Supplementary Material

**Table S1:** Ingredients of the experimental diets (FD = fish oil diet. VD = vegetable oil diet).

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| Ingredients | **FD** | **VD** |
|  | % | % |
| Fishmeal 70 LT FF Skagen | 10.000 | 10.000 |
| Fish protein concentrate (CPSP 90) | 15.000 | 15.000 |
| Squid meal | 25.000 | 25.000 |
| Shrimp hydrolisate | 5.000 | 5.000 |
| Fish gelatin | 2.000 | 2.000 |
| Pea protein concentrate | 7.500 | 7.500 |
| Wheat Gluten | 12.500 | 12.500 |
| Potato starch gelatinised | 2.500 | 2.500 |
| **Fish oil** | **7.200** | **0.000** |
| **Tuna oil** | **2.300** | **0.000** |
| Rapeseed oil | 0.000 | 2.900 |
| Linseed oil | 0.000 | 2.400 |
| Palm oil | 0.000 | 4.200 |
| Vit & Min Premix | 1.500 | 1.500 |
| Lutavit C35 | 0.030 | 0.030 |
| Lutavit E50 | 0.120 | 0.120 |
| Brewer's yeast | 5.000 | 5.000 |
| Betaine HCl | 1.000 | 1.000 |
| MAP (Monoammonium phosphate) | 3.000 | 3.000 |
| L-Taurine | 0.350 | 0.350 |
| NTNU - Phospholipids | 0.000 | 0.000 |
| **Total** | **100.000** | **100.000** |
|  |  |  |
| As fed basis | **FD** | **VD** |
| Crude protein | 65.00 | 65.00 |
| Crude fat | 14.10 | 14.10 |
| Fiber | 0.29 | 0.29 |
| Starch | 4.33 | 4.33 |
| Ash | 6.34 | 6.34 |
| Gross Energy | 20.43 | 20.43 |
| **C14** | **0.83** | **0.18** |
| C16 | 2.01 | 2.64 |
| **C18:1n9** | **1.66** | **4.42** |
| LNA | 0.41 | 1.48 |
| ALA | 0.20 | 1.52 |
| ARA | 0.01 | 0.01 |
| EPA | 1.15 | 0.25 |
| DHA | 1.26 | 0.48 |
| **EPA+DHA** | **2.40** | **0.73** |
| **DHA/EPA** | **1.10** | **1.90** |
| SFA | 3.51 | 3.44 |
| MUFA | 5.10 | 5.03 |
| PUFA | 3.35 | 3.50 |
| **TPL** | **1.31** | **1.28** |

Table S2: Number of pooled replicate DNA samples/replicate tank/time point of the pre-feeding *S*. *salar* life stages: Eggs (EG). yolk sac larvae (YS) and “D0” and feeding stages of a) fish oil group (FD): D35F, D65F and D93F and b) vegetable oil group (VD): D35V, D65V and D93V. \*DNA extracts from 5 individual samples were pooled, resulting in 2 pooled samples/tank/time point

|  |  |  |
| --- | --- | --- |
| Sample code | Number of replicate tanks | Number of pooled replicate DNA samples\*/replicate tank |
| EG | 1 | 2 |
| YS | 1 | 2 |
| D0 | 1 | 2 |
| D35F | 2 | 2 |
| D65F | 2 | 2 |
| D93F | 2 | 2 |
| D35V | 2 | 2 |
| D35V | 2 | 2 |
| D35V | 2 | 2 |

Table S3: List of Barcode sequences used for labeling the different samples.

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| --- | --- | --- |
| **Sample code** | **Sample code in manuscript** | **Barcode** |
| AFOAWS | FW | CATAATAG |
| AFOBWS | FW | CATATTCT |
| ASTWS | STW | CATAACAA |
| AVOAWS | VW | CATCAACA |
| AVOBWS | VW | CATCACCG |
| D0AG1P | D0 | CATTCGTG |
| D0AG2P | D0 | CATTCTAA |
| D35.AFOAG1P | D35F | CATTGCGT |
| D35.AFOAG2P | D35F | CCACCTTA |
| D35.AFOBG1P | D35F | CCACGGTG |
| D35.AFOBG2P | D35F | CCAGCGGT |
| D35.AVOAG1P | D35V | CCAGCTCA |
| D35.AVOAG2P | D35V | CCAGGACT |
| D35.AVOBG1P | D35V | CCAGGCTG |
| D35.AVOBG2P | D35V | CCAGTCGT |
| D65.AFOAG1P | D65F | CCATGATT |
| D65.AFOAG2P | D65F | CCATTGAG |
| D65.AFOBG1P | D65F | ATCGATGA |
| D65.AFOBG2P | D65F | ATCGATGG |
| D65.AVOAG2P | D65V | ATCGGCGG |
| D65.AVOBG1P | D65V | ATCTAGCG |
| D65.AVOBG2P | D65V | ATCTAGGA |
| D93.AFOAG1P | D93F | ATCTCGAT |
| D93.AFOAG2P | D93F | ATGAACAG |
| D93.AFOBG1P | D93F | ATGAACTT |
| D93.AFOBG2P | D93F | ATGAGCGA |
| D93.AVOAG1P | D93V | ATGATTAG |
| D93.AVOAG2P | D93V | ATGATTGT |
| D93.AVOBG1P | D93V | CGTAGGTG |
| D93.AVOBG2P | D93V | CGTATCTC |
| EGA1P | EG | CATGCGCA |
| EGA2P | EG | CATGGAAG |
| FOD | FD | CAGTTCAT |
| VOD | VD | CAGTTGCA |
| YSA1P | YS | CATGTTGT |
| YSA2P | YS | CATTCCGT |

**Table S4:** Body weight (g) and total length (cm) of *S*. *salar* at D0, D35, D65, D93 in dietary treatments Fish oil (FD) and Vegetable oil (VD) diets (mean ± SD).

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| --- | --- | --- | --- | --- |
| Dietary treatment | Life stage | N | Body weight (g) | Total length (cm) |
|  | D0 | 20 | 0.23 ± 0.030 | 29.9 ± 1.60 |
| FD | D35 | 20 | 0.57 ± 0.211 | 38.9 ± 5.40 |
|  | D65 | 20 | 2.29 ± 0.482 | 61.5 ± 5.10 |
|  | D93 | 20 | 4.58 ± 1.74 | 76.0 ± 8.90 |
| VD | D35 | 20 | 0.58 ± 0.228 | 38.2 ± 4.90 |
|  | D65 | 20 | 2.18 ± 4.54 | 61.2 ± 5.20 |
|  | D93 | 20 | 4.54 ± 1.78 | 73.8 ± 9.20 |

**Table S5:** Chao 1 and Simpson1-D values (mean ± SD) in all sample categories. Pre-feeding *S*. *salar* life stages: Eggs (EG), yolk sac larvae (YS) and “D0”. Feeding stages of a) fish oil group (FD): D35F, D65F and D93F and b) vegetable oil group (VD): D35V, D65V and D93V. Rearing water: Pre-feeding tank (STW). fish oil group (FW) and vegetable oil group (VW). Feed: vegetable oil (VD) and fish oil feed (FD). N: Number of biological replicates analyzed. D: Day.

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| --- | --- | --- | --- | --- |
| Sample category | N | Chao1 | Coverage (observed OTUs/Chao1) | Simpson1-D |
| EG | N=2 | 222 ± 113.9 | 77.5% | 0.89 ± 0.010 |
| YS | N=2 | 127 ± 28.9 | 68.5% | 0.84 ± 0.088 |
| D0 | N=2 | 167 ± 33.6 | 79.0% | 0.72 ± 0.277 |
| D35F | N=4 | 143 ± 67.5 | 84.6% | 0.95 ± 0.021 |
| D35V | N=4 | 151 ± 46.4 | 89.4% | 0.96 ± 0.010 |
| D65F | N=4 | 135 ± 30.9 | 81.5% | 0.96 ± 0.011 |
| D65V | N=3 | 144 ± 10.2 | 91.7% | 0.93 ± 0.048 |
| D93F | N=4 | 109 ± 10.7 | 85.3% | 0.96 ± 0.021 |
| D93V | N=4 | 85 ± 30.6 | 92.9% | 0.95 ± 0.014 |
| FD | N=1 | 306 | 84.6% | 0.81 |
| VD | N=1 | 249 | 86.7% | 0.82 |
| STW | N=1 | 2466 | 98.2% | 0.98 |
| FW | N=2 | 1769 ± 179.6 | 95.1% | 0.95 ± 0.008 |
| VW | N=2 | 1213 ± 156.3 | 90.7% | 0.93 ± 0.012 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S6:** P values of Tukey’s operational taxonomic units test for the detection of statistically significant differences of the (OTU) in *S*. *salar* larvae from Egg to day 93 dpff in both dietary treatments (FD, VD). \*: p < 0.05 Pre-feeding *S*. *salar* life stages: Eggs (EG), yolk sac larvae (YS) and “D0”. Feeding stages of a) fish oil group (FD): D35F. D65F and D93F and b) vegetable oil group (VD): D35V, D65V and D93V. D: Day.   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | **EG** | **YS** | **D0** | **D35F** | **D65F** | **D93F** | **D35V** | **D65V** | **D93V** | | **EG** |  | 0.619 | 1.000 | 0.006\* | 0.001\* | 0.001\* | 0.997 | 0.001\* | 0.001\* | | **YS** | 2.677 |  | 0.788 | 0.715 | 0.062 | 0.035\* | 0.113 | 0.324 | 0.018\* | | **D0** | 0.369 | 2.308 |  | 0.015\* | 0.001\* | 0.001\* | 0.979 | 0.003\* | 0.001\* | | **D35F** | 5.369 | 2.448 | 4.944 |  | 0.904 | 0.810 | 0.001\* | 0.998 | 0.666 | | **D65F** | 7.151 | 4.290 | 6.757 | 1.958 |  | 1.000 | 0.001\* | 1.000 | 1.000 | | **D93F** | 7.421 | 4.559 | 7.027 | 2.250 | 0.291 |  | 0.001\* | 0.998 | 1.000 | | **D35V** | 1.114 | 3.975 | 1.508 | 6.969 | 8.927 | 9.218 |  | 0.001\* | 0.001\* | | **D65V** | 5.973 | 3.297 | 5.605 | 1.048 | 0.765 | 1.035 | 7.500 |  | 0.990 | | **D93V** | 7.727 | 4.866 | 7.333 | 2.581 | 0.623 | 0.331 | 9.549 | 1.341 |  | |

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| **Figure S1:** Mean weight and length of *S*. *salar* individuals at the time points D0, D35, D65 and D93, in both diet treatments (FD and VD). |

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| **Figure S2:** Rarefaction curves for the number of Taxa (OTUs) observed in all individual samples that analyzed in this study (water. diets and *S*. *salar* samples). |
| **Chart, bar chart  Description automatically generated**  **Figure S3:** Relative abundance of bacterial phyla in all samples. grouped according to category. Pre-feeding *S*. *salar* life stages: Eggs (EG). yolk sac larvae (YS) and “D0”. Feeding stages of a) fish oil group (FD): D35F, D65F and D93F and b) vegetable oil group (VD): D35V, D65V and D93V. Rearing water: Pre-feeding tank (STW). fish oil group (FW) and vegetable oil group (VW). Feed: vegetable oil (VD) and fish oil feed (FD). |

Chart, scatter chart

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**Figure S4**. PCoA displays the bacterial communities of *S*. *salar* groups based on Bray-Curtis distance. Each feeding stage represented by different color: black = pre-feeding *S*. *salar* life stages (EG, YS, D0), blue = D35, purple = D65 and green = D93 . Different symbols correspond to the following dietary treatments: Fish oil group (FD) D35F, D65F and D93F and b) vegetable oil group (VD) D35V, D65V and D93V. D=day.

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**Figure S5:** Relative abundance of Proteobacterial subphyla in all sample categories. Pre-feeding *S*. *salar* life stages: Eggs (EG). yolk sac larvae (YS) and “D0”. Feeding stages of a) fish oil group (FD): D35F, D65F and D93F and b) vegetable oil group (VD): D35V, D65V and D93V. Rearing water: Pre-feeding tank (STW), fish oil group (FW) and vegetable oil group (VW). Feed: vegetable oil (VD) and fish oil feed (FD).

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| **Figure S6:** Pre-feeding *S*. *salar* life stages: Eggs (EG). yolk sac larvae (YS) and “D0”. Feeding stages of a) fish oil group (FD): D35F, D65F and D93F and b) vegetable oil group (VD): D35V, D65V and D93V. Rearing water: Pre-feeding tank (STW), fish oil group (FW) and vegetable oil group (VW). Feed: vegetable oil (VD) and fish oil feed (FD). |
| *Chart, bar chart  Description automatically generated* |
| **Figure S7:** Relative abundance of γ-proteobacterial families in all sample categories. Pre-feeding *S*. *salar* life stages: Eggs (EG). yolk sac larvae (YS) and “D0”. Feeding stages of a) fish oil group (FD): D35F. D65F and D93F and b) vegetable oil group (VD) FD= D35V. D65V and D93V. Rearing water: Pre-feeding tank (STW). fish oil group (FW) and vegetable oil group (VW). Feed: vegetable oil (VD) and fish oil feed (FD). |