyltransferase, cytosolic	thic	2.22	2.08	2.37
Diphosphomevalonate decarboxylase	erg19	2.54	1.98	3.25
Farnesyl pyrophosphate synthetase	fpps	2.03	1.78	2.31
Isopentenyl-diphosphate Delta-isomerase 1	idi1	2.25	1.92	2.62
Isopentenyl-diphosphate Delta-isomerase 2	idi1	1.82	1.51	2.20
Lanosterol 14-alpha demethylase	LOC106588568	2.01	1.86	2.18
Retinol dehydrogenase 11	LOC106596856	2.62	2.20	3.11
Squalene synthase	fdft1	1.84	1.41	2.40
Sterol-C5-desaturase	sc5d	2.27	2.20	2.35
Stress				
CCAAT/enhancer binding protein (C/EBP)_beta 1	LOC106572480	-1.75	1.73	1.78
CCAAT/enhancer binding protein (C/EBP)_beta 2	LOC106572480	-1.85	-1.92	1.78
CCAAT/enhancer binding protein (C/EBP)_beta 3	LOC106572480	-1.70	-1.69	1.71
Cholesterol 25-hydroxylase-like protein A	c25ha	-1.98	2.05	1.92
D-aspartate oxidase	LOC106611914	1.46	-1.53	1.39
Growth arrest and DNA-damage-inducible, beta b	LOC106568974	-1.66	1.53	-1.81
Immediate early response 2-1	LOC106606792	-1.76	-1.92	1.62
Immediate early response 2-2	ier2	-1.57	-1.67	1.47
Immediate early response 2-3	ier2	-1.52	-1.68	1.37
Immediate early response 5-1	LOC106613579	-1.73	-1.58	-1.89
Jun B-1	junb	-1.80	-1.88	1.72
Jun C1	jun	1.36	-1.52	1.22
Jun C2	LOC106613963	1.38	-1.66	1.14
Sgk1 serum/glucocrticoid regulated kinase	LOC106570356	-2.25	1.99	2.55

TARGET MARKET: sea bream farming





RESULTS and IMPACT

CURRENT STATUS: large scale production of algae and insect meals and implementation in commercial salmon farming

Algae-based feed effort focuses on providing sustainable, alternative ingredient

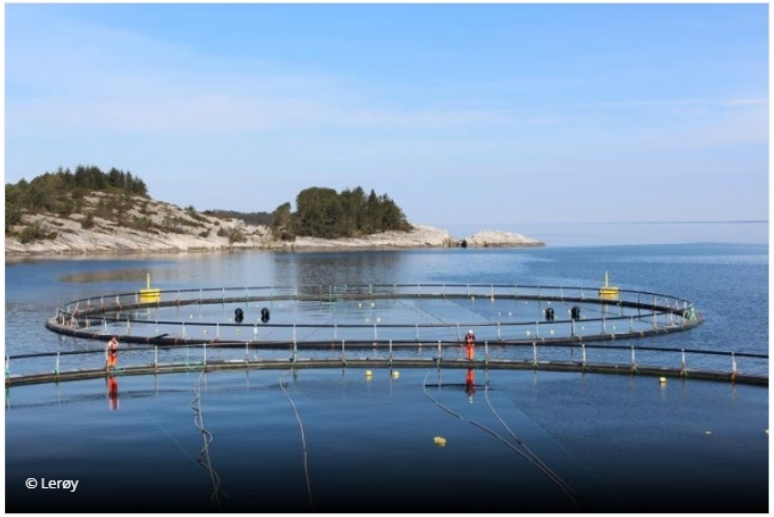
By Aerin Einstein-Curtis
02-Nov-2018 - Last updated on 31-Jan-2019 at 11:43 GMT

Consumer interest in aquaculture production and nutrition supports the role of alternative, algae-based omega-3 feed ingredients.

Lerøy flags up use of microalgae sourced DHA in its salmon diets

By Jane Byrne
24-Apr-2017 - Last updated on 27-Apr-2017 at 12:05 GMT

1 COMMENT



RELATED TAGS: Fatty acids, Omega-3 fatty acid, Eicosapentaenoic acid

Salmon producer, Lerøy, says it has reduced its use of marine sourced omega-3 fatty acids by switching to a feed incorporating a DHA laden microalgae product.

InnovaFeed opens biggest insect protein plant globally, secures €140m in funds, and partners with ADM to build US site

By Jane Byrne
19-Nov-2020 - Last updated on 19-Nov-2020 at 15:04 GMT

THANK YOU!

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