Table S9 VOCs' changes of GH in storage with diverse processing treatment by HS-GC-IMS

No.	Compounds	CAS	RI	Rt (sec)	Dt (a.u.)	Concentration (μg/g honey)					
						GH-0	GH-10	VCT-0	VCT-10	IS8-0	IS8-10
	Total alcohols (16)					**12.29±0.15**	**13.62±0.25**	**9.68±0.04**	**9.78±0.13**	**12.44±0.05**	**12.93±0.08**
1	1,2-Ethanediol	107-21-1	1671.3	1399.258	1.17271	0.19±0.02	0.27±0.03	0.29±0.02	0.28±0.03	0.26±0.01	0.24±0.01
2	1-Hexanol	111-27-3	1372.5	723.369	1.32929	0.1±0	0.12±0	0.07±0	0.06±0	0.13±0.01	0.1±0.01
3	2-Heptanol-M	543-49-7	1341.3	675.25	1.36015	0.45±0.01	0.41±0	0.23±0.01	0.23±0.01	0.41±0.01	0.38±0.01
4	2-Heptanol-D	543-49-7	1339.5	672.613	1.69631	0.11±0	0.11±0.01	0.04±0	0.04±0	0.11±0	0.09±0
5	1-Pentanol	71-41-0	1264.3	548.69	1.25621	0.17±0.02	0.2±0.01	0.09±0	0.09±0	0.18±0	0.18±0.01
6	3-Methyl-1-butanol-M	123-51-3	1219.8	471.147	1.24372	0.79±0.04	0.79±0.01	0.55±0.01	0.51±0.01	0.73±0.01	0.75±0.02
7	3-Methyl-1-butanol-D	123-51-3	1220.2	471.782	1.48827	0.49±0.03	0.72±0.02	0.24±0	0.23±0.01	0.5±0.01	0.64±0.01
8	1-Butanol-M	71-36-3	1155.7	376.664	1.18164	0.18±0.02	0.37±0.01	0.09±0	0.12±0.01	0.44±0	0.53±0.01
9	1-Butanol-D	71-36-3	1156.7	377.932	1.38563	0.03±0	0.14±0	0.02±0	0.02±0	0.16±0	0.28±0.01
10	2-Methyl-1-propanol-M	78-83-1	1107.7	317.691	1.17277	0.81±0.03	0.85±0.02	0.69±0.01	0.72±0.03	0.87±0	0.85±0.01
11	2-Methyl-1-propanol-D	78-83-1	1107.1	317.057	1.37043	0.67±0.01	0.95±0.03	0.27±0	0.32±0.02	0.76±0	0.88±0.01
12	1-Propanol	71-23-8	1057.5	271.517	1.11355	0.59±0.01	0.55±0.01	0.44±0	0.42±0.01	0.59±0	0.62±0.01
13	Ethanol	64-17-5	952.1	201.666	1.14322	7.43±0.12	7.77±0.32	6.49±0.05	6.46±0.02	7.05±0.03	7.06±0.01
14	2-Butanol-M	78-92-2	1034.2	253.075	1.14887	0.08±0	0.07±0	0.06±0	0.1±0	0.07±0	0.07±0
15	2-Butanol-D	78-92-2	1035.4	254.011	1.32506	0.08±0	0.16±0	0.02±0	0.09±0	0.09±0	0.15±0
16	1-Penten-3-ol	616-25-1	1171.8	398.716	0.94104	0.13±0	0.14±0	0.09±0	0.11±0	0.1±0	0.11±0
	Total aldehydes (12)					**4.79±0.16**	**6.98±0.16**	**4.51±0.29**	**7.86±0.57**	**5.31±0.09**	**9.08±0.2**
17	(E,E)-2,4-Octadienal	30361-28-5	1637.8	1299.659	1.26046	1.58±0.06	2.02±0.02	1.31±0.05	1.67±0.13	1.75±0.04	2.14±0.02
18	Benzaldehyde-M	100-52-7	1508.3	976.342	1.14803	0.82±0.02	1.28±0.02	0.66±0.01	1.24±0.07	0.87±0.01	1.44±0.04
19	Benzaldehyde-D	100-52-7	1509.2	978.363	1.46926	0.15±0.01	0.41±0.02	0.13±0	0.39±0.07	0.19±0	0.7±0.03
20	2-Furaldehyde-M	98-01-1	1470.7	898.544	1.08861	0.75±0.01	1.28±0.06	0.91±0.05	1.67±0.05	0.58±0.02	1.73±0.01
21	2-Furaldehyde-D	98-01-1	1469.7	896.523	1.33113	0.13±0.01	0.5±0.02	0.13±0.01	1.05±0.13	0.05±0	1.32±0.01

22	1-Nonanal-M	124-19-6	1402.6	773.174	1.48561	0.52±0.03	0.57±0.02	0.65±0.13	0.64±0.06	0.62±0.09	0.6±0.06
23	1-Nonanal-D	124-19-6	1400.3	769.116	1.94505	0.08±0.01	0.09±0.01	0.11±0.05	0.11±0.02	0.11±0.03	0.1±0.02
24	3-Methyl-2-butenal-M	107-86-8	1211	457.197	1.09294	0.19±0.01	0.21±0.01	0.17±0.01	0.31±0.01	0.2±0	0.26±0
25	3-Methyl-2-butenal-D	107-86-8	1211.4	457.831	1.35776	0.09±0	0.17±0	0.06±0	0.18±0.02	0.12±0	0.24±0
26	Heptaldehyde-M	111-71-7	1194.3	431.832	1.34129	0.32±0.01	0.29±0	0.27±0.01	0.41±0.01	0.26±0.01	0.31±0.01
27	Heptaldehyde-D	111-71-7	1195.6	433.734	1.69353	0.08±0.01	0.08±0	0.05±0	0.12±0	0.06±0	0.08±0
28	(E, E)-2,4-Hexadienal	142-83-6	1432.4	825.587	1.12911	0.08±0.01	0.07±0	0.07±0.01	0.06±0.01	0.5±0.04	0.16±0.03
	Total ketones (12)					**5.75±0.16**	**6.61±0.31**	**4.73±0.14**	**6.08±0.16**	**7.71±0.06**	**8.64±0.12**
29	3-Hydroxy-2-butanone	513-86-0	1297.7	613.288	1.32767	0.28±0.01	0.35±0.05	0.31±0.01	0.34±0.01	0.33±0.01	0.41±0.01
30	4-Methyl-3-penten-2-one	141-79-7	1131.9	346.226	1.44645	0.06±0	0.1±0	0.02±0	0.04±0	0.06±0	0.1±0
31	2-Butanone-M	78-93-3	908.6	180.555	1.06618	0.17±0.01	0.23±0.01	0.12±0.02	0.15±0.01	0.31±0	0.25±0
32	2-Butanone-D	78-93-3	913.2	182.666	1.24433	0.14±0	0.32±0.02	0.06±0	0.12±0.01	0.99±0	1.06±0.03
33	2-Propanone	67-64-1	830.5	147.994	1.11377	2.82±0.06	3.72±0.04	2.3±0.1	3.1±0.13	3.79±0.04	4.35±0.02
34	4-Methyl-2-pentanone	108-10-1	1010.1	235.287	1.46541	0.26±0.01	0.2±0.01	0.1±0	0.09±0	0.18±0.01	0.21±0.01
35	2-Pentanone	107-87-9	994.3	224.521	1.36537	0.05±0	0.07±0	0.02±0	0.02±0	0.14±0	0.23±0.01
36	2-Heptanone-M	110-43-0	1190.6	426.223	1.26342	0.5±0.02	0.18±0.01	0.31±0	0.24±0	0.31±0	0.22±0.01
37	2-Heptanone-D	110-43-0	1191	426.84	1.62547	0.35±0.02	0.05±0	0.1±0	0.08±0.01	0.13±0.01	0.08±0
38	(E)-3-Penten-2-one	3102-33-8	1111.5	322.046	1.09137	0.03±0	0.03±0	0.02±0	0.06±0	0.03±0	0.05±0
39	1-Hydroxy-2-propanone-M	116-09-6	1316.3	638.893	1.07409	0.4±0.03	0.59±0.08	0.53±0.05	0.83±0.02	0.62±0.01	0.75±0.02
40	1-Hydroxy-2-propanone-D	116-09-6	1315.9	638.333	1.23025	0.03±0	0.12±0.03	0.07±0.02	0.21±0.02	0.12±0	0.2±0.02
	Esters (7)										
41	Diethyl succinate	123-25-1	1713	1534.16	1.29839	0.19±0.01	0.28±0.01	0.17±0.01	0.3±0.04	0.14±0.02	0.25±0.03
42	Ethyl lactate	97-64-3	1362.5	707.549	1.14741	0.09±0.01	0.15±0.02	0.07±0	0.09±0.01	0.1±0.01	0.14±0
43	Ethyl isovalerate	108-64-5	1054.7	269.22	1.25708	0.2±0	0.27±0.01	0.1±0	0.1±0.01	0.35±0	0.44±0
44	Ethyl acetate-M	141-78-6	891.9	173.016	1.09868	0.4±0.02	0.39±0.01	0.25±0.01	0.26±0.01	0.31±0	0.29±0
45	Ethyl acetate-D	141-78-6	889.8	172.111	1.33582	0.46±0.03	0.84±0.02	0.17±0.01	0.21±0	0.79±0.02	0.77±0.01

46	Isoamyl formate	110-45-2	1062.3	275.495	1.26814	0.24±0.03	0.19±0.01	0.12±0.01	0.14±0	0.17±0.01	0.18±0
47	Isobutyl propionate	540-42-1	1098.3	307.251	1.27754	0.11±0.02	0.07±0.01	0.05±0.01	0.06±0.01	0.06±0.01	0.07±0
	Total esters					**1.68±0.07**	**2.2±0.03**	**0.93±0.03**	**1.16±0.04**	**1.93±0.03**	**2.14±0.04**
	Total terpenes (2)					**0.46±0.03**	**0.69±0.03**	**0.27±0.01**	**0.51±0.03**	**0.4±0.02**	**0.58±0.01**
48	Linalool oxide	60047-17-8	1440.7	840.953	1.26046	0.23±0.02	0.44±0.03	0.15±0.01	0.31±0.02	0.19±0.01	0.32±0.01
49	3-Carene	13466-78-9	1130.1	343.984	1.21806	0.22±0.01	0.25±0.01	0.12±0	0.2±0.01	0.22±0	0.26±0.01
	Total acids (2)					**2.06±0.21**	**2.41±0.13**	**2.79±0.05**	**2.5±0.03**	**2.86±0**	**2.46±0.03**
50	Acetic acid-M	64-19-7	1477.8	912.689	1.05166	1.84±0.14	2.08±0.1	2.4±0.03	2.11±0.02	2.48±0	2.08±0.01
51	Acetic acid-D	64-19-7	1477.8	912.689	1.15767	0.22±0.06	0.33±0.03	0.39±0.02	0.39±0.02	0.38±0	0.38±0.02
	Total furans (3)					**0.98±0.03**	**1.05±0.07**	**1.18±0.02**	**1.24±0.06**	**1.07±0.01**	**1.39±0.03**
52	2,5-Dimethyl-4-methoxy-3[2H]-furanone	4077-47-8	1606.9	1213.778	1.19622	0.26±0.03	0.3±0.01	0.36±0.01	0.35±0.06	0.31±0.01	0.33±0.02
53	2-Acetylfuran	1192-62-7	1500.7	960.128	1.12489	0.05±0	0.08±0	0.05±0.01	0.08±0.01	0.05±0	0.32±0.01
54	2-Methyltetrahydro-3-furanone	3188-00-9	1299.9	616.193	1.07573	0.66±0.02	0.66±0.06	0.77±0	0.81±0.01	0.71±0.01	0.74±0.02
	Total sulphcompounds (1)					**0.2±0.01**	**0.36±0.02**	**0.13±0.01**	**0.26±0.01**	**0.3±0**	**0.34±0.01**
55	Diallyl sulfide	592-88-1	1147.5	365.884	1.12335	0.2±0.01	0.36±0.02	0.13±0.01	0.26±0.01	0.3±0	0.34±0.01
	Total all					**27.54±0.63**	**33.25±0.32**	**23.44±0.43**	**28.58±0.98**	**31.31±0.04**	**36.82±0.46**

Note: RI represents retention index; Rt represents retention time; Dt represents drift time; GH-0, VCT-0 and IS8-0 denote untreated gallnut honey, vacuum concentrated gallnut honey and gallnut honey irradiated at 8 kGy, respectively;GH-10, VCT-10 and IS8-10 respectively denote the samples corresponding to GH-0, VCT-0 and IS8-0 after undergoing 10 d of accelerated storage; M=monomer, D=dimer; "-" means not detected.