Correction to: Umami taste, free amino acid composition, and volatile compounds of brown seaweeds

Ole G. Mouritsen¹ · Lars Duelund² · Mikael Agerlin Petersen³ · Anna Loraine Hartmann¹ · Michael Bom Frøst¹

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The original version of this article unfortunately contained mistakes. The necessary corrections are given below:

- 1) The presentation of Tables 3 and 4 were incorrect. The corrected Tables 3 and 4 are given below.

The online version of the original article can be found at <https://doi.org/10.1007/s10811-018-1632-x>

✉ Ole G. Mouritsen
ole.mouritsen@food.ku.dk

Lars Duelund
lad@kbm.sdu.dk

Mikael Agerlin Petersen
map@food.ku.dk

Anna Loraine Hartmann
hartmann@food.ku.dk

Michael Bom Frøst
mbf@food.ku.dk

¹ Department of Food Science, Taste for Life, Design and Consumer Behavior, University of Copenhagen, 26 Rolighedsvej, DK-1958 Frederiksberg, Denmark

² Department of Chemical Engineering, Biotechnology and Environmental Technology, University of Southern Denmark, 55 Campusvej, DK-5230 Odense M, Denmark

³ Department of Food Science, Design and Consumer Behavior, University of Copenhagen, 26 Rolighedsvej, DK-1958 Frederiksberg, Denmark

Table 3 Contents of identified volatile compounds (relative concentrations) in *das/ris* extracted from 16 selected dried seaweed and seaweed salt samples (cf. Table 1 for sample names)

Runing number applied for compounds in plots	Compound	KI	Identification ¹⁾	Sample					
				01NI	02Mp	03LS	10SI	13SI	15Up
Alcohols									
01	1-penten-3-ol	1179	MS, KI	0.046	0.0093	0.014	0.012	0.063	0.55
02	1-pentanol	1274	MS, KI, auth	0.089	0.015	0.012	0.028	0.024	0.55
03	(Z)-2-penten-1-ol	1342	MS, KI, auth	0.072	0	0.015	0	0.10	0.52
04	1-hexanol	1371	MS, KI, auth	0.093	0.062	0.065	0.093	0.090	0.34
05	1-octen-3-ol	1464	MS, KI, auth	0.039	0.012	0.016	0.071	0.060	0.42
06	1-heptanol	1470	MS, KI, auth	0.14	0.11	0.055	0.075	0.083	0.26
07	1,7-octadien-3-ol	1520	MS	0	0.0034	0.0049	0.0085	0.004	0.52
08	1-octanol	1572	MS, KI, auth	0.14	0.047	0.038	0.039	0.054	0.082
09	(E)-2-octen-1-ol	1631	MS, KI	0.049	0.0070	0.016	0.026	0.039	0.45
10	2,7-octadien-1-ol	1701	MS	0.037	0.022	0.021	0.019	0.033	0.53
11	(Z)-2-nonen-1-ol	1730	MS	0.0010	0	0	0.00036	0	0
Aldehydes									
12	Butanal	879	MS, KI	0.10	0.025	0.036	0.039	0.11	0.47
13	2-methylbutanal	913	MS, KI, auth	0.19	0.13	0.12	0.16	0.36	0.028
14	3-methylbutanal	917	MS, KI, auth	0.28	0.098	0.099	0.31	0.25	0.065
15	Pentanal	979	MS, KI, auth	0.14	0.028	0	0.053	0.060	0.44
16	(E)-2-butenal	1038	MS, KI	0.062	0	0.027	0.0077	0.011	0.47
17	2-methyl-(E)-2-butenal	1093	MS, KI	0.16	0.051	0.035	0.13	0.049	0.50
18	(E)-2-pentenal	1135	MS, KI	0.034	0.011	0.014	0.012	0.016	0.55
19	2-methyl-2-pentenal	1164	MS, KI	0.025	0	0	0.00017	0.0053	0.54
20	Heptanal	1191	MS, KI, auth	0.14	0.057	0.062	0.062	0.082	0.43
21	(E)-2-hexenal	1224	MS, KI, auth	0.064	0.010	0.063	0.013	0.034	0.54
22	(Z)-4-heptenal	1255	MS, KI	0.050	0.00017	0.0090	0.0063	0.040	0.55
23	Octanal	1305	MS, KI, auth	0.19	0.071	0.077	0.057	0.076	0.14
24	(E,Z)-2,4-heptadienal	1508	MS, KI, auth	0.025	0.0062	0.00068	0.00068	0.00028	0.55
25	Benzaldehyde	1540	MS, KI, auth	0.14	0.13	0.16	0.10	0.13	0.36
26	(E)-2-nonenal	1550	MS, KI, auth	0.14	0.030	0.055	0.039	0.037	0.15
27	2,5-dimethyl-benzaldehyde	1754	MS, KI	0.10	0.11	0.12	0.10	0.12	0.44
Alkane									
28	7-oxabicyclo[2.2.1]heptane	1143	MS	0.11	0	0.0038	0.018	0.064	0.53
Amine									
29	Trimethylamine	616	MS, KI	0.014	0.000	0.0078	0.0085	0	0
Carotenoid derived									
30	2,2,6-trimethylcyclohexanone	1329	MS, KI	0.079	0.030	0.042	0.068	0.36	0.26
31	1,6-dimethylhepta-1,3,5-triene	1506	MS	0.064	0.011	0.028	0.039	0.11	0.49
32	Beta-cyclocitral	1641	MS, KI	0.13	0.12	0.11	0.038	0.42	0.10
33	4-oxoisophorone	1714	MS, KI	0.017	0.29	0.019	0.020	0.040	0.47
34	Beta-ionone	1967	MS, KI	0.12	0.056	0.075	0.040	0.43	0.16
Ketones									
35	2-butanone	906	MS, KI, auth	0.096	0.091	0.079	0.13	0.10	0.31

Table 3 (continued)

Runing number applied for compounds in plots	Compound	KI	Identification ¹⁾	Sample						
				01NI	02Mp	03Ls	10SI	13SI	15Up	
36	2-pentanone	983	MS, KI, auth	0.15	0.080	0.22	0.10	0.085	0.36	
37	2,3-butanedione	985	MS, KI, auth	0.35	0.029	0.34	0.042	0.043	0.041	
38	1-penten-3-one	1022	MS, KI	0.097	0.050	0.026	0.021	0.33	0.38	
39	2-heptanone	1189	MS, KI, auth	0.087	0.038	0.027	0.075	0.17	0.43	
40	6-methyl-2-heptanone	1251	MS, KI	0.038	0.044	0.027	0.033	0.091	0.46	
41	2-octanone	1302	MS, KI, auth	0.077	0.079	0.052	0.077	0.12	0.40	
42	1-octen-3-one	1318	MS, KI, auth	0.078	0.013	0.014	0.033	0.064	0.13	
43	(Z)-6-octen-2-one	1348	MS, KI	0.052	0.034	0.012	0.038	0.088	0.48	
44	6-methyl-5-hepten-2-one	1354	MS, KI, auth	0.11	0.090	0.061	0.090	0.087	0.34	
45	(E)-3-octen-2-one	1419	MS, KI	0.19	0.024	0.013	0.036	0.037	0.40	
46	(E,E)-3,5-octadien-2-one	1587	MS, KI	0.017	0.005	0.0050	0.0075	0.014	0.56	
47	1-phenyl-1-propanone	1747	MS, KI	0.043	0.033	0.0045	0.046	0.055	0.51	
48	1-(3-methylphenyl)-ethanone	1800	MS, KI	0.047	0.043	0.040	0.064	0.087	0.51	
	<i>Lactone</i>									
49	γ -nonalactone	2060	MS, KI	0.026	0.044	0.081	0.270	0.16	0.34	

Runing number applied for compounds in plots	Sample	Odour descriptor ²⁾									
		16Ae	18Sj	23Sj	25Sj	26Sj	27Sj	28Pp	30Eb	32Ev	37NI
01	<i>Alcohols</i>	0.087	0.010	0.0041	0.0029	0.00029	0.0065	0.023	0.010	0.097	0.012
02		0.043	0.027	0.021	0.043	0.014	0.034	0.065	0.056	0.047	0.053
03		0.072	0.0071	0	0	0	0	0.067	0.042	0.16	0.046
04		0.19	0.085	0.029	0.081	0.051	0.075	0.14	0.13	0.088	0.32
05		0.17	0.079	0.052	0.053	0.042	0.089	0.12	0.053	0.16	0.029
06		0.13	0.096	0.086	0.11	0.078	0.11	0.27	0.17	0.11	0.22
07		0.027	0	0	0	0	0	0.0017	0	0.038	0
08		0.047	0.10	0.041	0.056	0.042	0.085	0.39	0.045	0.063	0.30
09		0.096	0.049	0.017	0.030	0.038	0.064	0.18	0.037	0.16	0.12
10		0.11	0.023	0.020	0.022	0.014	0.022	0.12	0.029	0.11	0.069
11		0.011	0.0082	0.20	0.33	0.31	0.49	0.014	0.0029	0.00072	0.0026
	<i>Aldehydes</i>										
12		0.11	0.099	0.032	0.046	0.025	0.037	0.067	0.067	0.051	0.12
13		0.21	0.067	0.038	0.059	0.028	0.11	0.056	0.072	0.059	0.098
14		0.13	0.10	0.054	0.11	0.027	0.17	0.079	0.071	0.063	0.12
15		0.084	0.083	0.032	0.050	0.019	0.064	0.14	0.071	0.052	0.20
16		0.0079	0.039	0.089	0.12	0.105	0.018	0.13	0.0035	0.0056	0.14
17		0.050	0.038	0.066	0.078	0	0.061	0.034	0.024	0.0053	0.052

Table 3 (continued)

Running number applied for compounds in plots	Sample										Odour descriptor ²⁾
	16Ae	18Sj	23Sj	25Sj	26Sj	27Sj	28Pp	30Eb	32Ev	37NI	
18	0.051	0.015	0.038	0.013	0	0.0080	0.021	0.014	0.010	0.036	pungent, green
19	0.011	0.0039	0	0	0	0	0.010	0.0059	0.0031	0.014	green, grassy
20	0.080	0.10	0.075	0.088	0.060	0.12	0.14	0.073	0.067	0.16	fatty, green
21	0.027	0.015	0.0053	0.060	0	0.0083	0.014	0.012	0.023	0.032	green, leafy
22	0.029	0.014	0.045	0.011	0	0.0039	0.036	0.0065	0.0089	0.033	fatty, green
23	0.075	0.10	0.087	0.084	0.073	0.12	0.35	0.063	0.069	0.15	citrus
24	0.012	0.0088	0	0	0	0	0.067	0.0016	0.0039	0.072	fried
25	0.17	0.097	0.099	0.12	0.048	0.10	0.140	0.068	0.044	0.14	almond
26	0.045	0.084	0.14	0.32	0.27	0.36	0.095	0.039	0.027	0.11	cardboard
27	0.12	0.088	0.049	0.062	0.032	0.091	0.094	0.051	0.094	0.072	
28	<i>Alkane</i>										
29	0.054	0.021	0	0.011	0	0.0060	0.057	0.017	0.014	0.065	
30	<i>Aniline</i>										
31	0.015	0.078	0.0036	0.0062	0.0021	0	0.011	0.015	0.49	0.0036	fishy
32	<i>Carotenoid derived</i>										
33	0.24	0.061	0.031	0.021	0.025	0.048	0.054	0.16	0.16	0.024	pungent, thujonic
34	0.10	0.034	0.014	0.038	0.0064	0.031	0.047	0.054	0.034	0.033	
35	0.099	0.023	0.024	0.0067	0.032	0.039	0.035	0.037	0.27	0.013	tropical, saffron
36	0.10	0.010	0.018	0.013	0	0.027	0.037	0.025	0.030	0.025	musty, woody
37	0.14	0.028	0.0075	0	0.013	0.0073	0.028	0.038	0.18	0.0065	floral, woody
38	<i>Ketones</i>										
39	0.16	0.081	0.055	0.066	0.046	0.11	0.10	0.16	0.21	0.23	acetone
40	0.19	0.074	0.031	0.024	0.011	0.085	0.064	0.10	0.072	0.17	fruity, winey
41	0.037	0.026	0.022	0.037	0.016	0.041	0.044	0.0089	0.0066	0.090	buttery, caramel
42	0.16	0.031	0.016	0.014	0	0.011	0.069	0.037	0.043	0.063	peppery, mustard
43	0.15	0.061	0.046	0.076	0.035	0.068	0.099	0.14	0.086	0.092	blue cheese
44	0.13	0.046	0.042	0.052	0.015	0.038	0.069	0.081	0.13	0.067	camphoreous
45	0.18	0.088	0.057	0.10	0.048	0.094	0.10	0.15	0.12	0.10	earthy, weedy
46	0.081	0.10	0.21	0.28	0.17	0.19	0.31	0.044	0.046	0.057	mushroom
47	0.23	0.035	0.0082	0.018	0	0.017	0.040	0.063	0.050	0.047	
48	0.14	0.080	0.14	0.11	0.061	0.074	0.18	0.16	0.18	0.13	citrus, green
49	0.089	0.059	0.018	0.026	0.014	0.033	0.15	0.064	0.096	0.19	
50	0.070	0.0083	0.0030	0.0049	0.00039	0.0066	0.030	0.014	0.035	0.006	fruity, green
51	0.13	0.054	0.024	0.048	0.0075	0.047	0.11	0.065	0.041	0.067	hawthorne, lilac
52	0.14	0.057	0.031	0.037	0.033	0.046	0.089	0.077	0.070	0.052	
53	<i>Lactone</i>										
54	0.19	0.11	0.043	0.034	0.055	0.067	0.11	0.073	0.090	0.053	coconut, fatty

¹⁾ MS=Identification by NIST search, KI=Identification confirmed by Kovats Index from literature, auth=Identification confirmed by running an authentic standard

²⁾ Odour descriptors from <http://www.thegoodscentscompany.com/>

Values are means of triplicate determinations except for samples 23Sj, 25Sj, and 26Sj (duplicate). Only volatiles with significant differences between samples (determined via ANOVA) are included

Table 4 Sensory characteristics of *dashis* extracted from 16 selected dried seaweed and seaweed salt samples (cf. Table 1 for sample names)

Abbreviated sample name	Turbidity (A)	Color Intensity (A)	Seaweed (O)	Mushroom (O)	Fishy (O)	Tea (O)	Roasted (O)	Roasted (F)	Fishy (F)	Salty (T)	Umami (T)	Sour (T)	Bitter (T)	Sweet (T)	Viscosity (M)	Astringent (AF)	Fatty (AF)	Metallic (AF)
01NI	6.8	2.9	5.7	5.5	4.0	2.8	2.4	4.2	2.0	6.4	6.5	2.1	2.4	3.4	5.1	3.6	4.0	3.6
02Mp	4.1	7.4	4.6	4.3	2.7	6.2	3.9	5.3	1.8	6.9	5.9	2.3	3.6	2.9	4.8	4.7	3.8	4.3
03Ls	4.4	0.6	5.7	4.7	3.3	2.4	2.7	2.8	1.4	1.7	5.0	0.9	1.9	2.9	3.2	2.7	2.1	3.4
10SI	3.6	2.5	5.5	5.4	3.6	3.2	4.8	4.5	1.1	1.8	5.5	1.1	2.6	1.9	3.7	3.4	2.5	3.3
13SI	1.4	4.9	6.7	4.5	4.5	3.8	3.7	4.0	1.5	1.5	4.5	0.8	4.3	2.5	3.1	4.5	2.4	3.6
15Up	1.9	1.3	7.5	3.2	6.3	4.0	2.5	3.5	4.0	6.0	4.8	2.5	3.2	2.0	4.4	4.8	2.8	4.5
16Ae	2.4	2.8	7.3	4.0	4.6	3.4	3.6	3.7	2.6	7.7	5.6	2.2	2.2	2.7	4.4	4.1	4.1	3.8
18Sj	3.9	0.3	6.4	5.2	4.5	2.8	2.2	3.6	1.1	3.2	6.9	1.4	1.8	2.4	4.3	3.1	3.2	3.8
23Sj	1.9	0.3	4.2	5.2	2.7	2.5	2.7	3.4	1.2	2.7	6.9	1.2	1.3	4.3	4.6	3.2	4.2	3.6
25Sj	2.4	0.6	4.8	6.3	1.8	2.9	2.6	3.5	1.1	5.9	7.7	2.1	2.1	3.7	4.3	3.1	3.5	3.9
26Sj	2.3	0.3	3.3	4.9	1.7	2.3	2.4	3.2	1.0	3.9	7.9	1.7	1.4	4.0	4.5	3.2	3.8	3.7
27Sj	2.7	1.4	4.9	5.2	3.2	2.6	2.9	3.8	1.8	6.8	8.0	2.4	2.0	3.2	4.9	3.2	4.1	4.1
28Pp	4.6	5.8	7.5	4.4	5.2	4.0	2.9	4.3	3.1	5.5	5.7	1.8	3.8	2.8	4.2	5.1	3.4	4.5
30Eb	2.2	8.6	6.1	5.8	3.6	3.8	4.8	6.3	2.3	5.9	6.2	2.0	6.7	2.4	4.4	6.0	3.8	4.7
32Fv	1.4	7.8	6.1	4.7	7.2	3.3	3.8	4.1	2.9	2.0	4.6	1.0	2.6	1.6	3.8	4.3	2.8	3.6
37NI	4.6	1.4	6.5	5.6	4.0	3.2	3.1	3.0	2.8	9.4	6.2	3.8	4.8	2.1	5.4	5.7	4.3	5.8
<i>p</i> -value	$p<0.0001$	$p<0.0001$	$p<0.0001$	$p=0.002$	$p<0.0001$	$p<0.0001$	$p<0.0001$	$p=0.002$	$p=0.001$	$p<0.0001$	$p<0.0001$	$p<0.0001$	$p<0.0001$	$p<0.0001$	$p=0.037$	$p<0.0001$	$P=0.018$	$p=0.019$
CI95%	0.7	0.4	0.6	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.7	0.8	0.8
RMSEC - Sensory from design 5 factors	1.14	0.45	0.81	0.91	1.12	1.00	0.73	0.74	0.73	0.62	0.89	0.51	0.69	0.72	0.62	0.48	1.11	0.75
RMSEC - Sensory from chemical measurements 5 factors	1.19	2.00	0.99	0.84	1.33	1.04	0.87	0.89	0.69	1.69	0.84	0.64	1.19	0.72	0.63	0.99	1.03	0.79

Mean rating on a scale 1–10 (over panellists and replicates) of intensity for all significant sensory descriptors for the 16 samples of *dashis* subjected to descriptive analysis. *p* values and 95% confidence intervals (CI95%) are from ANOVA. Abbreviations in labels refer to the following: turbidity/visual appearance (A), orthonasal odour (O), flavour i.e. retronasal odour perception (F), taste (T) mouthfeel (M), and after mouthfeel (AF)

- 2) The caption of Figure 7 must be updated by inserting reference to Tables 1 and 3. The updated caption of Figure is given below:

Fig. 7 Correlation loading plot from PLSR analysis. X-matrix: amino. acids, ions, and aroma compounds, Y-matrix: sensory analysis. (a): Dimensions 1 ($X = 45\%$; $Y = 9\%$) and 2 ($X = 9\%$; $Y = 19\%$). (b): Dimensions 3 ($X =$

9% ; $Y = 12\%$) and 4 ($X = 10\%$; $Y = 8\%$). Dashi samples (in blue), amino acids, ions, and aroma compounds (in two red colours), and sensory descriptors (in green). Less relevant variables are omitted for clarity. Confer table 1 for sample names and 3 for abbreviated aroma compound names and running numbers

The original article has been corrected.