Table 3

Growth and performance parameters in three strains of Atlantic salmon fed the experimental fish oil (FO) and vegetable oil (VO) diets for 55 weeks

							Two-way ANOVA (P value)		
Parameter/Diet and strain	Lean FO	Lean VO	Fat FO	Fat VO	CAL FO	CAL VO	Diet	Strain	Interaction
Initial weight (g)	80.6 ± 11.6	89.5 ± 12.9	92.1 ± 4.9	84.3 ± 8.7	52.8 ± 1.4	51.6 ± 2.1	0.995	**0.002**	0.409
Final weight (kg)	3.12 ± 0.13	3.03 ± 0.09	3.18 ± 0.08	2.84 ± 0.04	2.75 ± 0.13	2.89 ± 0.04	0.118	**0.019**	**0.027**
Final length (cm)	65.3 ± 0.5	63.7 ± 1.0	63.9 ± 1.0	62.5 ± 0.7	63.1 ± 1.6	62.8 ± 0.9	0.101	0.139	0.650
SGR	0.92 ± 0.02	0.91 ± 0.01	0.93 ± 0.01	0.89 ± 0.01	1.00 ± 0.01	1.01 ± 0.01	0.109	**<0.0001**	0.065
FCR	1.23 ± 0.03	1.39 ± 0.22	1.08 ± 0.09	1.19 ± 0.03	1.08 ± 0.06	1.06 ± 0.03	0.211	**0.041**	0.495
TGC	3.55 ± 0.14	3.50 ± 0.05	3.57 ± 0.05	3.38 ± 0.03	3.57 ± 0.08	3.66 ± 0.02	0.247	0.072	0.087
CF (%)	1.17 ± 0.03	1.19 ± 0.02	1.18 ± 0.03	1.22 ± 0.04	1.07 ± 0.06	1.12 ± 0.03	0.129	**0.013**	0.742
HSI (%)	0.71 ± 0.00	0.70 ± 0.07	0.59 ± 0.03	0.61 ± 0.00	0.62 ± 0.04	0.61 ± 0.01	0.896	**0.010**	0.809
VSI (%)	4.92 ± 0.32	4.82 ± 0.01	5.17 ± 0.09	5.51 ± 0.18	4.97 ± 0.32	4.82 ± 0.01	0.730	**0.034**	0.291

All values are mean ± SD (n = 2). Fish weights and lengths were obtained by weighing 50 fish/pen. SGR, specific growth rate; FCR, feed conversion ratio; TGC, thermal growth coefficient; CF, condition factor; HIS, hepato-somatic index; VSI, viscero-somatic index. P values shown in bold are significantly different ($P < 0.05$).

Table 4

Lipid content (%) of flesh, viscera and liver and protein content of flesh in three strains of Atlantic salmon fed the experimental fish oil (FO) and vegetable oil (VO) diets for 55 weeks

							Two-way ANOVA (P value)		
Parameter/Diet and strain	Lean FO	Lean VO	Fat FO	Fat VO	CAL FO	CAL VO	Diet	Strain	Interaction
Flesh lipid (%)	11.6 ± 0.2	12.8 ± 0.3	13.2 ± 0.2	12.9 ± 0.2	12.3 ± 0.3	11.3 ± 0.2	0.816	**0.0008**	**0.0002**
Viscera lipid (%)	28.0 ± 0.4	29.6 ± 0.3	31.7 ± 0.7	29.4 ± 0.3	25.8 ± 0.4	26.8 ± 0.3	0.702	**<0.0001**	**<0.0001**
Liver lipid (%)	4.0 ± 0.3	4.1 ± 0.1	3.4 ± 0.1	4.8 ± 0.4	3.2 ± 0.1	3.6 ± 0.2	**0.003**	**0.009**	**0.017**
Flesh protein (%)	19.4 ± 0.1	19.9 ± 0.3	19.1 ± 0.2	19.2 ± 0.1	19.3 ± 0.1	19.5 ± 0.1	**0.034**	**0.016**	0.291

All values are mean ± SD, n = 2. P values shown in bold are significantly different ($P < 0.05$).

Table 5

Fatty acid compositions (% by weight of total fatty acids) of flesh from three strains of Atlantic salmon fed the experimental fish oil (FO) and vegetable oil (VO) diets for 55 weeks

							Two-way ANOVA (P value)		
Fatty acid/Diet and strain	Lean FO	Lean VO	Fat FO	Fat VO	CAL FO	CAL VO	Diet	Strain	Interaction
14:0	4.5 ± 0.0	1.4 ± 0.0	4.6 ± 0.1	1.5 ± 0.1	4.5 ± 0.2	1.5 ± 0.2	**<0.0001**	0.471	0.761
16:0	15.0 ± 0.3	13.1 ± 0.1	15.0 ± 0.3	13.7 ± 0.2	15.4 ± 0.3	13.8 ± 0.2	**<0.0001**	**0.044**	0.271
18:0	2.6 ± 0.1	2.9 ± 0.1	2.7 ± 0.1	3.0 ± 0.1	2.8 ± 0.0	3.2 ± 0.1	**0.007**	**0.023**	0.687
Total saturated[1]	22.6 ± 0.4	17.9 ± 0.3	22.8 ± 0.5	18.8 ± 0.4	23.1 ± 0.5	18.9 ± 0.3	**<0.0001**	0.071	0.449
16:1n-7	5.5 ± 0.1	1.7 ± 0.1	5.6 ± 0.1	2.0 ± 0.1	5.6 ± 0.1	1.9 ± 0.2	**<0.0001**	0.132	0.548
18:1n-9	17.7 ± 0.5	37.7 ± 0.3	17.8 ± 0.7	37.3 ± 0.4	18.5 ± 0.3	37.1 ± 0.6	**<0.0001**	0.765	0.204
18:1n-7	3.2 ± 0.2	2.4 ± 0.2	3.2 ± 0.1	2.6 ± 0.5	3.5 ± 0.2	2.7 ± 0.2	**0.003**	0.332	0.831
20:1n-9	7.6 ± 0.1	5.2 ± 0.1	7.5 ± 0.1	5.1 ± 0.1	7.3 ± 0.1	5.1 ± 0.1	**<0.0001**	0.079	0.332
22:1n-11	7.6 ± 0.2	1.3 ± 0.1	7.6 ± 0.2	1.5 ± 0.1	7.2 ± 0.4	1.3 ± 0.2	**<0.0001**	0.234	0.492
22:1n-9	0.9 ± 0.2	0.7 ± 0.0	0.8 ± 0.1	0.7 ± 0.0	0.9 ± 0.4	0.7 ± 0.0	0.174	0.911	0.911
Total monounstaurates[2]	43.7 ± 0.5	49.9 ± 0.3	43.9 ± 0.3	49.8 ± 0.4	44.3 ± 0.6	49.6 ± 0.3	**<0.0001**	0.877	0.361
18:2n-6	4.9 ± 0.1	14.0 ± 0.2	4.9 ± 0.1	13.3 ± 0.2	5.0 ± 0.1	13.3 ± 0.3	**<0.0001**	0.069	**0.041**
20:2n-6	0.6 ± 0.0	1.6 ± 0.0	0.6 ± 0.0	1.4 ± 0.0	0.6 ± 0.0	1.5 ± 0.0	**<0.0001**	**<0.0001**	**<0.0001**
20:3n-6	0.3 ± 0.0	0.6 ± 0.0	0.3 ± 0.0	0.6 ± 0.0	0.3 ± 0.0	0.6 ± 0.0	**<0.0001**	1.000	1.000

20:4n-6	0.4 ± 0.0	0.2 ± 0.0	0.4 ± 0.0	0.2 ± 0.0	0.4 ± 0.0	0.2 ± 0.0	**<0.0001**	1.000	1.000
Total n-6[3]	6.5 ± 0.2	16.5 ± 0.2	6.4 ± 0.1	15.7 ± 0.2	6.6 ± 0.1	15.8 ± 0.3	**0.043**	0.995	0.955
18:3n-3	1.8 ± 0.1	6.7 ± 0.1	1.9 ± 0.0	6.3 ± 0.1	1.8 ± 0.1	6.2 ± 0.2	**<0.0001**	0.058	0.341
18:4n-3	1.7 ± 0.1	0.7 ± 0.0	1.8 ± 0.1	0.8 ± 0.0	1.5 ± 0.1	0.7 ± 0.0	**<0.0001**	**0.020**	0.148
20:4n-3	1.7 ± 0.1	0.9 ± 0.0	1.7 ± 0.0	0.9 ± 0.0	1.6 ± 0.1	0.8 ± 0.0	**<0.0001**	0.079	0.079
20:5n-3	5.8 ± 0.1	1.7 ± 0.1	5.7 ± 0.2	1.9 ± 0.1	5.5 ± 0.2	1.9 ± 0.1	**<0.0001**	0.630	0.115
22:5n-3	2.9 ± 0.1	0.9 ± 0.1	2.8 ± 0.1	0.9 ± 0.0	2.8 ± 0.1	0.9 ± 0.1	**<0.0001**	0.687	0.687
22:6n-3	13.1 ± 0.4	4.0 ± 0.1	12.8 ± 0.4	4.2 ± 0.2	12.7 ± 0.6	4.5 ± 0.2	**<0.0001**	0.926	0.280
Total n-3[4]	27.1 ± 0.7	15.7 ± 0.3	26.9 ± 0.7	15.7 ± 0.4	26.0 ± 1.0	15.7 ± 0.2	**<0.0001**	0.453	0.453
Total PUFA	33.6 ± 0.8	32.2 ± 0.3	33.3 ± 0.8	31.4 ± 0.6	32.6 ± 1.1	31.5 ± 0.4	**0.012**	0.309	0.740
Total n-3 LC-PUFA	23.6 ± 0.6	8.3 ± 0.3	23.2 ± 0.5	8.6 ± 0.3	22.7 ± 0.8	8.8 ± 0.2	**<0.0001**	0.842	0.216
n-3/n-6	4.2 ± 0.4	1.0 ± 0.2	4.2 ± 0.4	1.0 ± 0.3	3.9 ± 0.5	1.0 ± 0.2	**<0.0001**	0.792	0.792

Values are mean ± SD, n = 2. [1]Includes 15:0, 17:0, 20:0 and 22:0. [2]Includes 16:1n-9, 20:1n-7 and 20:1n-11. [3]Includes 18:3n-6 and 22:5n-6. [4]Includes 20:3n-3. P values shown in bold are significantly different ($P < 0.05$).