Supporting Information

Title: Improving the lipid profile of *Hermetia illucens* (Black Soldier Fly) for aquafeeds: current state of knowledge

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Table S1 – Relative abundance of molecular species of fatty acids (expressed as % of total pool of fatty acids) of *Hermetia illucens* larvae fed with different substrates retrieved from the literature surveyed.

	Substrate tested															
BSF Fatty acids	Philippine tung seed	Rice straw and Restaurant Waste	Palm kernel meal	Ice cream industrial waste Mix	Pig manure, dog food, human feces (4:4:2)	Control diet Chicken feed	Fish discard	n-3 enriched meal	Layer mash	Fish offal and Layer Mash	Bread	Fish	Food waste	Fresh mussels	Ensile Mussels	Rotten mussels
(C4:0)			0.00	0.04												
(C8:0)			0.04	0.13				0.1								
(C10:0)		3.8	1.27	1.44	1			0.9	0.95	1.02						
(C11:0)			0.02	0.02												
(C12:0)		27.8	40.54	46.72	48	Nd	1.7	22.6	44.2	48.3	51.8	28.6	39.9	52.1	13.4	32.3
(C13:0)			0.05	0.02												
(C14:0)		8.1	15.57	11.13	7	Nd	8.2	5.3			9.5	6.1	6.7	8.0	5.8	10.1
(C15:0)		1.5	0.00	0.05					0.09	0.03						
(C16:0)	10	14.2	14.55	12.12	14	15.2	14.5	17.9	13.6	13.4	12.7	12.6	16.3	11.9	21.9	19.8
(C17:0)		0.8				Nd	1.1	0.3	0.09	0.11						
(C18:0)		7.6	2.13	1.43	2	3.2	5.9	4.6	1.74	2.06	1.5	2.2	2.1	1.6	4.0	3.3
(C19:0)		1.7														
(C20:0)	2.5		0.07	0.07					0.23	0.04						
(C21:0)			0.22	0.12												
(C22:0)			0.02	0.03					0.02	0.02						
(C23:0)			0.04	0.00					0.00	0.02						
(C24:0)									0.00	0.12						
SFA (total)	12.5	65.5	74.52	73.32	72	18.3	31.3	51.7	68.9	72.0	75.6	49.6	65.2	73.7	45.3	65.6
(C14:1)			0.22	0.60					0.16	0.20	0.2 (n-5)	0.2(n-5)	0.2(n-5)	0.3(n-5)	0.4(n-5)	0.6(n-5)
(C15:1)									0.05	0.02						
(C16:1)		4.5	2.21	1.43	2 (n-7)	Nd (n-7)	7.3 (n-7)	1.9 (n-7)	2.39	3.82	2.8 (n-7)	4.8(n-7)	2.6(n-7)	6.9(n-7)	14.1(n-7)	9.8(n-7)
(C17:1)			0.10	0.06		Nd	1.0		0.13	0.16						
(C18:1)	11.0	22.5	17.48	15.95	13 (n-9)	23.8 (n-9) /0.9 (n-7)	8.0 (n-9)/ 3.8 (n-7)	22.9(n-9) /1.0(n-7)	13.7 (n-9) 1.11 (n-11)	13.3 (n-9) 1.05 (n-11)	12.0 (n-9) /0.1(n-7)	25.1(n-9) /1.1(n-7)	19.1(n-9) /0.4(n-7)	10.3(n-9) /1.3(n-7)	14.0(n-9) /2.2(n-7)	12.9(n-9) /1.5(n-7)
(C20:1)			0.05	0.02		Nd (n-9)	4.0 (n-9)	0.4 (n-9)	0.11 (n-9)	0.09 (n-9)						
(C22:1)						Nd (n-1)	2.4 (n-1)		0.08(n-9)	0.03(n-9)						
(C24:1)						Nd (n-9)	1.1 (n-9)		0.00	0.00						
MUFA (total)	11.0	27.0	20.06	18.06	16.0	24.7	27.7	26.2	17.7	18.7	15.1	31.8	22.4	19.5	32.1	26.2
(C18:2)	14.6	1.8			8 (n-6)/2(n-3)	52.5 (n-6)	1.6 (n-6)	15.0(n-6)	11.0 (n-6)	4.28(n-6)	7.7(n-6)	12.5(n-6)	9.9(n-6)	2.6(n-6)	4.5(n-6)	4.2(n-6)
(C18:3)		2.1				4.5 (n-3)	1.1 (n-3)	0.9 (n-3)	0.02(n-6) /0.44(n-3)	0.05(n-6) /0.19(n-3)	1.6(n-3)	3.4(n-3)	1.8(n-3)	1.3(n-3)	3.6(n-3)	1.1(n-3)
(C18:4)						Nd (n-3)	2.1 (n-3)	0.9(n-3)								
α-eleosteatic acid (C18:3)	53															
(C20:2)									0.08	0.63						
(C20:3)									0.02(n-6) /0.02(n-3)	0.04(n-6) /0.07(n-3)						
(C20:4)								0.2(n-6)	0.05	0.12	0.0(n-6)	0.1(n-6)	0.2(n-6)	0.2(n-6)	1.3(n-6)	0.1(n-6)
(C20:5)			0.15			Nd (n-3)	13.6 (n-3)	1.6 (n-3)	0.07	1.00	0.0(n-3)	1.7(n-3)	0.5(n-3)	2.0(n-3)	8.2(n-3)	1.9(n-3)
(C22:2)									0.96(n-6)	0.29(n-6)						
(C22:5)						Nd(n-3)	1.7(n-3)	0.5 (n-3)	0.00	0.32						
(C22:6)			0.01			Nd(n-3)	21.4 (n-3)	0.7 (n-3)			0.0(n-3)	0.7(n-3)	0.0(n-3)	0.5(n-3)	4.5(n-3)	0.3(n-3)
PUFA	67.6	3.9	0.16		10	57.0	41.5	19.7	12.6	6.99	9.3	18.7	12.4	6.8	22.6	8.2
Omega 6			4.47	5.77	8	52.5	1.6	15.2	12.1	5.42	7.7	12.6	10.1	2.8	5.8	4.3
Omega 3			0.32	0.12	2	4.5	39.9	4.5	0.53	1.57	1.6	5.9	2.3	3.8	16.5	3.4
n-6/n-3			13.7	48.08	4	11.67	0.04	3.38	22.9	3.45	4.81	2.14	4.39	0.73	0.35	1.26
Reference	(Abduh et al. 2018)	(Zheng et al. 2012)	(Alifian et al. 2019)	(Alifian et al. 2019)	(Alipour et al. 2019)	(Barroso et al. 2019)	(Barroso et al. 2019)	(Barroso et al. 2017)	(Cullere et al. 2019)	(Cullere et al. 2019)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)

Table S1 - Cont.

	Substrate tested														
BSF Fatty acids	Bread and Mussels 10%	Bread and Mussels 20%	Bread and Mussels 30%	Bread and Mussels 40%	Bread and Mussels 50%	Wheat bran	Fermented maize straw	Fruit	Vegetables	Fruits/ Vegetables	Seaweed 100%	Coconut endosperm and soybean crude residue (3:2)	Commercial broiler chicken feed (L-prepupae)	Broiler and cow manure	Rye meal
(C10:0)						1.25	0.85	1.1	1.5	1.0			0.8	0.8	
(C12:0)	47.4	47.6	43.6	42.0	35.3	38.26	22.36	68.0	25.0	41.5		16.1	78.4	31.9	47.7
(C14:0)	8.7	8.5	8.0	7.8	6.8	6.28	4.41	7.6	5.4	7.4	10.4	3.0	8.8	5.5	11.5
(C16:0)	13.9	14.3	14.7	14.6	15.8	11.84	13.15	8.3	15.4	12.8	11.0	4.8	5.3	21.9	15.6
(C17:0)						2.93	2.73								
(C18:0)	2.7	2.9	2.7	2.8	3.1	1.72	1.90	0.9	4.9	1.7	0.5	9.22	0.6	2.7	2.2
(C20:0)															0.1
SFA total	72.8	73.5	69.2	67.4	61.3	62.28	45.41	86.0	56.5	65.0	22.7	47.0	93.9	62.8	77.1
(C14:1)	0.2(n-5)	0.2(n-5)	0.2(n-5)	0.3(n-5)	0.2(n-5)										
(C16:1)	3.1(n-7)	3.8(n-7)	4.6(n-7)	5.2(n-7)	5.9(n-7)	0.49	1.23	3.8 (n-7)	10.0(n-7)	1.4 (n-7)	1.8 (n-7)	8.4	0.6	2.3 (n-9)	0.1 (n-7)/ 3.9 (n-9)
(C17:1)						n.d	0.34								
(C18:1)	13.3(n-9)/0.8(n-7)	11.7(n-9)/1.2(n-7)	12.3(n-9)/1.2(n-7)	13.2(n-9) /1.2(n-7)	14.0(n-9) /1.5(n-7)	15.84	23.29	7.1 (n-9)	11.8 (n-9)	8.7 (n-9)	31.3 (n-9)	16.93	2.0 (n-9)	20.2 (n-9)	9.7
(C20:1)												1.0			
(C22:1)												7.28			
MUFA	17.6	17.2	18.8	20.3	22.2			11.2	27.2	11.0	34.4	34.4	2.6	22.5	13.7
(C18:2)	5.6(n-6)	4.5(n-6)	4.8(n-6)	4.5(n-6)	5.9(n-6)	15.46 (n-6)	24.02 (n-6)	2.3 (n-6)	7.5 (n-6)	21.2 (n-6)	8.2 (n-6)		3.2 (n-6)	13.0 (n-6)	6.1 (n-6))
(C18:3)	2.6(n-3)	2.2(n-3)	2.7(n-3)	2.6(n-3)	3.4(n-3)	1.11 (n-3)	1.35 (n-3)	0.5 (n-3)	5.8 (n-3)	2.6 (n-6)	3.2 (n-3)		0.2 (n-3)	1.7(n-3)	0.8 (n-3)
(C18:4)											2.6 (n-3)				
(C20:2)											1.5 (n-6)				
(C20:4)	0.1(n-6)	0.1(n-6)	0.2(n-6)	0.3(n-6)	0.4(n-6)						12.4 (n-6)				
(C20:5)	0.9(n-3)	1.7(n-3)	3.0(n-3)	3.5(n-3)	4.8(n-3)						6.6 (n-3)				
(C22:2)												0.52(n-6)			
(C22:6)	0.3(n-3)	0.5(n-3)	0.9(n-3)	1.1(n-3)	1.7(n-3)										
PUFA	9.6	9.3	12.0	12.2	16.6	16.57	25.37	2.8	16.2	24.1	37.8	0.52	3.4	14.7	6.9
Omega 6	5.8	4.6	5.3	5.0	6.7			2.3	8.3	20.4	23.6	0.52	3.2	13.0	6.1
Omega 3	3.8	4.4	6.7	7.2	9.9			0.5	6.8	2.8	14.1		0.2	1.7	0.8
n-6/n-3	1.53	1.05	0.79	0.69	0.68			4.6	1.2	7.3	1.67		16.0	7.65	7.62
Reference	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Ewald et al. 2020)	(Gao et al. 2019)	(Gao et al. 2019)	(Jucker et al. 2017)	(Jucker et al. 2017)	(Jucker et al. 2017)	(Liland et al. 2017)	(Lim et al. 2019)	(Liu et al. 2017)	(Mai et al. 2019)	(Matthäus et al. 2019)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	Vegetable–fruit waste	Fruit waste	Winery by-product	Brewery by-product	Cow manure	Cow manure and fish	Pig manure	Horse manure	chicken feed + 4% of Flaxseed oil	Chicken Feed	HPHF (high protein, high fat)	HPLF (high protein, low fat)	LPHF (low protein, high fat)	LPLF (low protein, low fat)	Chicken feed	Pig manure and rice straw
(C10:0)								2.8	0.8	1.1	0.7	1.3	0.8	1.2	0.9	
(C12:0)	52.1	57.4	34.7	32.4	21.4	49.3	42.6	28.1	38.9	47.8	28.9	48.4	38.4	50.7	46.6	32.87
(C13:0)											2.4	2.4	2.3	1.8	2.4	
(C14:0)	10.3	9.6	6.5	6.6	2.9	6.8	6.9	6.7	7.7	9.2	7.4	9.5	7.8	9.0	9.2	8.26
(C15:0)											0.0 (iso)	0.0 (iso)	0.2 (iso)	0.0 (iso)	0.1 (iso)	1.98
(C16:0)	13.9	13.1	18.9	20.4	16.1	10.5	11.1	22.0	12.7	13.7	17.0	11.8	14.4	11.6	12.7	19.17
(C17:0)								0.8			0.5 (Al)	0.1(Al)	0.6(Al)	0.2(Al)	0.2(Al)	0.63
(C18:0)	2.6	1.7	2.8	1.8	5.7	2.8	1.3	5.1	2.8	2.3	2.8	2.0	2.4	1.8	2.1	6.60
SFA	78.9	81.9	63.0	61.2	46.1	69.4	61.9	65.5	63.5	74.4	59.7	75.5	66.9	76.3	74.2	69.51
(C14:1)											0.4	0.9	0.6	0.7	0.3	
(C16:1)	3.4 (n-9)	3.7 (n-9)	6.1 (n-9)	2.9 (n-9)				8.2 (n-7)	1.5 (n-9)	2.5(n-9)	2.9	6.6	3.4	4.7	3.4	8.46
(C18:1)	8.5 (n-9) 0.4 (n-11)	9.3(n-9) 0.3 (n-11)	12.5(n-9) 0.4 (n-11)	9.2 (n-9) 0.6 (n-11)	32.1(n-9)	11.8 (n-9)	12.3 (n-9)	22.9 (n-9)	13.4(n-9) 0.4 (n-7)	11.7 (n-9) 0.5 (n-7)	0.2(t11) 15.9 (n-9) 0.3 (c11)	0.0(t11) 10.0 (n-9) 0.5 (c11)	0.2(t11) 18.1(n-9) 0.2(c11)	-(t11) 10.3(n-9) 0.2 (c11)	-(t11) 10.2 (n-9) 0.7 (c11)	17.97
(C24:1)															0.5	
MUFA	12.3	13.3	19.0	12.7	32.1	11.8	12.3	31.1	15.6	15.1	19.7	18.0	22.5	15.9	15.1	26.43
(C18:2)	7.0(n-6)	4.1 (n-6)	17.6 (n-6)	23.5 (n-6)	4.5 (n-6)	3.7 (n-6)	3.6 (n-6)	2.1 (n-6)	10.4 (n-6)	9.1 (n-6)	17.1 (n-6)	3.6(n-6)	8.3 (n-6)	6.0 (n-6)	9.4 (n-6)	0.49
(C18:3)	1.7 (n-3)	0.7 (n-3)	0.4 (n-3)	2.5 (n-3)	0.2 (n-6)	0.1 (n-6)	0.7 (n-6)	Nd	9.7 (n-3)	0.5 (n-3)	1.5 (n-3)	0.6 (n-3)	0.8 (n-3)	1.0(n-3)	0.6(n-3)	
(C20:4)											0.2 (n-6)	0.2 (n-6)	0.1 (n-6)	0.1 (n-6)	0.0 (n-6)	
(C20:5)							1.7 (n-3)									
(C22:5)								1.4								
(C22:6)							0.6									
PUFA	8.8	4.8	18.0	26.0	4.7	3.8	6.6	3.5	20.3	10.1	18.8	4.4	9.2	7.1	10.0	0.49
Omega 6	7.0	4.1	17.6	23.5	4.7	3.8	4.4	2.1	10.4	9.1	17.3	3.8	8.4	6.1	9.4	
Omega 3	1.7	0.7	0.4	2.5			1.7		9.7	0.5	1.5	0.6	0.8	1.0	0.6	
n-6/n-3	4.12	5.86	44.0	9.4			2.59		1.1	18.3	11.53	6.33	10.5	6.1	15.67	
Reference	(Meneguz et al. 2018)	(Meneguz et al. 2018)	(Meneguz et al. 2018)	(Meneguz et al. 2018)	(Moula et al. 2018)	(Moula et al. 2018)	(Moula et al. 2018)	(Moula et al. 2018)	(Oonincx et al. 2019)	(Oonincx et al. 2019)	(Oonincx et al. 2015)	(Oonincx et al. 2015)	(Oonincx et al. 2015)	(Oonincx et al. 2015)	(Oonincx et al. 2015)	(Pang et al. 2019)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	Control diet	Biodecomposed media	Dairy Cow Manure	Fish Offal+Cow Manure	SCR with *Lactobacillus buchneri*	Soybean crude residues	Artificial feed	Chicken feed	Digestate	Vegetable waste	Restaurant waste	Cow manure	10% fish offal and 90% cow manure	25% fish offal and 75% cow manure	50% fish offal and 50% cow manure	24 h 22% fish offal and 78% cow manure
(C10:0)	1.09	0.86			1.5	1.7	2.2	1.4	1.2	1.6	2.0					
(C12:0)	36.40	40.79	23.6	37.1	39.6	36.9	41.3	57.3	43.6	60.9	57.6	20.9	34.1	41.0	42.6	14.7
(C13:0)	0.02	0.02														
(C14:0)	6.89	6.56	5.1	6.3	6.5	5.9	6.5	7.3	6.9	9.5	7.1	2.85	6.46	6.67	6.91	4.51
(C15:0)	0.13	0.13			0.4	0.4	0.7									
(C16:0)	15.31	16.27	19.8	17.3	13.1	13.2	12.6	9.6	10.1	8.7	10.3	16.05	14.3	12.08	11.14	16.5
(C17:0)	0.08	0.12			0.4	0.4	0.7									
(C18:0)	3.35	7.34	6.5	2.0	2.1	1.7	1.6	1.4	1.7	1.1	1.0	5.68	2.35	1.64	1.29	6.22
(C19:0)	0.01	0.01														
(C20:0)	0.05	0.08														
(C22:0)	0	0.01														
SFA	63.33	72.19	55.0	62.7	63.6	60.2	65.6	77.4	64.8	82.8	78.3	45.48	57.21	61.39	61.94	41.93
(C14:1)					1.0	1.1	1.3									
(C15:1)					0.5	0.5	0.5									
(C16:1)	2.39 (n-7) 0.72 (n-9)	2.36 (n7) 0.45 (n-9)	6.3 (n-7)	7.6 (n-7)	2.7 (n-7)	3.2 (n-7)	4.3 (n-7)	2.0	7.6	2.9	3.3					
(C17:1)					0.6	0.8	1.3									
(C18:1)	21.10 (n-9) 0.58 (n-7)	18.24 (n-9) 0.67 (n-7)	22.7 (n-9)	18.8 (n-9)	11.5(n-9)	12.1(n-9)	10.1 (n-9)	7.5(n-9) 0.2 (n-11)	7.9 (n-9) 2.3 (n-11)	5.7(n-9) 0.3 (n-11)	8.0(n-9) 0.1(n-11)	32.11 (n-9)	16.52 (n-9)	13.96 (n-9)	12.28 (n-9)	27.00 (n-9)
(C20:1)	0.09 (n-7)	0.10 (n-7)														
MUFA	24.88	21.82	29.0	26.4	16.3	17.7	17.5	10.0	19.1	9.5	12.0	32.11	16.52	13.96	12.28	27.00
(C18:2)	11.01 (n-6)	10.7 (n-6)	6.8 (n-6)	5.9 (n-6)	17.5(n-6)	17.0(n-6)	12.8 (n-6)	11.5 (n-6)	7.9 (n-6)	4.5(n-6)	7.8 (n-6)	4.51 (n-6)	3.96 (n-6)	3.22 (n-6)	3.57 (n-6)	3.89 (n-6)
(C18:3)	2.5 (n-3)	1.6 (n-3)	0.0	0.5 (n-3)	1.4 (n-3)	1.2 (n-3)	0.9 (n-3)	0.7 (n-3)	0.8 (n-3)	1.4(n-3)	1.1 (n-3)	0.19 (n-3)	0.74 (n-3)	0.71 (n-3)	0.74 (n-3)	0.86 (n-3)
(C18:4)			0.0	0.5 (n-3)				0.07 (n-3)	0.6 (n-3)	0.9 (n-3)	0.05 (n-3)					
(C20:4)	0.02 (n-6)	0.02 (n-6)			1.3 (n-6)	1.3 (n-6)	2.3(n-6)					0.04 (n-6)	0.2 (n-6)	0.18 (n-6)	0.2 (n-6)	0.19 (n-6)
(C20:5)	0.04 (n-3)	0.02 (n-3)	0.1 (n-3)	3.5 (n-3)	0.4 (n-3)	0.4 (n-3)	0.4(n-3)	0.06 (n-3)	0.1(n-3)	0.01 (n-3)	0.2 (n-3)	0.03 (n-3)	1.76 (n-3)	1.63 (n-3)	1.66 (n-3)	1.43 (n-3)
(C22:5)			0	0.35 (n-3)								0	0.1 (n-3)	0.11 (n-3)	0.14 (n-3)	0.53 (n-3)
(C22:6)			0	1.7 (n-3)				0.01 (n-3)	0.02(n-3)	0.01(n-3)	0.01 (n-3)	0.006 (n-3)	0.41 (n-3)	0.43 (n-3)	0.59 (n-3)	1.66 (n-3)
PUFA	13.57	12.34	6.9	12.45	20.6	19.90	16.4	12.34	9.42	6.82	9.1	4.78	7.17	6.33	6.9	8.56
Omega 6	11.03	10.72	6.80	5.90	18.80	18.30	15.10	11.60	8.00	4.60	8.00	4.55	4.26	3.57	3.91	4.60
Omega 3	2.54	1.62	0.10	6.55	1.80	1.60	1.30	0.90	1.60	2.30	1.40	0.23	2.91	2.76	2.99	3.96
n-6/n-3	4.34	6.62	68	0.90	10.44	11.44	11.61	12.89	5.0	2	5.71	19.78	1.46	1.29	1.31	1.16
Reference	(Rabani et al. 2019)	(Rabani et al. 2019)	(Sealey et al. 2011)	(Sealey et al. 2011)	(Somroo et al. 2019)	(Somroo et al. 2019)	(Somroo et al. 2019)	(Spranghers et al. 2017)	(Spranghers et al. 2017)	(Spranghers et al. 2017)	(Spranghers et al. 2017)	(St-Hilaire, Cranfill, et al. 2007)	(St-Hilaire, Cranfill, et al. 2007)	(St-Hilaire, Cranfill, et al. 2007)	(St-Hilaire, Cranfill, et al. 2007)	(St-Hilaire, Cranfill, et al. 2007)

Table S1 - Cont.

	Substrate tested																	
BSF Fatty acids	Swine manure	Food waste	100% coffee silverskin	Coffee silverskin + 5% *Schyzochytrium sp*	Coffee silverskin + 10% *Schyzochytrium sp*	Coffee silverskin + 20% *Schyzochytrium sp*	Coffee silverskin + 25% *Schyzochytrium sp*	Coffee silverskin + 5% *Isochrysis sp*	Coffee silverskin + 10% *Isochrysis sp*	Coffee silverskin + 20% *Isochrysis sp*	Coffee silverskin + 25% *Isochrysis sp*	By-products from roasting coffee	Corn meal and fruit and vegetable mixture (50:50)	Coconut Endosperm Waste	Cereal Mix 1	Cereal Mix 2	Cereal Mix 3	Cereal Mix 4
(C10:0)			0.25	0.38	0.52	0.85	0.55	0.87	1.03	0.94	0.85	0.15	0.003	2.2				
(C12:0)	49.3	44.9	14.1	9.4	8.0	19.5	19.9	28.3	32.5	30.2	28.2	0.2	0.026	63.1	0.64	0.37	0.22	0.17
(C13:0)												0.03	Nd					
(C14:0)	6.8	8.3	3.2	2.7	2.0	5.9	4.0	5.7	6.7	6.8	6.9	3.1	0.045	13.5	0.50	0.6	0.59	0.40
(C15:0)			0.46	0.32	0.22	0.16	0.12	0.24	0.27	0.25	0.20	0.57	0.012					
(C16:0)	10.48	13.5	18.1	16.6	15.9	12.1	10.8	14.4	14.3	12.7	12.0	21	0.83	8.2	24.41	32.31	27.45	27.36
(C17:0)			0.51	0.42	0.35	0.21	0.16	0.27	0.20	0.20	0.24	0.80	0.014					
(C18:0)	2.78	2.1	10.8	17.1	12.6	4.7	5.8	21.4	12.9	11.0	9.0	8.9	0.32		1.5	1.57	1.12	1.09
(C20:0)			11.0	6.9	2.7	1.2	1.3	4.2	2.9	2.6	2.4	2.42	0.033					
(C21:0)												0.17	Nd					
(C22:0)			16.0	8.9	2.8	1.3	1.1	5.0	3.3	3.0	2.8	2.68	0.027					
SFA	69.35	69.90	74.42	62.72	45.09	46.32	42.63	80.38	74.1	67.69	62.59	40.02	1.31	87.00	27.31	35.11	29.76	29.33
(C16:1)	3.45 (n-7)	2.4 (n-7)	4.7(n-7)	4.1(n-7)	5.2(n-7)	4.3(n-7)	5.0(n-7)	3.8(n-7)	4.6(n-7)	3.9(n-7)	3.6(n-7)	0.06 (n-9) 0.40 (n-7)	0.006 (n-9) 0.015 (n-7)	2.7	0.33	0.20	0.30	0.30
(C18:1)	11.81 (n-9)	12.0 (n-9)	9.0(n-9) 2.5 (n-7)	8.2(n-9) 1.5(n-7)	11.3(n-9) 1.4(n-7)	11.7(n-9) 0.9(n-7)	12.9(n-9) 0.5(n-7)	7.4(n-9) 1.6(n-7)	10.2(n-9) 1.2(n-7)	12.4(n-9) 1.2(n-7)	13.9(n-9) 1.1(n-7)	2.9 (n-9) 0.28 (n-7)	0.90 (n-9) 0.039 (n-7)	8.3	20.49 (n-9) 0.7 (n-11)	13.04 (n-9) 0.54 (n-11)	13.77 (n-9) 0.97 (n-11)	13.48 (n-9) 0.96 (n-11)
(C20:1)			0.02 (n-9)	0.15(n-9)	0.12(n-9)	0.01(n-9)	0.05(n-9)	0.04(n-9)	0.06(n-9)	0.04(n-9)	0.07(n-9)	0.65 (n-9)	0.027 (n-9)		Nd	0.16 (n-11)	0.29 (n-11)	0.27 (n-11)
MUFA	15.26	14.90	16.22	13.95	18.02	16.91	18.45	12.84	16.06	17.54	18.67	4.29	0.99	11.00	21.72	14.15	15.71	15.33
(C18:2)	3.68 (n-6)	9.9 (n-6)	6.2(n-6)	4.6(n-6)	4.9(n-6)	3.7(n-6)	3.9(n-6)	4.0(n-6)	4.8(n-6)	5.9(n-6)	6.8(n-6)	0.69 (n-6)	2.32 (n-6)	2.0	46.60 (n-6)	46.40 (n-6)	49.92 (n-6)	49.82 (n-6)
(C18:3)	0.08 (n-3)	0.1 (n-3)	0.4(n-6) 1.0 (n-3)	0.9(n-6) 0.9 (n-3)	1.6(n-6) 1.1(n-3)	1.6(n-6) 1.0(n-3)	1.9(n-6) 1.1(n-3)	0.1(n-6) 1.2(n-3)	0.1(n-6) 2.3(n-3)	0.2(n-6) 3.8(n-3)	0.2(n-6) 5.3(n-3)		0.48 (n-3)		Nd 4.21 (n-3)	nd 4.26 (n-3)	0.08 (n-6) 4.34 (n-3)	0.06 (n-6) 5.18 (n-3)
(C20:4)			0.1 (n-6)	2.2 (n-6)	3.2(n-6)	3.6(n-6)	3.9(n-6)	0.4(n-6)	0.7(n-6)	1.4(n-6)	2.0(n-6)							
(C20:5)			0.8 (n-3)	6.5(n-3)	10.6(n-3)	10.6(n-3)	11.7(n-3)	0.6(n-3)	1.2(n-3)	2.2(n-3)	3.0(n-3)							
(C22:6)			0.7 (n-3)	8.3 (n-3)	15.6 (n-3)	16.7 (n-3)	15.2 (n-3)	0.5(n-3)	0.6(n-3)	1.2 (n-3)	1.4(n-3)							
PUFA	3.76	10.00	9.20	23.40	37.00	37.2	37.8	6.8	9.7	14.7	18.7	0.69	2.80	2.00	50.96	50.74	54.53	55.34
Omega 6	3.68	9.9	6.7	7.7	9.7	8.9	9.7	4.5	5.6	7.5	9.00	0.69	2.32	2.0	46.60	46.40	50.00	49.88
Omega 3	0.08	0.1	2.5	15.7	27.3	28.3	28.1	2.3	4.1	7.2	9.7		0.48		4.21	4.26	4.34	5.18
n-6/n-3	46	99	2.68	0.49	0.35	0.31	0.34	1.96	1.37	1.04	0.93		4.83		11.07	10.89	11.52	9.63
Reference	(St-Hilaire, Sheppard, et al. 2007)	(Surendra et al. 2016)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Truzzi et al. 2020)	(Vargas et al. 2018)	(Vargas et al. 2018)	(Wong et al. 2019)	(Danieli et al. 2019)	(Danieli et al, 2019)	(Danieli et al. 2019)	(Danieli et al. 2019)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	Cotton cake &Corn bran	Chicken feed	Fish waste & corn bran	Wheat bran & rabbit feed (control)	!00% raw apricots	25% brewer's spent grain (dried), 12.5% feed mill by-products and 62.5% brewer's spent yeast (raw)	Brewer's by-product	Quail manure 0%	Quail manure 20%	Quail manure 40%	Quail manure 60%	Quail manure 80%	Quail manure 100%	*Schizochytrium* waste 0%	*Schizochytrium* waste 10%	*Schizochytrium* waste 20%
(C10:0)	0.97	0.83	0.69	0.57	0.52	1.36	0.92	1.28	1.34	1.32	1.41	1.3	1.51	1.58	1.30	1.19
(C12:0)	50.12	43.93	43.35	50.83	49.86	55.39	36.0	41.96	39.44	40.50	40.70	35.92	30.91	46.36	36.88	34.14
(C13:0)																
(C14:0)	8.82	8.49	9.13	8.74	8.34	7.5	7.83	7.05	6.09	6.28	6.16	5.24	5.28	7.84	6.06	5.92
(C15:0)							0.21									
(C16:0)	15.39	13.71	15.00	11.92	13.96	11.99	16.8	12.59	12.45	11.91	12.13	10.33	11.17	12.20	16.15	18.18
(C17:0)				0.18	0.22	0.38										
(C18:0)	1.8	2.77	3.09	1.61	1.89	9.64	2.28									
(C19:0)																
(C20:0)							0.11									
(C22:0)	0.41	0.00														
SFA	77.57	69.73	71.26	73.85	74.78	84.26	64.5	64.36	60.49	61.28	61.77	54.04	51.36	69.63	62.03	61.22
(C14:1)							0.15	0.50	0.48	0.50	0.61	1.00	1.39	0.53	0.28	0.17
(C15:1)							0.10									
(C16:1)	3.85	2.28	2.79	0.8 (n-9) / 1.71 (n-7)	0.46 (n-9) / 2.00 (n-7)	0.19 (n-9) / 4.35 (n-7)	2.29	5.82	7.30	8.82	8.97	9.88	15.00	5.56	5.34	5.70
(C17:1)	0.53	0.15	0.59													
(C18:1)	10.62	12.97	14.81	9.17	11.35	9.64	9.38	11.19	12.03	12.51	13.79	15.17	16.49	10.58	12.15	11.10
(C20:1)							0.19	0.18	0.26	0.29	0.33	0.39	0.00			
MUFA	15.01	15.41	18.20	11.68	13.81	14.18	12.3	17.7	21.07	21.12	21.70	26.43	32.89	16.68	17.78	16.98
(C18:2)	7.13 (n-6)	13.58 (n-6)	8.29	12.7	10.47	4.44	18.1	12.36	10.45	8.99	9.05	7.15	2.99	12.45	14.85	14.35
(C18:3)	0.12	1.19	0.23	1.77	0.93	1.85	1.48	1.08	0.81	0.73	0.62	0.39	0.19	0.99	1.14	1.02
(C18:4)																
(C20:3)	0.06	0.04	0.23													
(C20:4)	0.02 (n-6)	0.05	0.03			0.17										
(C20:5)			1.38			0.57								0.23	0.79	1.18
(C22:5)																
(C22:6)			0.37											0.00	3.4	5.23
PUFA	7.90	14.86	10.53	14.47	11.4	7.03	19.6	13.43	11.25	9.71	9.67	7.55	3.19	13.63	20.18	21.79
Omega 6	7.14	13.62	8.32	12.7	10.47	4.44	18.1	12.36	10.45	8.99	9.05	7.15	2.99	12.45	14.85	14.35
Omega 3	0.7	1.23	2.21	1.77	0.93	2.59	1.48	1.08	0.81	0.73	0.62	0.39	0.19	1.23	5.33	7.44
n-6/n-3	10.2	11.07	3.76	7.17	11.26	1.71	12.23	11.44	12.90	12.31	14.60	18.33	15.74	10.12	2.79	1.93
Reference	(Agbohessou et al. 2021)	(Agbohessou et al. 2021)	(Agbohessou et al. 2021)	(Boukid et al. 2021)	(Boukid et al. 2021)	(Boukid et al. 2021)	(Campbell et al. 2020)	(El-Dakar, Ramzy, & Ji 2021)	(El-Dakar et al. 2021)	(El-Dakar et al. 2021)	(El-Dakar et al. 2021)	(El-Dakar et al. 2021)	(El-Dakar et al. 2021)	(El-Dakar et al. 2020)	(El-Dakar et al. 2020)	(El-Dakar et al. 2020)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	*Schizochytrium* waste 30%	*Schizochytrium* waste 40%	*Schizochytrium* waste 50%	Poultry manure	Quail manure	Goat manure	Pig manure	Dry solid digestate 0.25	Dry solid digestate 0.50	Dry solid digestate 0.75	Dry solid digestate 1.00	Wheat bran	Brewer's spent grain	Brewery by-products	Cow's milk whey	Grape stalks
(C10:0)	1.03	1.04	0.75	0.96	1.69	1.53	0.97					1.5	0.9	1.4	1.3	1.4
(C12:0)	32.33	35.65	30.62	30.89	52.30	38.24	23.18	25.3	27.7	29.1	29.0	54.5	31.6	48.5	53.4	17.0
(C13:0)																
(C14:0)	5.90	6.38	6.57	5.10	6.90	6.33	4.69	6.1	5.9	9.5	9.5	8.3	5.0	5.6	7.8	2.9
(C15:0)								0.9	0.3	0.6	0.7					
(C16:0)	21.68	21.24	24.69	19.06	7.55	11.66	19.24	11.0	9.8	12.8	12.6	11.0	19.6	10.7	8.8	12.8
(C17:0)								1.4	0.5	1.0	1.0					
(C18:0)	1.46	1.22	1.57	1.0	1.26	2.60	3.39	2.0	1.7	3.2	3.3	1.0	1.3	1.1	1.7	3.3
(C19:0)																
(C20:0)																
(C22:0)																
SFA	62.42	65.55	64.22	57.08	69.70	60.37	51.47	46.6	45.9	56.1	56.0	76.3	58.4	67.3	73.0	37.4
(C14:1)	0.22	0.25	0.00	0.37	1.32	0.75	0.46									
(C15:1)																
(C16:1)	5.92	4.94	5.31	9.15	9.80	9.60	11.54	11.1	8.6	9.1	9.0	3.5	5.4	1.9	2.0	0.5
(C17:1)																
(C18:1)	9.24	7.50	8.22	15.09	9.26	13.98	23.98	38.9	41.1	32.8	33.0	7.9	8.2	8.2	11.4	22.9
(C20:1)				0.24												
MUFA	15.39	12.70	13.53	24.85	20.39	24.33	35.52	50.0	49.7	41.9	42.0	11.4	13.6	10.1	13.4	23.4
(C18:2)	13.88	12.36	10.43	10.19	1.37	2.14	1.96	3.4	4.4	2.0	2.1	5.2	14.3	20.5	12.9	31.8
(C18:3)	0.82	0.92	0.84	0.17		0.04	0.04							2.1	0.8	2.9
(C18:4)																
(C20:3)																
(C20:4)																
(C20:5)	1.61	1.52	1.58													
(C22:5)																
(C22:6)	5.85	6.92	9.75													
PUFA	22.18	21.74	22.23	10.37	1.37	2.19	2.00	3.4	4.4	2.0	2.1	5.2	14.3	22.6	13.8	34.7
Omega 6	13.88	12.36	10.43	10.19	1.37	2.14	1.96	3.4	4.4	2.0	2.1	5.2	14.3	20.5	12.9	31.8
Omega 3	8.29	9.38	11.80	0.17		0.04	0.04							2.1	0.8	2.9
n-6/n-3	1.67	1.32	0.88	59.94		53.5	49							9.8	16.1	11.0
Reference	(El-Dakar et al. 2020)	(El-Dakar et al. 2020)	(El-Dakar et al. 2020)	(El-Dakar, Ramzy, Plath, et al. 2021)	(El-Dakar, Ramzy, Plath, et al. 2021)	(El-Dakar, Ramzy, Plath, et al. 2021)	(El-Dakar, Ramzy, Plath, et al. 2021)	(Elsayed et al. 2020)	(Elsayed et al. 2020)	(Elsayed et al. 2020)	(Elsayed et al. 2020)	(Grossule et al. 2019)	(Grossule et al. 2019)	(Hadj Saadoun et al. 2020)	(Hadj Saadoun et al. 2020)	(Hadj Saadoun et al. 2020)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	Tomato peels and seeds	Bread dough	Fish scraps	wheat bran and solubles	Fruit and vegetables raw waste, brewer's grain and pasta production waste	Rape cake 10%	Rape cake 20%	Rape cake 40%	Rape cake 60%	Rape cake 80%	Rape cake 100%	Flax cake 10%	Flax cake 20%	Flax cake 40%	Flax cake 60%	Flax cake 80%
(C10:0)	0.7	1.1	1.5	1.3	1.1	1.6	1.4	1.4	1.4	1.3	1.1	1.7	1.7	1.4	1.4	1.3
(C12:0)	28.0	33.4	43.9	48.4	45.8	55.6	52.2	1.4	51.2	49.8	49.2	54.5	52.9	49.3	48.5	41.4
(C13:0)																
(C14:0)	3.2	4.0	3.8	8.6	9.4	6.4	6.5	6.4	6.4	6.2	5.3	6.4	6.2	6.3	6.5	5.7
(C15:0)				0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
(C16:0)	9.0	8.4	7.7	11.2	15.5	9.0	8.8	8.0	7.5	6.9	6.8	10.4	10.2	8.5	8.1	7.6
(C17:0)				0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	0.2
(C18:0)	1.2	1.1	0.8	1.6	2.7	1.3	1.3	1.1	0.9	0.8	0.9	1.7	1.6	1.3	1.3	1.4
(C19:0)																
(C20:0)	0.4	0.0	6.5	0.1	0.1											
(C22:0)				0.02	0.02											
SFA	42.5	47.9	58.4	71.8	75.2	70.8	69.8	68.5	66.3	64.7	56.3	75.1	72.9	67.1	66.1	57.7
(C14:1)				0.15	0.25	0.1	0.1	0.1	0.2	0.2	0.1		0.1	0.2	0.3	0.5
(C15:1)										0.1	0.1	0.1	0.1	0.1	0.1	0.2
(C16:1)	1.6	0.4	7.2	1.8	2.3	0.5	0.5	0.7	0.8	1.1	1.8	0.3	0.2	0.4	0.5	0.7
(C17:1)				0.1	0.1		0.1	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.3
(C18:1)	16.5	30.0	20.5	11.1	13.1	9.3	10.0	13.0	15.6	17.8	24.2	7.0	7.4	9.1	9.3	11.1
(C20:1)																
MUFA	18.1	30.4	27.7	13.9	16.7	9.9	10.7	13.9	16.8	19.4	26.4	7.4	7.8	10.0	10.4	12.7
(C18:2)	37.4	16.9	10.5	12.2	6.49	8.8	9.3	7.7	6.0	6.2	8.9	7.4	7.9	6.4	6.2	7.3
(C18:3)	1.3	1.1	1.3	1.0	0.9	1.2	1.4	1.5	1.3	1.5	2.4	2.1	3.1	5.8	6.5	12.6
(C18:4)																
(C20:3)																
(C20:4)																
(C20:5)																
(C22:5)																
(C22:6)																
PUFA	38.7	18.0	11.8	14.3	8.1	9.9	10.8	9.1	7.3	7.7	11.3	9.5	12.3	12.6	13.7	19.9
Omega 6	37.4	16.9	10.5	12.2	6.7	8.8	9.3	7.7	6.0	6.2	8.9	7.4	7.9	6.4	6.2	7.3
Omega 3	1.3	1.1	1.3	1.0	1.0	1.2	1.4	1.5	1.3	1.5	2.4	2.1	3.1	5.8	6.5	12.6
n-6/n-3	28.8	15.4	8.1	12.0	6.9	7.3	6.6	5.1	4.6	4.1	3.7	3.5	2.5	2.2	0.9	0.6
Reference	(Hadj Saadoun et al. 2020)	(Hadj Saadoun et al. 2020)	(Hadj Saadoun et al. 2020)	(Heuel et al. 2021)	(Heuel et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)	(Hoc et al. 2021)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	Flax cake 100%	Wheat Bran	Flaxseed 20%	Flaxseed 10%	Rapeseed 20%	Chia 20%	Chia 10%	Hemp 20%	Fruit waste	Foods waste	Food waste	Bacterial cell	Dewater sewage sludge and palm kernel expeller (5:0)	Dewater sewage sludge and palm kernel expeller (4:1)	Dewater sewage sludge and palm kernel expeller (3:2)	Dewater sewage sludge and palm kernel expeller (2:3)
(C10:0)	1.1	5.5	2.1	2.6	2.4	1.4	4.0	1.7	1.0	1.3	1.0	1.6	0.9	5.6	4.5	18.9
(C12:0)	40.4	62.1	55.4	45.0	53.0	36.5	52.5	33.4	67.8	55.5	37.0	48.7	19.6	24.3	53.4	21.4
(C13:0)																
(C14:0)	5.5	7.5	8.8	7.2	8.3	7.1	6.7	5.7	8.6	10.1	8.0	14.1	10.3	16.3	12.5	6.6
(C15:0)	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1						
(C16:0)	7.2	9.4	9.4	11.5	10.8	11.9	5.8	10.5	9.8	12.5	15.3	9.8	15.3	10.2	9.9	16.1
(C17:0)	0.2	0.1	0.2	0.3	0.2	0.2	0.2	0.2		0.1						
(C18:0)	1.5	1.5	1.2	2.1	1.2	2.3	1.7	2.6	0.7	1.7	1.6	1.2		2.6	1.2	8.7
(C19:0)																
(C20:0)		0.5	2.4	1.8	1.9	2.4	0.9	4.8		0.5						
(C22:0)																
SFA	56.1	86.7	79.8	70.8	78.1	62.1	72.0	59.1	88.0	81.8	62.9	75.4	46.1	59.0	81.5	71.7
(C14:1)	0.3								0.1	0.5			8.9	7.2	2.8	14.1
(C15:1)	0.2	0.4	0.4	0.6	0.5	0.4	0.5	0.4								
(C16:1)	1.0	2.1	2.3	2.3	2.7	2.0	1.9	1.6	2.3	2.4	2.6	4.2	12.8	1.4	4.4	6.3
(C17:1)	0.2									0.1						
(C18:1)	11.7	4.5	5.7	7.7	10.8	6.0	4.6	7.2	4.1	10.0	20.6	13.5	24.4	20.3	9.2	5.0
(C20:1)		0.1	0.2	0.2	0.2	0.2	0.1	0.4		0.1						
MUFA	13.2	7.9	9.0	12.4	14.6	8.9	7.8	9.9	6.5	13.1	23.2	17.7	46.1	28.9	16.4	25.4
(C18:2)	6.5	4.8	5.0	7.1	6.4	9.7	7.7	24.0	1.5		10.5	5.17	7.9	12.2	2.1	2.9
(C18:3)	15.3	0.5	5.8	9.6	0.7	18.9	12.3	6.8	1.1	0.1	0.4					
(C18:4)																
(C20:3)			0.1		0.1	0.1				0.1						
(C20:4)																
(C20:5)			0.1		0.1	0.1										
(C22:5)																
(C22:6)																
PUFA	21.8	5.3	11.2	16.8	7.3	29.0	20.1	30.9	2.6	0.2	10.9	5.17	7.9	12.2	2.1	2.9
Omega 6	6.5										10.5	5.17	7.9	12.2	2.1	2.9
Omega 3	15.3										0.4					
n-6/n-3	0.4	9.9	0.9	0.7	7.1	0.5	0.6	3.5			26.2					
Reference	(Hoc et al. 2021)	(Lawal et al. 2021)	(Lawal et al. 2021)	(Lawal et al. 2021)	(Lawal et al. 2021)	(Lawal et al. 2021)	(Lawal et al. 2021)	(Lawal et al. 2021)	(Leong & Kutty 2020)	(Leong & Kutty 2020)	(Mohamad et al. 2020)	(Mohamad et al. 2020)	(Raksasat et al. 2021)	(Raksasat et al. 2021)	(Raksasat et al. 2021)	(Raksasat et al. 2021)

Table S1 - Cont.

	Substrate tested															
BSF Fatty acids	Dewater sewage sludge and palm kernel expeller (1:4)	Dewater sewage sludge and palm kernel expeller (0:5)	Schizochytrium residue													
(C10:0)	16.3	5.7														
(C12:0)	7.9	16.9	16.9													
(C13:0)																
(C14:0)	16.1	11.0	7.9													
(C15:0)																
(C16:0)	11.9	5.3	15.1													
(C17:0)																
(C18:0)	5.8	10.3	4.4													
(C19:0)																
(C20:0)																
(C22:0)																
SFA	58.0	49.2	44.3													
(C14:1)	7.8	15.1														
(C15:1)																
(C16:1)	5.2	5.5	2.9													
(C17:1)																
(C18:1)	18.6	11.9	21.3													
(C20:1)			2.8													
MUFA	31.6	32.5	21.3													
(C18:2)	10.3	17.8	15.9													
(C18:3)			0.5													
(C18:4)																
(C20:3)																
(C20:4)			0.2													
(C20:5)			2.6													
(C22:5)																
(C22:6)			10.6													
PUFA	10.3	17.8	34.4													
Omega 6	10.3	17.8	4.6													
Omega 3			13.2													
n-6/n-3			0.3													
Reference	(Raksasat et al. 2021)	(Raksasat et al. 2021)	(Xu et al. 2021)													

Table S2: Dataset used on MetaboAnalist to perform the statistical analysis.

Samples	*Lables*	*ALA*	*EPA*	*DHA*	*PUFA*	*SFA*
CRT1	Control	0.44	0.07	0	12.6	68.9
CTR2	Control	0.19	1	0	6.99	72
CRT2	Control	4.5	0	0	57	18.3
CTR3	Control	0.2	0	0	3.4	93.9
CRT3	Control	9.7	0	0	20.3	63.5
CTR4	Control	0.5	0	0	10.1	74.4
CRT4	Control	0.6	0	0	10	74.2
CTR5	Control	0	0	0	13.57	63.33
CRT5	Control	0.7	0.06	0.01	12.34	77.4
CTR6	Control	1.08	0	0	13.43	64.36
CRT6	Control	0.99	0.23	0	13.63	69.63
CTR7	Control	1.2	0	0	14.9	69.73
CER1	Cereal	0	0	0	2.9	71.7
CER2	Cereal	0	0	0	10.3	58
CER3	Cereal	0	0	0	17.8	49.2
CER4	Cereal	0.5	0	0	5.3	86.7
CER5	Cereal	5.8	0.1	0	11.2	79.8
CER6	Cereal	9.6	0	0	16.8	70.8
CER7	Cereal	0.7	0.1	0	7.3	78.1
CER8	Cereal	18.9	0.1	0	29.0	62.1
CER9	Cereal	12.3	0	0	20.1	72.0
CER10	Cereal	6.8	0	0	30.9	59.1
CER11	Cereal	1.2	0	0	9.9	70.8
CER12	Cereal	1.4	0	0	10.8	69.8
CER13	Cereal	1.5	0	0	9.1	68.5
CER14	Cereal	1.3	0	0	7.3	66.3
CER15	Cereal	1.5	0	0	7.7	64.7
CER16	Cereal	2.4	0	0	11.3	56.3
CER17	Cereal	2.1	0	0	9.5	75.1
CER18	Cereal	3.1	0	0	12.3	72.9
CER19	Cereal	5.8	0	0	12.6	67.1
CER20	Cereal	6.5	0	0	13.7	66.1
CER21	Cereal	12.6	0	0	19.9	57.7
CER22	Cereal	15.3	0	0	21.8	56.1
CER23	Cereal	1	0	0	14.3	71.8
CER24	Cereal	0	0	0	5.2	76.3
CER25	Cereal	0.12	0	0	7.9	77.57
CER26	Cereal	0	0	0	67.6	12.5
CER27	Cereal	2.1	0	0	3.9	65.5
CER28	Cereal	0	0.15	0.01	0.16	74.52
CER29	Cereal	1.11	0	0	16.57	62.28
CER30	Cereal	1.35	0	0	25.37	45.41
CER31	Cereal	1.4	0.4	0	20.6	63.6
CER32	Cereal	1.2	0.4	0	19.9	60.2
CER33	Cereal	1	0.8	0.7	9.2	74.42
CER34	Cereal	0	0	0	0.69	40.02
CER35	Cereal	0.48	0	0	2.8	1.31
CER36	Cereal	4.21	0	0	50.96	27.31

CER37	Cereal	4.26	0	0	50.74	35.11
CER38	Cereal	4.34	0	0	54.53	29.76
CER39	Cereal	5.18	0	0	55.34	29.33
CER40	Cereal	0.8	0	0	6.9	77.1
CER41	Cereal	1.6	0	0	9.3	75.6
CER42	Cereal	1.77	0	0	14.47	73.85
MIX 1	Miscellaneous	0	0	0	5.17	75.4
Mix 2	Miscellaneous	0.9	0	0	8.1	75.2
MIX 3	Miscellaneous	1.1	0	0	18	47.9
MIX 4	Miscellaneous	0	0	0	0	73.32
MIX 5	Miscellaneous	0.4	0	0	18	63
MIX 6	Miscellaneous	2.5	0	0	26	61.2
MIX 7	Miscellaneous	1.5	0	0	18.8	59.7
MIX 8	Miscellaneous	0.6	0	0	4.4	75.5
MIX 9	Miscellaneous	0.8	0	0	9.2	66.9
MIX 10	Miscellaneous	1	0	0	7.1	76.3
MIX 11	Miscellaneous	0	0	0	12.34	72.19
MIX 12	Miscellaneous	0.9	0.4	0	16.4	65.6
MIX 13	Miscellaneous	0.8	0.1	0.02	9.42	64.8
MIX 14	Miscellaneous	1.48	0	0	19.6	64.5
MIX 15	Miscellaneous	1.85	0.57	0	7.03	84.26
MIX 16	Miscellaneous	0	0	0	3.4	50.0
MIX 17	Miscellaneous	0	0	0	4.4	49.7
MIX 18	Miscellaneous	0	0	0	2.0	41.9
MIX 19	Miscellaneous	0	0	0	2.1	42.0
MAN 1	Manure	0	0	0	7.9	46.1
MAN 2	Manure	0	0	0	12.2	59
MAN 3	Manure	0	0	0	2.1	81.5
MAN 4	Manure	0	0	0	14.3	58.4
MAN 5	Manure	2.1	0	0	22.6	67.3
MAN 6	Manure	0.8	0	0	13.8	73.0
MAN 7	Manure	0.19	0	0	3.19	51.36
MAN 8	Manure	0.39	0	0	7.55	54.04
MAN 9	Manure	0.62	0	0	9.67	61.77
MAN 10	Manure	0.73	0	0	9.71	61.28
MAN 11	Manure	0.81	0	0	11.25	60.49
MAN 12	Manure	0	0	0	10	72
MAN 13	Manure	1.7	0	0	14.7	62.8
MAN 14	Manure	0	0	0	4.7	46.1
MAN 15	Manure	0	0	0	3.8	69.4
MAN 16	Manure	0	1.7	0	6.6	61.9
MAN 17	Manure	0	0	0	3.5	65.5
MAN 18	Manure	0	0	0	0.49	69.51
MAN 19	Manure	0	0	0	6.9	55
MAN 20	Manure	0.19	0.03	0.006	4.78	45.48
MAN 21	Manure	0.08	0	0	3.76	69.35
MAN 22	Manure	0.17	0	0	10.37	57.08
MAN 23	Manure	0	0	0	1.37	69.7
MAN 24	Manure	0.04	0	0	2.19	60.37

MAN 25	Manure	0.04	0	0	2.00	51.47
SEAF 1	Seafood	1.3	0	0	11.8	58.4
SEAF 2	Seafood	0.23	1.4	0.4	10.53	71.26
SEAF 3	Seafood	0.5	3.5	1.7	12.45	62.7
SEAF 4	Seafood	0.74	1.76	0.41	7.17	57.21
SEAF 5	Seafood	0.71	1.63	0.43	6.33	61.39
SEAF 6	Seafood	0.74	1.66	0.59	6.9	61.94
SEAF 7	Seafood	0.86	1.43	1.66	8.56	41.93
SEAF 8	Seafood	1.3	2	0.5	6.8	73.7
SEAF 9	Seafood	3.6	8.2	4.5	22.6	45.3
SEAF 10	Seafood	1.1	1.9	0.3	8.2	65.6
SEAF 11	Seafood	2.6	0.9	0.3	9.6	72.8
SEAF 12	Seafood	2.2	1.7	0.5	9.3	73.5
SEAF 13	Seafood	2.7	3	0.9	12	69.2
SEAF 14	Seafood	2.6	3.5	1.1	12.2	67.4
SEAF 15	Seafood	3.4	4.8	1.7	16.6	61.3
WST 1	Waste	1.8	0.5	0	12.4	65.2
WST 2	Waste	1.1	0.2	0.01	9.1	78.3
WST 3	Waste	0.1	0.1	0	0.2	81.8
WST 4	Waste	0.4	0	0	10.9	62.9
WST 5	Waste	0.1	0	0	10	69.9
FRU 1	Fruit	1.1	0	0	2.6	88.0
FRU 2	Fruit	1.3	0	0	38.7	42.5
FRU 3	Fruit	2.9	0	0	34.7	37.4
FRU 4	Fruit	0.93	0	0	7.03	84.26
FRU 5	Fruit	0.5	0	0	2.8	86
FRU 6	Fruit	0	0	0	0.52	47
FRU 7	Fruit	0.7	0	0	4.8	81.9
FRU 8	Fruit	0	0	0	2	87
VEG 1	Vegetables	1.4	0.01	0.01	6.82	82.8
VEG 2	Vegetables	5.8	0	0	16.2	56.5
VEG 3	Vegetables	0	0	0	24.1	65
VEG 4	Vegetables	1.7	0	0	8.8	78.9
SEAW 1	Seaweed	0.5	2.6	10.6	34.4	44.3
SEAW 2	Seaweed	3.2	6.6	0	37.8	22.7
SEAW 3	Seaweed	1.14	0.79	3.4	20.18	62.03
SEAW 4	Seaweed	1.02	1.18	5.23	21.79	61.22
SEAW 5	Seaweed	0.82	1.61	5.85	22.18	62.42
SEAW 6	Seaweed	0.92	1.52	6.92	21.74	65.55
SEAW 7	Seaweed	0.84	1.58	9.75	22.23	64.22
SEAW 8	Seaweed	0.9	6.5	8.3	23.4	62.72
SEAW 9	Seaweed	1.1	10.6	15.6	37	45.09
SEAW 10	Seaweed	1	10.6	16.7	37.2	46.32
SEAW 11	Seaweed	1.1	11.7	15.2	37.8	42.63
SEAW 12	Seaweed	1.2	0.6	0.5	6.8	80.38
SEAW 13	Seaweed	2.3	1.2	0.6	9.7	74.1
SEAW 14	Seaweed	3.8	2.2	1.2	14.7	67.69
SEAW 15	Seaweed	5.3	3	1.4	18.7	62.59

Table S3 - Top 10 peer-reviewed scientific journals publishing scientific research addressing the fatty acid profile of *Hermetia illucens* retrieved from WoS™ and Scopus. (Journals publishing 5 or less articles on this topic were grouped as Others)

Source title	*Number of Publications*
Aquaculture	33
Animals	23
Journal of Insects as Food and Feed	16
Animal Feed Science and Technology	12
Scientific Reports	10
Waste Management	10
Journal of Cleaner Production	9
Renewable Energy	7
Animal Feed Science and Technology	6
Others ≤5	266

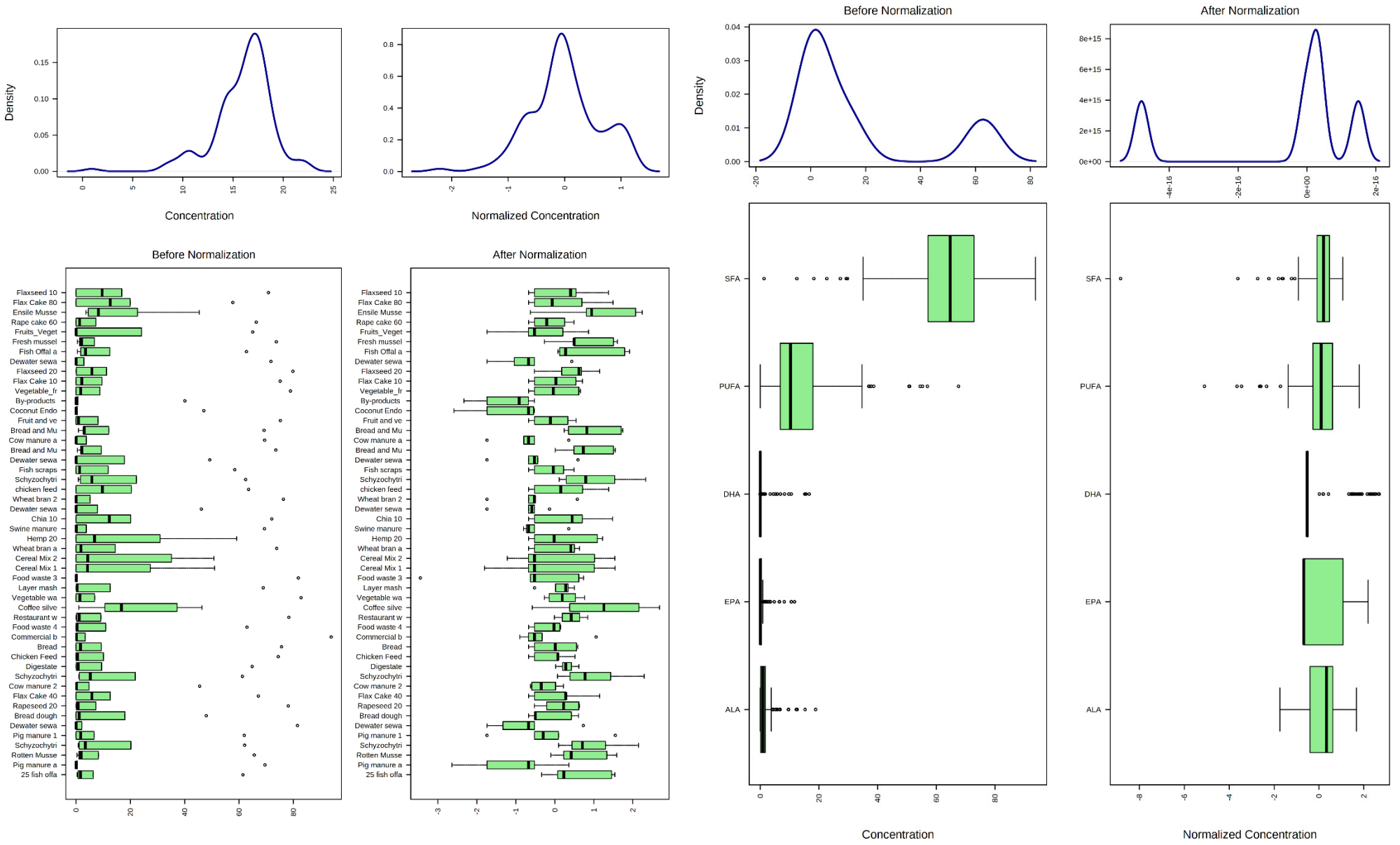

Figure S1: Box plots and kernel density plots before and after normalization. The boxplots show at most 50 features due to space limitations. The density plots are based on all samples. Data transformation: Log Normalization; Data scaling: Autoscaling.

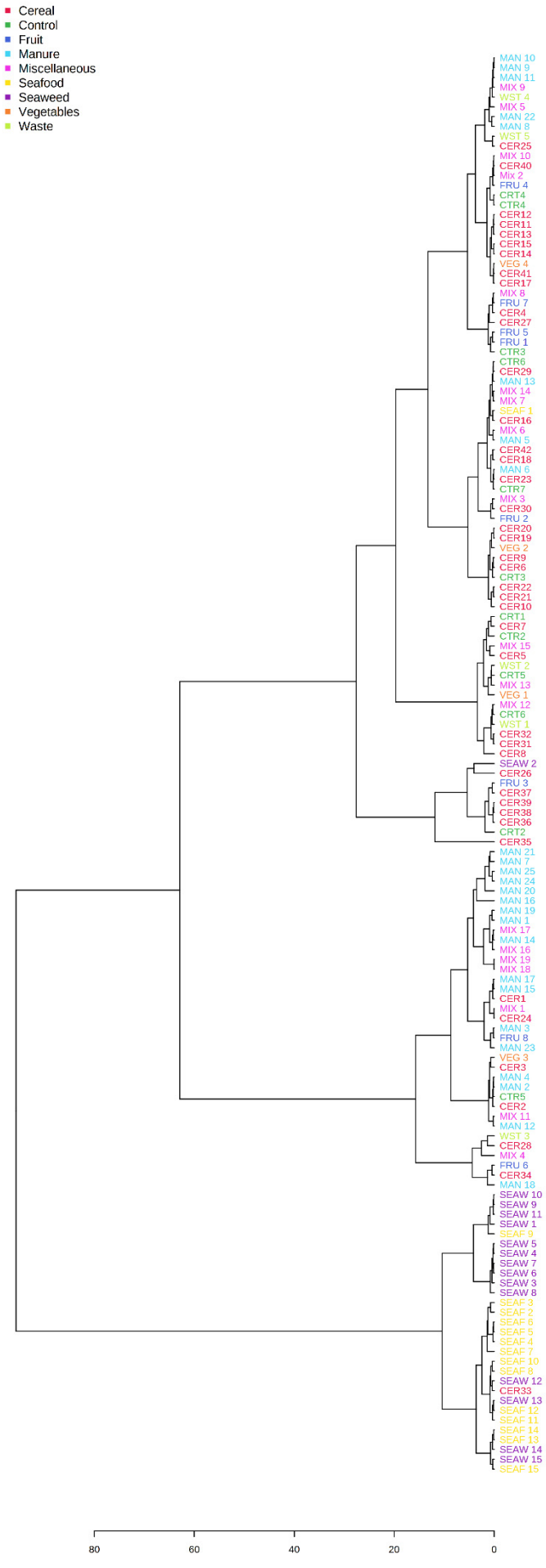

Figure S2: Hierarchical clustering of substrates shown as dendrogram (distance measures using Euclidean, and clustering algorithm using Ward's Distance).

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