Supplemental Table 1: Composition and proximate composition of experimental diets from trial 1.

	FM-FO	HPP - MVO	MPP - HVO	HPP - HVO
Ingredients, g/kg				
Fish meal *	560	120	300	120
Krill meal †	-	50	25	50
Wheat gluten ‡	-	150	90	150
Corn gluten §	-	150	150	150
Soybean meal extracted |	-	110	14	110
Wheat |	157	123	127	124
Fish oil ¶	280	188	84	86
Rapeseed oil ¶	-	56	110	110
Palm oil |	-	32	61	61
Linseed oil **	-	18	36	36
Premixes ††	3	3	3	3
Proximate composition, g/kg				
Protein	422	424	412	426
Fat	343	318	339	328
DM	923	925	924	932
Energy, kJ/g	25.1	25.4	25.4	25.3

FM-FO, 100% fish meal and 100% fish oil; HPP-MVO, 80% plant protein (PP) and 35% vegetable oil (VO); MPP-HVO, 40% PP and 70% VO; HPP-HVO, 80% PP and 70% VO; DM, dry matter.

* South American fish meal, Skretting, Stavanger, Norway

† Aker BioMarine ASA, Oslo, Norway

‡ Cargill Nordic, Charlottenlund, Denmark

§ Cargill, Minneapolis, USA

| Denofa AS, Fredrikstad, Norway

| Statkorn, Oslo, Norway

¶ Skretting, Stavanger, Norway

** Elbe Fetthandel GmbH, Geesthacht, Germany

†† Include vitamins and minerals; Trouw Nutrition, Boxmeer, the Netherlands, proprietary composition Skretting ARC, vitamin and mineral supplementation as estimated to cover requirements according to National Research Council (2011) *Nutrient Requirements of Fish and Shrimp*. Washington DC: The National Academies Press.

Supplemental Table 2: Composition and proximate composition of experimental diets from trial 2.

	PP-FO	PP-OO	PP-RO	PP-SO
Ingredients, g/kg				
Fish meal *	180	180	180	180
Wheat gluten †	162	162	162	162
Hi-pro soya ‡	97.3	97.3	97.3	97.3
Soya concentrate §	150	150	150	150
Wheat |	70	70	70	70
Fish oil |	310	62	62	62
Rapeseed oil |	-	-	248	-
Olive oil |	-	208	-	-
Soybean oil ¶	-	20	-	218
Palm oil **	-	-	-	30
Linseed oil ††	-	20	-	-
Premixes ‡‡	31.8	31.8	31.8	31.8
Proximate composition, g/kg				
Protein	411	408	413	406
Fat	341	336	345	332
DM	932	931	936	934
Energy, kJ/g	25.6	25.5	25.8	25.4

PP-FO, 70% plant protein (PP) and 100% fish oil; PP-OO, 70% PP, 68% olive oil, 6% soybean oil and 6% linseed oil; PP-RO, 70% PP and 80% rapeseed oil; PP-SO, 70% PP, 70% soybean oil and 10% palm oil; DM, dry matter.

* South American fish meal, Skretting, Stavanger, Norway

† Cargill Nordic, Charlottenlund, Denmark

‡ Felleskjøpet, Stavanger, Norway

§ Imcopa, Araucaria, Brazil

| Skretting, Stavanger, Norway

| D. Danielsen AS, Stavanger, Norway

¶ Denofa AS, Fredrikstad, Norway

** Fritex 24, Aarhus Karlshamns, Karlshamn, Sweden

†† Elbe Fetthandel GmbH, Geesthacht, Germany

‡‡ Include vitamins and minerals; Trouw Nutrition, Boxmeer, the Netherlands, proprietary composition Skretting ARC, vitamin and mineral supplementation as estimated to cover requirements according to National Research

Council (2011) *Nutrient Requirements of Fish and Shrimp*. Washington DC: The National Academies Press. Diluted to ease blending into meal mix.

Supplemental Table 3: Details about primers used in article.

Name	Primer sequences	Amplicon size, *bp*	Accession nº	Annealing temp., *ºC*
New primers				
cyp7a1	F: GAAGACCTTAGCAGGGTAGAAG	178	BT059202.1	60
	R: GCCGAAGAGTAGTCAGGTAGC			
npc1l1	F: GATAGGAATAGAGCCGACAGC	178	EZ788198.1	60
	R: GGGTATAGAATAGCAACCTAGCT			
Other primers used and reference article:				
apob100	(1)		GI854619	
srebp1	(2)		TC148424	
srebp2	(3)		DY733476	
dhcr7	(3)		DW561983	
lxr-α	(4)		NM001159338	
abcb11	(5)		NM001124656	
fas	(6)		CK876943	
ef1a-b	(7)		BG933853	
actb	(7)		AF012125	

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2. Minghetti M, Leaver MJ & Tocher DR (2011) Transcriptional control mechanisms of genes of lipid and fatty acid metabolism in the Atlantic salmon (*Salmo salar* L.) established cell line, SHK-1. *Biochim Biophys Acta* **1811**, 194-202.

3. Leaver MJ, Villeneuve LA, Obach A *et al.* (2008) Functional genomics reveals increases in cholesterol biosynthetic genes and highly unsaturated fatty acid biosynthesis after dietary substitution of fish oil with vegetable oils in Atlantic salmon (*Salmo salar*). *BMC Genomics* **9**, 299-313.

4. Cruz-Garcia L, Sanchez-Gurmaches J, Gutierrez J *et al.* (2011) Regulation of LXR by fatty acids, insulin, growth hormone and tumor necrosis factor-alpha in rainbow trout myocytes. *Comp Biochem Physiol A Mol Integr Physiol* **160**, 125-136.

5. Lončar J, Popović M, Zaja R *et al.* (2010) Gene expression analysis of the ABC efflux transporters in rainbow trout (*Oncorhynchus mykiss*). *Comp Biochem Physiol C Pharmacol Toxicol Endocrinol* **151**, 209-15.

6. Morais S, Pratoomyot J, Taggart J *et al.* (2011) Genotype-specific responses in Atlantic salmon (*Salmo salar*) subject to dietary fish oil replacement by vegetable oil: a liver transcriptomic analysis. *BMC Genomics* **12**, 255-271.

7. Olsvik P, Lie K, Jordal AE *et al.* (2005) Evaluation of potential reference genes in real-time RT-PCR studies of Atlantic salmon. *BMC Mol Biol* **6**, 21-29.

Supplemental Table 4: Fatty acid, taurine and methionine content of experimental diets.

	Trial 1				Trial 2			
	FM-FO	HPP - MVO	MPP - HVO	HPP - HVO	PP-FO	PP-OO	PP-RO	PP-SO
Fatty acids, g/100g total fatty acid								
Total SFA	25.4	23.5	22.8	22.6	26.8	18.0	13.2	21.2
Total MUFA	36.7	39.8	43.3	43.3	38.5	58.4	53.5	28.6
Total *n*-6	3.4	8.2	13.3	13.1	4.7	13.2	17.2	39.0
20 : 5*n*-3, EPA	9.8	7.5	3.5	3.9	8.1	1.9	2.5	2.0
22 : 6*n*-3, DHA	13.0	8.5	5.0	4.7	10.0	2.3	3.0	2.4
Total *n*-3	30.5	26.0	19.9	20.3	24.9	9.5	14.8	10.1
Total PUFA	33.9	34.2	33.2	33.4	29.6	22.7	32.0	49.1
n-3 / *n*-6	8.9	3.2	1.5	1.6	5.3	0.7	0.9	0.3
Amino acids, g/16N								
Taurine	0.9	0.2	0.5	0.3	0.3	0.3	0.3	0.3
Methionine	2.6	2.6	3.2	2.5	2.2	2.4	2.5	2.2

FM-FO, 100% fish meal and 100% fish oil (FO); HPP-MVO, 80% plant protein (PP) and 35% vegetable oil (VO); MPP-HVO, 40% PP and 70% VO; HPP-HVO, 80% PP and 70% VO; PP-FO, 70% PP and 100% FO; PP-OO, 70% PP, 68% olive oil, 6% soybean oil and 6% linseed oil; PP-RO, 70% PP and 80% rapeseed oil; PP-SO, 70% PP, 70% soybean oil and 10% palm oil.

Supplemental Table 5: Plasma lipoprotein cholesterol in each lipoprotein fraction from Atlantic salmon fed diets with different levels of plant ingredients in trial 1, sampled at week 52.*

	FM-FO		HPP-MVO		MPP-HVO		HPP-HVO		P (one-way ANOVA)
	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	
Plasma lipoprotein cholesterol, mmol/l lipoprotein fraction									
VLDL	1.9	0.7	1.2	0.4	1.2	0.2	2.0	0.4	0.49
LDL	11.0[a]	1.2	7.7[ab]	1.0	6.6[b]	1.3	6.5[b]	0.5	0.0598
HDL	48.9	2.6	45.0	1.7	45.2	4.6	39.4	2.6	0.26

FM-FO, 100% fish meal and 100% fish oil; HPP-MVO, 80% plant protein (PP) and 35% vegetable oil (VO); MPP-HVO, 40% PP and 70% VO; HPP-HVO, 80% PP and 70% VO.

* Data presented as mean with SEM, *n* 3 (3 tanks per diet with 3 pooled individuals from each tank).

[a,b] Mean values with unlike superscript letters within a row were borderline significantly different ($P < 0.1$).

Supplemental Table 6: Plasma lipoprotein cholesterol in each lipoprotein fraction from Atlantic salmon fed diets fed diets with high PP and different lipid sources in trial 2, sampled at week 28.*

	PP-FO		PP-OO		PP-RO		PP-SO		P (one-way ANOVA)
	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM	
Plasma lipoprotein cholesterol, mmol/l lipoprotein fraction									
VLDL	1.3	0.2	2.7	0.4	2.7	0.6	1.7	0.2	0.09
LDL	6.8	0.9	8.9	0.4	7.4	0.6	8.1	0.8	0.24
HDL	19.9[b]	0.4	21.3[a]	0.2	21.2[a]	0.2	21.1[ab]	0.2	0.02

PP-FO, 70% plant protein (PP) and 100% fish oil; PP-OO, 70% PP, 68% olive oil, 6% soybean oil and 6% linseed oil; PP-RO, 70% PP and 80% rapeseed oil; PP-SO, 70% PP, 70% soybean oil and 10% palm oil.

* Data presented as mean with SEM, *n* 3 (3 tanks per diet with 3 pooled individuals from each tank).

[a,b] Mean values with unlike superscript letters within a row were significantly different ($P < 0.05$).