**Supplementary Material**

**Table S1.** Formulation and nutrient composition (%) of experimental diets fed to Atlantic salmon for 12 weeks. Modified from Emam et al. (2020).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ingredient (% of diet)a | 0.3%EPA+DHA  | 0.3%EPA+DHA | 1%EPA+DHA | 1%EPA+DHA | 1.4%EPA+DHA |
| ↑ω6 | ↑ω3 | ↑ω6 | ↑ω3 | balanced |
| Fish oil | 0.1 | - | 4.3 | 4.3 | 6.8 |
| Soy oil | 12.5 | - | 10.1 | - | - |
| Linseed oil | - | 7.9 | - | 6.5 | - |
| Poultry fatb | 2.4 | 7.1 | 0.6 | 4.3 | 3.4 |
| Rapeseed oil | - | - | - | - | 4.8 |
| Proximate composition (% as fed basis)  |  |  |  |  |  |
| Nitrogenc | 7.3 | 7.5 | 7.8 | 7.3 | 7.2 |
| Crude lipidd | 19.9 | 20.6 | 20.0 | 20.7 | 20.4 |
| Dry matterd  | 97.4 | 97.6 | 98.0 | 97.5 | 97.8 |
| Ashd | 5.7 | 5.7 | 5.4 | 5.7 | 6.0 |

a All ingredients were sourced from EWOS stocks.

b Poultry fat contained EPA+DHA and 18:2ω6 levels of 0.4 and 2.9% of total FA, respectively. This contributed to their level in experimental diets.

c Analysed as % of dry weight (n=3).

d Analysed as % of wet weight (n=3).

**Table S2.** Lipid and fatty acid composition (%) of experimental dietsa fed to Atlantic salmon for 12 weeks. Modified from Emam et al. (2020).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | 0.3%EPA+DHA | 0.3%EPA+DHA | 1%EPA+DHA | 1%EPA+DHA | 1.4%EPA+DHA |
|   | ↑ω6 | ↑ω3 | ↑ω6 | ↑ω3 | balanced |
| Lipid classes composition (% of total lipid) |  |  |  |  |
| TAG (%)b | 62.2 | 68.4 | 70.6 | 60.9 | 71.6 |
| ST (%)c | 3.8 | 5.5 | 3.8 | 3.4 | 3.4 |
| AMPL (%)d | 2.1 | 2.7 | 1.8 | 1.7 | 2.1 |
| PL (%)e | 11.7 | 6.0 | 4.4 | 10.2 | 6.3 |
| TL (mg/g)f  | 174.0 | 189.1 | 168.9 | 210.1 | 201.8 |
| Fatty acid composition (% of total FA)  |  |  |  |  |
| 14:0 | 0.7 | 0.8 | 1.9 | 2.0 | 2.7 |
| 16:0 | 14.0 | 14.0 | 13.5 | 13.3 | 12.9 |
| 16:1ω7 | 1.2 | 2.3 | 1.8 | 2.7 | 3.2 |
| 18:0 | 5.2 | 5.8 | 4.7 | 5.0 | 4.0 |
| 18:1ω7 | 1.7 | 1.6 | 1.9 | 2.0 | 2.9 |
| 18:1ω9 | 23.2 | 28.1 | 18.6 | 22.5 | 29.5 |
| **18:2ω6 (LNA)** | **41.4** | **18.3** | **33.4** | **14.8** | **13.3** |
| **18:3ω3 (ALA)** | **6.0** | **22.4** | **5.0** | **18.4** | **4.1** |
| 20:1ω9 | 0.3 | 0.4 | 1.0 | 1.0 | 1.7 |
| 20:1ω11 | 0.1 | 0.1 | 2.5 | 2.6 | 4.1 |
| 20:4ω6 (ARA) | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 |
| **20:5ω3 (EPA)** | **1.1** | **1.2** | **3.1** | **3.1** | **4.3** |
| 22:1ω11 | 0.2 | 0.1 | 2.6 | 2.7 | 4.2 |
| **22:6ω3 (DHA)** | **1.7** | **1.8** | **3.6** | **3.5** | **4.5** |
| ΣSFAg | 21.1 | 21.4 | 21.4 | 21.3 | 20.9 |
| ΣMUFAh | 27.2 | 33.2 | 29.6 | 34.8 | 47.3 |
| ΣPUFAi | 51.6 | 45.2 | 48.8 | 43.6 | 31.4 |
| **Σω3**  | **9.4** | **25.9** | **14.1** | **27.4** | **16.4** |
| **Σω6**  | **41.9** | **19.0** | **34.0** | **15.6** | **14.2** |
| ω6:ω3 | 4.5 | 0.7 | 2.4 | 0.6 | 0.9 |
| EPA+DHA | 2.8 | 3.0 | 6.7 | 6.6 | 8.8 |
| DHA:EPA | 1.5 | 1.5 | 1.2 | 1.1 | 1.0 |
| EPA:ARA | 3.7 | 3.0 | 10.3 | 7.8 | 10.8 |

a Mean (n=3). b Triacylglycerol. c Sterols. d Acetone mobile polar lipid. e Phospholipids. f Total lipids. g Totalsaturated fatty acids. h Total monounsaturated fatty acids. i Total polyunsaturated fatty acids. Fatty acids in bold font were key to the experimental design.

**Table S3.** PERMANOVA pairwise testa of head kidney FA and lipid composition compared across dietary treatments.

|  |  |  |
| --- | --- | --- |
| Dietary treatments |  t | P(perm)b |
| 0.3%EPA+DHA↑ω6, 0.3%EPA+DHA↑ω3 | 5.11 | **0.0001** |
| 0.3%EPA+DHA↑ω6, 1%EPA+DHA↑ω6 | 2.40 | **0.003** |
| 0.3%EPA+DHA↑ω6, 1%EPA+DHA↑ω3 | 5.64 | **0.0001** |
| 0.3%EPA+DHA↑ω6, 1.4%EPA+DHA/balanced | 5.91 | **0.0001** |
| 0.3%EPA+DHA↑ω3, 1%EPA+DHA↑ω6 | 3.64 | **0.0001** |
| 0.3%EPA+DHA↑ω3, 1%EPA+DHA↑ω3 | 1.50 | 0.12 |
| 0.3%EPA+DHA↑ω3, 1.4%EPA+DHA/balanced | 3.13 | **0.0002** |
| 1%EPA+DHA↑ω6, 1%EPA+DHA↑ω3 | 3.76 | **0.0001** |
| 1%EPA+DHA↑ω6, 1.4%EPA+DHA/balanced | 4.19 | **0.0001** |
| 1%EPA+DHA↑ω3, 1.4%EPA+DHA/balanced | 2.84 | **0.002** |

Significant P(perm)-values (i.e. p < 0.05) are in bold font.

a The non-parametric Bray-Curtis similarity was used with 9999 permutations

(see Materials and Methods).

b PERMANOVA p-values for all dietary treatment comparisons.

**Table S4**. SIMPER dissimilarities of head kidney FA and lipid composition compared across dietary treatments.

|  |  |  |  |
| --- | --- | --- | --- |
| Dietary treatments | Average dissimilarity (%) | Major lipid class / FA contributora | Contribution (%) |
| 0.3%EPA+DHA↑ω6 & | 15.6 | TAG | 12.9 |
| 0.3%EPA+DHA↑ω3 |  | PL | 12.6 |
|  |  | Σω6 | 12.1 |
|  |  | Σω3 | 7.7 |
|   |   | ST | 7.4 |
| 0.3%EPA+DHA↑ω6 & | 11.0 | TAG | 15.6 |
| 1%EPA+DHA↑ω6 |  | PL | 15.6 |
|  |  | ST | 9.2 |
|  |  | Σω6 | 7.7 |
|   |   | Σω3 | 6.2 |
| 0.3%EPA+DHA↑ω3 & | 12.5 | TAG | 15.0 |
| 1%EPA+DHA↑ω6 |  | PL | 13.8 |
|  |  | ST | 9.2 |
|  |  | Σω6 | 8.5 |
|   |   | 18:2ω6 | 6.8 |
| 0.3%EPA+DHA↑ω6 & | 16.6 | Σω6 | 13.1 |
| 1%EPA+DHA↑ω3 |  | TAG | 12.2 |
|  |  | PL | 11.2 |
|  |  | Σω3 | 8.8 |
|   |   | 18:2ω6 | 7.9 |
| 0.3%EPA+DHA↑ω3 & | 10.0 | TAG | 22.1 |
| 1%EPA+DHA↑ω3 |  | PL | 17.9 |
|   |   | ST | 10.9 |
| 1%EPA+DHA↑ω6 & | 12.7 | TAG | 14.7 |
| 1%EPA+DHA↑ω3 |  | PL | 12.4 |
|  |  | Σω6 | 10.6 |
|  |  | ST | 8.0 |
|   |   | 18:2ω6 | 7.9 |
| 0.3%EPA+DHA↑ω6 & | 18.7 | Σω6 | 12.4 |
| 1.4%EPA+DHA/balanced |  | TAG | 12.1 |
|  |  | PL | 10.4 |
|  |  | ΣMUFA | 9.2 |
|   |   | ΣPUFA | 9.2 |
| 0.3%EPA+DHA↑ω3 & | 12.7 | TAG | 18.3 |
| 1.4%EPA+DHA/balanced |  | PL | 14.8 |
|  |  | ST | 9.2 |
|   |   | ΣPUFA | 7.8 |
| 1%EPA+DHA↑ω6 & | 14.9 | TAG | 14.3 |
| 1.4%EPA+DHA/balanced |  | PL | 11.0 |
|  |  | Σω6 | 10.0 |
|  |  | ΣMUFA | 9.7 |
|   |   | ΣPUFA | 9.7 |
| 1%EPA+DHA↑ω3 & | 12.3 | TAG | 19.6 |
| 1.4%EPA+DHA/balanced |  | PL | 14.5 |
|  |  | ST | 9.2 |
|   |   | ΣPUFA | 8.0 |

a TAG, PL and ST represent triacylglycerol, phospholipids, and sterols, respectively. ΣMUFA and ΣPUFA represent total monounsaturated and polyunsaturated fatty acids, respectively.

**Table S5.** Relative transcript expression of genes related to FA and eicosanoid metabolism in the head kidney of Atlantic salmon after 12 weeks of feeding diets with different ratios of ω6:ω3 and levels of EPA+DHA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Transcripta  | 0.3%EPA+DHA | 0.3%EPA+DHA | 1%EPA+DHA | 1%EPA+DHA | 1.4%EPA+DHA | p-valueb |
| ↑ω6 | ↑ω3 | ↑ω6 | ↑ω3 | balanced |
| *elovl4b* | 1.6 ± 0.4 | 1.5 ± 0.3 | 1.5 ± 0.4 | 1.9 ± 0.3 | 1.6 ± 0.4 | 0.24 |
| *elovl5a* | 1.5 ± 0.4a | 2.0 ± 0.3b | 2.0 ± 0.3b | 2.1 ± 0.3b | 2.0 ± 0.1b | **0.01** |
| *fadsd5* | 2.0 ± 0.5a | 2.6 ± 0.9ab | 3.2 ± 1.2ab | 3.3 ± 0.7b | 3.0 ± 0.5ab | **0.04** |
| *fadsd6b* | 3.1 ± 1.3 | 3.2 ± 1.6 | 2.7 ± 0.8 | 2.8 ± 0.3 | 2.9 ± 0.7 | 0.70 |
| *fadsd6c* | 3.0 ± 1.2 | 2.9 ± 1.1 | 3.1 ± 1.3 | 3.9 ± 1.3 | 3.5 ± 1.1 | 0.50 |
| *srebp1* | 1.6 ± 0.4a | 1.8 ± 0.6ab | 2.0 ± 0.3ab | 2.4 ± 0.3b | 2.3 ± 0.5b | **0.02** |
| *srebp2* | 1.7 ± 0.6 | 1.8 ± 0.4 | 2.2 ± 0.5 | 2.3 ± 0.6 | 2.0 ± 0.4 | 0.11 |
| *lxra* | 1.5 ± 0.3 | 1.5 ± 0.3 | 1.5 ± 0.2 | 1.7 ± 0.2 | 1.8 ± 0.3 | 0.23 |
| *lxrb* | 2.3 ± 0.4 | 2.4 ± 0.8 | 2.8 ± 0.9 | 3.0 ± 0.7 | 2.4 ± 0.6 | 0.35 |
| *pparaa* | 7.4 ± 4.5a | 2.8 ± 1.4b | 5.1 ± 2.0ab | 3.8 ± 1.9ab | 6.2 ± 3.0ab | **0.02** |
| *pparb1* | 2.1 ± 0.5 | 2.0 ± 0.2 | 1.9 ± 0.6 | 2.0 ± 0.4 | 1.8 ± 0.3 | 0.68 |
| *pparb2a* | 1.4 ± 0.3 | 1.5 ± 0.3 | 1.5 ± 0.3 | 1.6 ± 0.3 | 1.4 ± 0.3 | 0.33 |
| *fasa* | 2.0 ± 0.9 | 2.0 ± 0.7 | 2.0 ± 0.6 | 2.3 ± 0.6 | 1.9 ± 0.6 | 0.85 |
| *fasb* | 4.0 ± 1.9 | 3.6 ± 1.4 | 3.5 ± 0.9 | 3.7 ± 1.1 | 3.0 ± 0.8 | 0.78 |
| *acox1* | 1.5 ± 0.4 | 1.7 ± 0.4 | 1.7 ± 0.3 | 1.8 ± 0.3 | 1.6 ± 0.2 | 0.62 |
| *cpt1a* | 1.5 ± 0.3 | 1.5 ± 0.1 | 1.5 ± 0.3 | 1.4 ± 0.3 | 1.5 ± 0.2 | 0.93 |
| *cpla2* | 1.3 ± 0.2 | 1.3 ± 0.2 | 1.3 ± 0.2 | 1.3 ± 0.1 | 1.4 ± 0.2 | 0.97 |
| *cox1* | 1.6 ± 0.3 | 1.8 ± 0.4 | 1.5 ± 0.2 | 1.8 ± 0.5 | 1.5 ± 0.3 | 0.19 |
| *cox2* | 3.3 ± 2.1 | 3.3 ± 0.8 | 4.2 ± 1.5 | 3.1 ± 1.5 | 3.9 ± 1.7 | 0.58 |
| *5loxa* | 1.9 ± 0.2 | 1.7 ± 0.4 | 1.9 ± 0.5 | 1.7 ± 0.5 | 1.8 ± 0.6 | 0.88 |
| *5loxb* | 1.5 ± 0.3 | 1.7 ± 0.3 | 1.6 ± 0.4 | 1.7 ± 0.4 | 1.7 ± 0.5 | 0.82 |
| *pgds* | 2.6 ± 1.1 | 3.4 ± 1.7 | 3.0 ± 1.1 | 3.1 ± 0.4 | 2.8 ± 0.9 | 0.74 |
| *ptges2* | 2.1 ± 0.6 | 2.1 ± 0.5 | 2.0 ± 0.8 | 2.0 ± 0.6 | 1.6 ± 0.4 | 0.57 |
| *ptges3* | 1.6 ± 0.5 | 2.1 ± 0.2 | 1.9 ± 0.5 | 1.9 ± 0.4 | 1.6 ± 0.4 | 0.06 |
| *ikha4* | 1.6 ± 0.4 | 1.5 ± 0.2 | 1.7 ± 0.7 | 1.6 ± 0.2 | 1.4 ± 0.3 | 0.71 |
|  |  |  |  |  |  |  |

 Significant p-values (i.e. p < 0.05) are in bold font.

a Transcript expression values presented as mean relative quantity (RQ) ± SD (n = 7–8). RQs were normalized to eukaryotic translation initiation factor 3 subunit D (*eif3d*) and polyadenylate-binding protein cytoplasmic 1 (*pabpc1*), and calibrated to the lowest expressing individual for each gene of interest (see Materials and Methods).

b Different letters indicate significant differences among treatments (one-way ANOVA followed by Tukey post-hoc tests; see Materials and Methods).

**Table S6**. Two-way ANOVA analysisa illustrating effects of dietary EPA+DHA (i.e. 0.3 and 1%) and ω6:ω3 (i.e. high ω6 and high ω3) on the transcript expression of genes related to FA and eicosanoid metabolism in Atlantic salmon head kidney.

|  |  |  |  |
| --- | --- | --- | --- |
| Transcript | EPA+DHA | ω6:ω3 | Interaction |
| *elovl4b* | 0.34 | 0.22 | **0.04** |
| *elovl5a* | **0.03** | **0.01** | 0.11 |
| *fadsd5* | **0.01** | 0.27 | 0.48 |
| *fadsd6b* | 0.31 | 0.77 | 0.90 |
| *fadsd6c* | 0.24 | 0.43 | 0.27 |
| *srebp1* | **0.01** | 0.09 | 0.72 |
| *srebp2* | **0.01** | 0.58 | 0.93 |
| *lxra* | 0.28 | 0.31 | 0.39 |
| *lxrb* | **0.048** | 0.57 | 0.83 |
| *pparaa* | 0.50 | **0.004** | 0.09 |
| *pparb1* | 0.53 | 0.86 | 0.45 |
| *pparb2a* | 0.35 | 0.19 | 0.89 |
| *fasa* | 0.48 | 0.55 | 0.55 |
| *fasb* | 0.67 | 0.87 | 0.56 |
| *acox1* | 0.32 | 0.43 | 0.76 |
| *cpt1a* | 0.55 | 0.69 | 0.77 |
| *cpla2* | 0.88 | 0.68 | 0.99 |
| *cox1* | 0.90 | **0.03** | 0.63 |
| *cox2* | 0.53 | 0.35 | 0.35 |
| *5loxa* | 0.65 | 0.20 | 0.93 |
| *5loxb* | 0.70 | 0.30 | 0.92 |
| *pgds* | 0.85 | 0.31 | 0.40 |
| *ptges2* | 0.77 | 0.86 | 0.87 |
| *ptges3* | 0.65 | 0.14 | 0.09 |
| *ikha4* | 0.54 | 0.30 | 0.93 |

a p-values corresponding to the factors EPA+DHA, ω6:ω3, and their interaction (see Materials and Methods). Significant p-values (i.e. p < 0.05) are in bold font.

**Table S7.** Lipid class and fatty acid composition (mg g-1 wet weight) of Atlantic salmon head kidneya before (Initial) and after 12 weeks of feeding diets with different ratios of ω6:ω3 and levels of EPA+DHA.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|   | Initial | 0.3%EPA+DHA | 0.3%EPA+DHA | 1%EPA+DHA | 1%EPA+DHA | 1.4%EPA+DHA |
|   |   | ↑ω6 | ↑ω3 | ↑ω6 | ↑ω3 | balanced |
| Lipid classes composition (mg g-1) |  |  |  |  |  |
| TAGb  | 14.2 ± 10.2 | 12.9 ± 6.0 | 17.3 ± 8.1 | 15.7 ± 6.4 | 18.2 ± 14.9 | 20.3 ± 13.1 |
| STc  | 9.9 ± 2.1 | 6.1 ± 1.7 | 6.5 ± 1.8 | 7.1 ± 1.5 | 7.1 ± 2.1 | 6.0 ± 1.5 |
| PLd | 6.6 ± 2.9 | 7.2 ± 3.4 | 9.2 ± 3.7 | 7.0 ± 2.9 | 8.8 ± 2.8 | 8.5 ± 3.4 |
| Fatty acid composition (mg g-1)  |  |  |  |  |  |
| 14:0 | 0.4 ± 0.3 | 0.2 ± 0.1a | 0.3 ± 0.1ab | 0.3 ± 0.2ab | 0.4 ± 0.3bc | 0.5 ± 0.3c |
| 16:0 | 2.7 ± 1.7 | 2.6 ± 0.8 | 3.3 ± 1.1 | 3.3 ± 1.4 | 3.2 ± 1.6 | 3.6 ± 1.7 |
| 16:1ω7 | 0.9 ± 0.6 | 0.4 ± 0.2a | 0.7 ± 0.3ab | 0.5 ± 0.3ab | 0.8 ± 0.7ab | 0.9 ± 0.6b |
| 18:0 | 0.9 ± 0.7 | 1.0 ± 0.3 | 1.2 ± 0.4 | 1.2 ± 0.6 | 1.1 ± 0.5 | 1.1 ± 0.5 |
| 18:1ω9 | 5.1 ± 3.1 | 3.7 ± 1.6a | 5.9 ± 2.4ab | 4.3 ± 1.9ab | 5.7 ± 4.0ab | 7.0 ± 4.3b |
| 18:1ω7 | 0.6 ± 0.4 | 0.4 ± 0.1a | 0.5 ± 0.2a | 0.5 ± 0.2a | 0.6 ± 0.4ab | 0.8 ± 0.4b |
| 18:2ω6 (LNA) | 1.6 ± 1.3 | 3.5 ± 1.7 | 2.8 ± 1.1 | 3.3 ± 1.3 | 2.7 ± 1.9 | 2.6 ± 1.6 |
| 18:3ω6 | 0.1 ± 0.05 | 0.2 ± 0.1a | 0.1 ± 0.1ab | 0.1 ± 0.04b | 0.1 ± 0.1b | 0.1 ± 0.1b |
| 18:3ω3 (ALA) | 0.2 ± 0.2 | 0.3 ± 0.2a | 1.6 ± 0.7b | 0.4 ± 0.2a | 1.6 ± 1.0b | 0.5 ± 0.3a |
| 18:4ω3 | 0.1 ± 0.1 | 0.1 ± 0.1a | 0.4 ± 0.2c | 0.2 ± 0.1a | 0.4 ± 0.2bc | 0.3 ± 0.2ab |
| 20:1ω11 | 0.1 ± 0.1 | 0.02 ± 0.01a | 0.1 ± 0.1a | 0.2 ± 0.1b | 0.2 ± 0.2b | 0.4 ± 0.2c |
| 20:1ω9 | 0.4 ± 0.3 | 0.2 ± 0.1a | 0.3 ± 0.2a | 0.3 ± 0.2ab | 0.4 ± 0.4ab | 0.6 ± 0.4b |
| 20:2ω6 | 0.1 ± 0.1 | 0.3 ± 0.1a | 0.2 ± 0.1b | 0.2 ± 0.1a | 0.2 ± 0.1ab | 0.2 ± 0.1ab |
| 20:3ω6 (DGLA) | 0.1 ± 0.1 | 0.5 ± 0.1a | 0.2 ± 0.1bc | 0.3 ± 0.1b | 0.2 ± 0.1c | 0.2 ± 0.1c |
| 20:4ω6 (ARA) | 0.2 ± 0.2 | 0.7 ± 0.2a | 0.5 ± 0.1b | 0.5 ± 0.1b | 0.4 ± 0.1b | 0.4 ± 0.1b |
| 20:3ω3 | 0.01 ± 0.01 | 0.03 ± 0.01a | 0.1 ± 0.04b | 0.03 ± 0.01a | 0.1 ± 0.1b | 0.04 ± 0.02a |
| 20:4ω3 | 0.1 ± 0.1 | 0.1 ± 0.03a | 0.2 ± 0.1b | 0.1 ± 0.1a | 0.2 ± 0.1b | 0.2 ± 0.1b |
| 20:5ω3 (EPA) | 0.5 ± 0.5 | 0.4 ± 0.1a | 0.8 ± 0.2b | 0.7 ± 0.2b | 1.0 ± 0.4bc | 1.1 ± 0.4c |
| 22:1ω11 | 0.4 ± 0.2 | 0.1 ± 0.1a | 0.2 ± 0.1ab | 0.3 ± 0.1ab | 0.4 ± 0.3bc | 0.5 ± 0.4c |
| 22:4ω6 | 0.02 ± 0.03 | 0.04 ± 0.01 | 0.03 ± 0.01 | 0.03 ± 0.02 | 0.03 ± 0.01 | 0.03 ± 0.01 |
| 22:5ω6 (ω6 DPA) | 0.02 ± 0.02 | 0.1 ± 0.02a | 0.1 ± 0.01b | 0.04 ± 0.01b | 0.04 ± 0.02b | 0.05 ± 0.02b |
| 22:5ω3 (ω3 DPA) | 0.2 ± 0.2 | 0.1 ± 0.1a | 0.2 ± 0.1ab | 0.2 ± 0.1ab | 0.3 ± 0.2b | 0.3 ± 0.2b |
| 22:6ω3 (DHA) | 1.2 ± 1.1 | 2.1 ± 0.5a | 2.8 ± 0.7abc | 2.6 ± 0.7ab | 3.1 ± 1.1bc | 3.4 ± 0.9c |
| ΣSFAe | 4.3 ± 2.7 | 3.9 ± 1.2 | 4.9 ± 1.6 | 5.0 ± 2.2 | 4.9 ± 2.5 | 5.5 ± 2.6 |
| ΣMUFAf | 8.5 ± 5.2 | 5.0 ± 2.2a | 8.0 ± 3.3ab | 6.6 ± 2.9a | 8.5 ± 6.1ab | 10.6 ± 6.5b |
| ΣPUFAg | 4.5 ± 3.9 | 8.7 ± 2.8 | 10.3 ± 3.3 | 9.0 ± 2.6 | 10.4 ± 5.2 | 9.7 ± 4.2 |
| Σω3 | 2.2 ± 2.1 | 3.3 ± 0.9a | 6.2 ± 1.9c | 4.3 ± 1.2ab | 6.7 ± 2.8c | 5.9 ± 2.1bc |
| Σω6 | 2.0 ± 1.6 | 5.3 ± 2.0 | 3.9 ± 1.4 | 4.5 ± 1.5 | 3.6 ± 2.2 | 3.6 ± 2.0 |
| EPA+DHA | 2.0 ± 1.6 | 2.5 ± 0.6a | 3.6 ± 0.9bc | 3.4 ± 0.9ab | 4.1 ± 1.5bc | 4.5 ± 1.3c |

a Mean (n = 10-20) ± standard deviation (SD). Different superscripts in the same row indicate significant differences among treatments at week 12. Underlines represent values that are significantly different to week 0 (Initial) (p < 0.05). b Triacylglycerol. c Sterols. d Phospholipids. e Total saturated fatty acids. f Total monounsaturated fatty acids. g Total polyunsaturated fatty acids.

**Table S8**. Significant Pearson correlationsa (p < 0.05) between head kidney lipid and fatty acid composition (% of total) in Atlantic salmon fed diets with different ratios of ω6:ω3 and levels of EPA+DHA. TAG, PL, and ST represent triacylglycerol, phospholipids, and sterols, respectively. ΣSFA, ΣMUFA, and ΣPUFA represent total saturated, monounsaturated, and polyunsaturated fatty acids, respectively.

|  |  |  |  |
| --- | --- | --- | --- |
| Lipid class | FA | Pearson r | p-value |
| TAG | 16:0 | -0.36 | 0.03 |
|  | 18:0 | -0.44 | 0.01 |
|  | 18:1ω9 | 0.55 | 0.0001 |
|  | 20:4ω6 (ARA) | -0.41 | 0.01 |
|  | 22:6ω3 (DHA) | -0.45 | 0.01 |
|  | ΣSFA | -0.35 | 0.04 |
|  | ΣMUFA | 0.49 | 0.002 |
| PL | 18:2ω6 (LNA) | -0.40 | 0.01 |
|  | 20:2ω6 | -0.34 | 0.04 |
|  | 20:5ω3 (EPA) | 0.41 | 0.01 |
|  | ω6:ω3 | -0.34 | 0.04 |
| ST | 18:1ω9 | -0.70 | 0.0001 |
|  | 20:3ω6 (DGLA) | 0.43 | 0.01 |
|  | 20:4ω6 (ARA) | 0.57 | 0.0001 |
|  | 22:6ω3 (DHA) | 0.44 | 0.01 |
|  | ΣMUFA | -0.71 | 0.0001 |
|  | ΣPUFA | 0.49 | 0.002 |
|   | EPA:ARA | -0.49 | 0.002 |

a Pearson correlations were calculated using individual fish (n = 6–8).