Supporting Information

Formation and Conversion of Characteristic Volatile Compounds in Grilled Eel (*Astroconger Myriaster*) During Different Processing Steps

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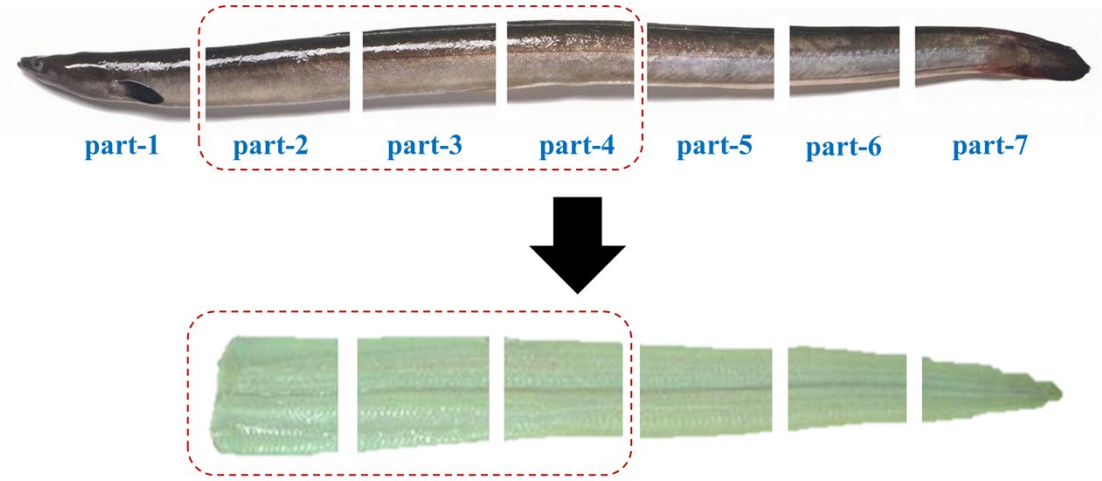

Figure S1 abridged general view of eel samples used in experiment. The parts in red dotted box were the eel meat used in this study.

Table S1 Contents of nutrition composition in different parts of eel muscle (%)

	part-1	part-2	part-3	part-4	part-5	part-6	part-7
water	57.85±0.54^{d}	58.84±0.51^{bc}	59.01±0.33^{b}	60.20±0.46^{a}	59.30±0.25^{b}	58.86±0.55^{bc}	54.97±0.75^{e}
protein	22.48 ±0.13^{bc}	22.87 ±0.15^{b}	22.88 ±0.24^{b}	22.52 ±0.31^{b}	21.66 ±0.27^{d}	22.10 ±0.12^{c}	24.46 ±0.21^{a}
lipid	20.08 ±0.22^{b}	21.10 ±0.17^{a}	21.19 ±0.28^{a}	21.18 ±0.16^{a}	20.19 ±0.29^{b}	19.59 ±0.22^{bc}	18.35±0.15^{c}
ash	0.75 ±0.01^{d}	0.80 ±0.03^{c}	0.82 ±0.06^{c}	0.82 ±0.05^{c}	1.18±0.11^{b}	1.04 ±0.07^{bc}	1.51 ±0.13^{a}
carbohydrate	0.35 ±0.01^{b}	0.30 ±0.02^{d}	0.30±0.02^{d}	0.30 ±0.01^{d}	0.33 ±0.06^{c}	0.32±0.04^{cd}	0.44 ±0.02^{a}

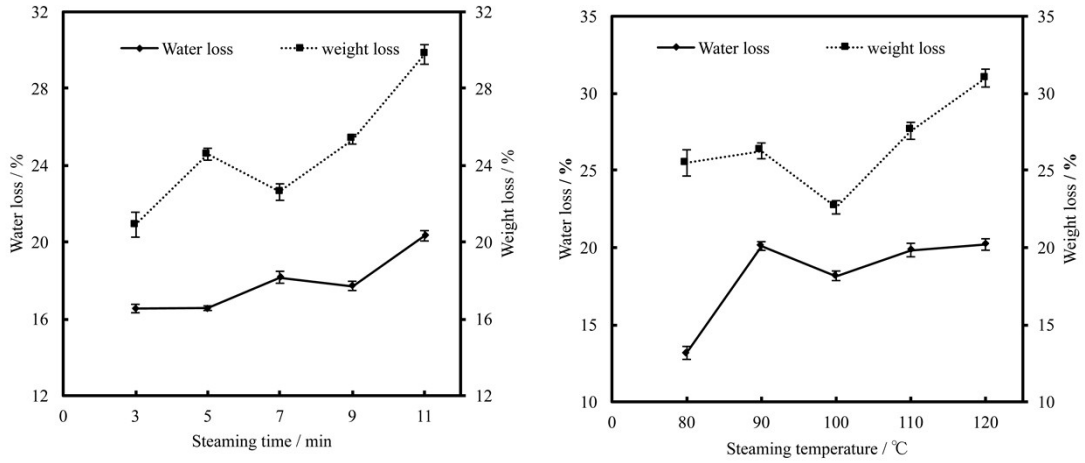

Figure S2 Water loss and weight loss of eel samples during steaming.

Table S2 standard and value of sensory evaluation

Item	Standard	Value
Color	golden, great color and luster, no variegated color, no black scorched spots	15-20
	pale golden, no variegated color, no black scorched spots	10-14
	claybank, irregularity color, variegated color, black scorched spots	0-9
shape	complete and elastic	15-20
	most complete and general elasticity	10-14
	incomplete and poor elasticity	0-9
Odor	strong aroma, long duration, no fishy odor	15-20
	light aroma, long duration, no fishy odor	10-14
	weak aroma, short duration, fishy	0-9
Taste	suitable taste, umami, delicious	15-20
	a little strong or light taste, light umami	10-14
	no umami, awful taste	0-9
Texture	suitable texture	15-20
	great chewiness, but a little hard, tenderness	10-14
	poor chewiness, weak tenderness	0-9

Table S3 list of key volatile compounds of eels

A1	A2	A3	A4	A5	A6
(1-methylbutyl)-benzene	(E)-1-allyl-2-(prop-1-en-1-yl)disulfane	(E)-2-heptene	(E)-3-hepten-2-one	(Z)-2-nonenal	1,2-dibromo-ethane
A7	A8	A9	A10	A11	A12
1,3-dibromo-propane	1,3-dichloro-propane	1-ethenyl-4-methyl-benzene	1-octen-3-one	1-undecanol	2-(diethylamino)-ethanethiol
A13	A14	A15	A16	A17	A18
2,2-dimethyl-1-butanol	2,3-dimethyl-pyrazine	2,4-dimethyl-heptane-3,5-dione	2-acetyl-1,4,5,6-tetrahydropyridine	2-ethyl-3,5-dimethyl-pyrazine	2-methyl-3-buten-1-ol
A19	A20	A21	A22	A23	A24
2-methyl-pyrazine	3-heptanone	3-thiophenethiol	4-hexen-3-one	6-methyl-3,5-heptadiene-2-one	7-methyl-1-octene
A25	A26	A27	A28	A29	A30
benzene	benzenemethanethiol	butanoic acid, 2-methyl-, 2-methylbutyl ester	carvone	cis-1,3-dimethyl-cyclopentane	methyl 2-furoate
A31	A32	A33			
pentanoic acid, 4-methyl-, methyl ester	tert-butyl-benzene	trans-decahydro-naphthalene			

Table S4 list of key odors of eels

B1	B2	B3	B4	B5	B6
fruity	melon odor	banana odor	dried orange peels	pineapple-like	berry-like
B7	B8	B9	B10	B11	B12
apple-like	Cracker-like	green	orris-like	mushroom	cinnamon-like
B13	B14	B15	B16	B17	B18
spearmint	caraway	floral	citrus-like odor	garlic-like odor	nutty
B19	B20	B21	B22	B23	B24
cocoa	Potato	Must	tobacco	dairy	creamy
B25	B26	B27	B28	B29	B30
sour milky	blue cheese	chocolate	fishy	fatty	meaty
B31	B32	B33	B34	B35	B36
sulfurous	pungent	horseradish	mustard	Spice	sweet
B37	B38	B39	B40	B41	B42
ethereal	waxy	slightly ketonic	Aromatic odor	roasted	Earthy
B43	B44				
Slight menthol	Indeterminate				

Table S5 Volatile compounds identified in eel samples

NO	Compounds name	MI	Average RI	Relative Content			
				Fresh	Cured	Steamed	Grilled
1	[1S-(1α,7α,8aβ)]-1,2,3,5,6,7,8,8a-octahydro-1,4-dimethyl-7-(1-methylethenyl)-Azulene	MS, RI	1498	24.42	32.99	2.04	2.99
2	(1-methylbutyl)-Benzene	MS, RI	1110	-	2.91	1.12	1.17
3	(2-methylpropyl)-Cyclopentane	MS, RI	979	1.03	5.12	3.58	20.10
4	(E)-1-Allyl-2-(prop-1-en-1-yl)disulfane	MS, RI	1188	-	0.43	0.28	0.33
5	(E)-2-Heptene	MS, RI, CRS	787	3.06	2.61	30.74	38.23
6	(E)-3-Hepten-2-one	MS, RI, CRS	943	1.65	1.06	-	1.01
7	(E,E)-2,6-Octadiene	MS, RI	920	4.16	-	1.58	1.07
8	(R)-(+)-3-Methylcyclopentanone	MS, RI	731	20.42	55.65	6.08	3.30
9	(Z)-2-Nonenal	MS, RI, CRS	1119	-	0.28	1.78	2.12
10	(Z)-4-methyl-2-Pentene	MS, RI	756	32.17	36.17	115.82	34.76
11	1-(2,3-dihydro-1H-inden-5-yl)-Ethanone	MS, RI	1367	4.20	3.05	0.73	1.03
12	1-(propylthio)-Pentane	MS, RI	1270	0.19	3.41	3.48	1.20
13	1,1,2-trimethyl-Cyclopropane	MS, RI	779	16.29	8.16	9.32	4.91
14	1,1'-oxybis-2-Propanol	MS, RI	1008	8.70	9.80	3.34	4.70
15	1,2-dibromo-Ethane	MS, RI	749	53.14	10.53	13.48	7.91
16	1,3,5-Trioxepane	MS, RI	791	4.36	8.31	6.23	0.99
17	1,3-Cycloheptadiene	MS, RI	821	3.22	1.11	27.95	8.14
18	1,3-dibromo-Propane	MS, RI	853	4.08	43.17	14.16	21.28
19	1,3-dichloro-Propane	MS, RI	776	2.15	-	-	-

20	1,4-Cyclohexadiene	MS, RI	791	0.51	0.75	2.28	2.95
21	1,4-dimethyl-Cyclohexene	MS, RI	921	17.24	9.07	10.14	7.57
22	1-ethenyl-4-methyl-Benzene	MS, RI	949	3.67	0.19	31.49	42.03
23	1-isopropyl-5-methyl-2-Pyrazoline	MS, RI	1029	4.13	2.90	1.47	1.51
24	1-methyl-Cyclopentanol	MS, RI	909	41.66	12.33	43.43	22.48
25	1-Octen-3-one	MS, RI, CRS	987	1.51	3.56	6.93	11.17
26	1-Undecanol	MS, RI, CRS	1468	2.55	2.35	0.13	0.35
27	2-(3,3-dimethylbicyclo[2.2.1]hept-2-ylidene)-Ethanol	MS, RI	1131	-	-	1.62	-
28	2-(diethylamino)-Ethanethiol	MS, RI	1024	-	5.75	2.37	2.15
29	2,2,3,3-tetramethyl-Pentane	MS, RI	974	5.89	5.23	3.01	3.67
30	2,2,4,4-tetramethyl-Pentane	MS, RI	839	48.60	11.19	13.68	5.80
31	2,2'-[methylenebis(oxy)]bis-propane	MS, RI	974	30.30	32.26	19.97	5.74
32	2,2-dibromo-Propane	MS, RI	853	104.12	30.61	9.13	6.41
33	2,2-dimethyl-1-Butanol	MS, RI, CRS	856	2.75	0.57	30.04	27.63
34	2,3-dimethyl-2,5-Cyclohexadiene-1,4-dione	MS, RI	1172	2.00	0.12	1.06	1.33
35	2,3-dimethyl-Pentane	MS, RI	848	10.92	9.76	7.65	2.89
36	2,3-dimethyl-Pyrazine	MS, RI	836	0.18	4.45	2.44	34.45
37	2,3-dimethyl-Thiophene	MS, RI, CRS	981	3.64	0.97	0.63	0.76
38	2,4-dimethyl-2-Decene	MS, RI	1088	2.47	-	-	1.96
39	2,4-Dimethyl-heptane-3,5-dione	MS, RI	1037	1.83	121.23	49.33	94.78
40	2,5-dimethyl-Octane	MS, RI	846	5.55	2.99	53.55	21.42
41	2-Acetyl-1,4,5,6-tetrahydropyridine	MS, RI	1058	85.45	30.25	16.79	10.86
42	2-ethoxy-1-Propanol	MS, RI, CRS	911	87.64	64.50	59.28	109.30
43	2-ethyl-3,5-dimethyl-Pyrazine	MS, RI, CRS	1254	-	0.16	0.31	0.38
44	2-ethyl-6-methyl-Pyridine	MS, RI, CRS	1112	0.17	0.30	3.41	4.45
45	2-methyl-1-Octene	MS, RI	1067	7.34	2.52	0.68	0.54

46	2-methyl-3-Buten-1-ol	MS, RI, CRS	787	13.43	1.73	0.06	0.01
47	2-Methylnonanoic acid, methyl ester	MS, RI	1096	3.04	-	2.29	1.52
48	3-(3-methylbutyl)-Cyclopentene	MS, RI	1018	2.67	4.21	3.50	2.08
49	3,3-dimethyl-Hexanal	MS, RI	989	8.64	2.70	2.24	9.37
50	3,4-dimethyl-Cinnoline	MS, RI	1278	6.07	6.24	1.28	1.76
51	3-ethyl-4-methyl-Hexane	MS, RI	924	0.63	0.55	20.08	8.43
52	3-Heptanone	MS, RI, CRS	822	0.38	0.62	0.02	16.27
53	3-methyl-1-pentene	MS, RI	767	15.24	1.63	1.97	40.60
54	3-methyl-3-Buten-2-ol	MS, RI, CRS	739	9.75	7.68	11.48	12.98
55	3-Thiophenethiol	MS, RI, CRS	962	0.58	6.59	73.84	17.14
56	4-Hexen-3-one	MS, RI	942	-	1.04	0.19	1.25
57	4-hydroxy-3-methyl-2-Butanone	MS, RI, CRS	915	1.93	5.32	2.39	1.52
58	4-Methyl-5H-furan-2-one	MS, RI	1063	0.94	13.51	2.54	1.57
59	4-methyl-Pyrimidine	MS, RI	1001	15.06	17.76	7.14	6.77
60	4-Pyridinecarbonitrile	MS, RI	1001	0.72	1.66	5.54	4.47
61	5-methyl-1H-Imidazole-4-methanol	MS, RI	1122	3.61	3.21	1.74	1.26
62	5-methyl-3-methylene-5-Hexen-2-one	MS, RI	992	36.95	2.98	14.92	4.93
63	6-Methyl-3,5-heptadiene-2-one	MS, RI	1153	-	-	0.41	13.66
64	7-methyl-1-Octene	MS, RI	849	-	-	0.74	0.99
65	Allyl alcohol, bromomethyldimethylsilyl ether	MS, RI	1293	6.77	6.40	0.99	1.60
66	Benzene	MS, RI, CRS	766	0.78	0.68	1.15	2.02
67	Benzenemethanethiol	MS, RI	1176	-	5.11	0.08	0.06
68	Benzoic acid, 2-(3-methylbutyl)thio-, methyl ester	MS, RI	1961	9.87	8.26	1.80	3.78
69	Butanoic acid, 2-methyl-, 2-methylbutyl ester	MS, RI	1165	0.16	0.93	1.38	0.69
70	Carbonic acid, monoamide, N-nonyl-, propyl ester	MS, RI	1008	93.53	131.11	97.27	64.60
71	Carvone	MS, RI, CRS	1201	6.29	7.28	2.24	3.29

72	cis-1,3-dimethyl-cyclopentane	MS, RI	770	0.44	0.33	-	-
73	[1R-(1α,3α,4β)]-Acetate 4-ethenyl-α,α,4-trimethyl-3-(1-methylethenyl)-Cyclohexanemethanol	MS, RI	1697	3.02	2.60	0.25	0.43
74	Cyclopropanecarboxylic acid, hex-4-yn-3-yl ester	MS, RI	1102	1.20	1.39	0.42	0.58
75	Cyclopropanecarboxylic acid, pent-2-en-4-ynyl ester	MS, RI	1013	0.45	4.77	3.17	1.30
76	Diethyl phosphite	MS, RI	1153	3.30	2.83	0.95	0.51
77	Ethyl diazoacetate	MS, RI	968	2.56	0.91	7.28	5.22
78	Formic acid, 1-tert-butoxyprop-2-yl ester	MS, RI	944	-	7.39	1.47	4.03
79	Fumaric acid, butyl 2,3,5,6-tetrachlorophenyl ester	MS, RI	1159	55.79	47.94	7.56	10.22
80	Hexadecanoic acid, cyclohexyl ester	MS, RI	2785	2.41	3.99	2.46	2.57
81	Isopropyl methyl methylphosphonate	MS, RI	1122	-	-	0.02	-
82	Isopropylcyclobutane	MS, RI	755	0.23	18.06	0.25	0.09
83	Methyl 2-furoate	MS, RI	984	1.61	13.89	7.37	13.46
84	Methyl isobutyl disulphide	MS, RI, CRS	954	0.16	0.26	0.59	0.58
85	methyl-Pyrazine	MS, RI, CRS	811	0.03	0.24	58.03	119.49
86	Mexiletine	MS, RI	1511	1.57	0.07	0.15	0.44
87	Pentanoic acid, 4-methyl-, methyl ester	MS, RI	960	0.55	0.60	3.90	2.93
88	Pimelic acid, di(2-methylpropyl) ester	MS, RI	1867	10.86	12.36	3.13	5.61
89	Sebacic acid, 2-(4-bromophenoxy)ethyl propyl ester	MS, RI	1330	18.43	20.98	2.84	3.51
90	tert-butyl-Benzene	MS, RI, CRS	1035	3.15	31.26	25.15	18.65
91	trans-decahydro-Naphthalene	MS, RI	1285	0.36	10.38	0.84	6.18
92	trimethylpropyl-Stannane	MS, RI	800	0.79	0.39	2.05	0.97

MI, methods of identification.

RI, retention indices.

MS, mass spectral data.

CRS, Chemical Reference Substance.