Table S1

Identified volatile compounds of saturated and unsaturated chicken fat fractions during thermal process, using GC × GC-ToFMS with retention index (RI), experimental retention index (RI_{exp}), retention times in the first (Peak I) and in the second (Peak II) chromatographic dimensions, similarity match, reverse match, library probability and identification method.

No.	Compounds	RI[a]	RI_{exp}*[b]	Peak I (min)	Peak II (s)	Similarity match	Reverse match	Library probability	Identification method[c]	Unsaturated			Saturated		
										0 h	1 h	2 h	0 h	1 h	2 h
	Aldehydes (29)														
1	Pentanal	979	970	9.00	2.43	916	923	8900	MS, RI	+	+	+	+	+	+
2	2-Ethylbutanal	1018	974	9.75	2.84	875	887	7353	MS, RI	-	-	+	-	+	-
3	Hexanal	1083	1028	12.83	2.81	932	941	8714	MS, RI	+	+	+	+	+	+
4	Heptanal	1184	1154	17.42	3.09	939	939	8641	MS, RI	+	+	+	+	+	+
5	Octanal	1289	1272	22.25	3.22	956	968	9390	MS, RI	+	+	+	+	+	+
6	Nonanal	1391	1382	27.00	3.34	941	941	8407	MS, RI	+	+	+	+	+	+
7	Decanal	1498	1487	31.50	3.34	878	882	5058	MS, RI	-	+	+	-	+	+
8	Undecanal	1604	1593	35.75	3.40	937	943	6143	MS, RI	-	+	+	-	+	+
9	Dodecanal	1711	1699	39.83	3.43	890	899	4569	MS, RI	-	-	+	-	-	+
10	(*E*)-2-Butenal	1039	1018	12.50	2.06	892	932	7877	MS, RI	-	+	+	+	+	+
11	(*E*)-2-Pentenal	1127	1107	14.83	2.42	859	889	7102	MS, RI	+	+	+	-	+	+
12	(*Z*)-3-Hexenal	1142	1129	16.42	2.60	854	859	6681	MS, RI	-	-	+	-	-	+
13	(*E*)-2-Hexenal	1213	1207	19.50	2.54	905	913	6337	MS, RI	-	+	+	+	+	+
14	(*Z*)-4-Heptenal	1240	1209	19.58	2.76	864	877	6026	MS, RI	-	+	+	-	+	+
15	(*E*)-2-Heptenal	1323	1306	23.75	2.73	940	945	7949	MS, RI	+	+	+	+	+	+
16	(*E*)-2-Octenal	1429	1415	28.42	2.91	952	963	7549	MS, RI	+	+	+	+	+	+
17	(*E*)-2-Nonenal	1534	1522	32.92	2.97	953	962	7031	MS, RI	-	+	+	-	+	+
18	(Z)-4-Decenal	1544	1538	33.58	3.00	901	903	5327	MS, RI	-	-	+	-	-	+
19	(*E*)-2-Decenal	1644	1629	37.17	3.04	926	929	7399	MS, RI	-	-	+	-	-	-
20	2-Undecenal	1751	1739	41.33	3.06	913	918	6219	MS, RI	-	+	+	-	+	+
21	(*E*)-2-Dodecenal	1867	1852	45.00	2.28	900	901	4514	MS, RI	-	-	+	-	-	-
22	(*E,E*)-2,4-Hexadienal	1400	1385	27.17	2.30	886	910	7006	MS, RI	-	+	+	-	+	+
23	(*E,E*)-2,4-Heptadienal	1495	1475	31.00	2.50	903	904	5346	MS, RI	-	+	+	-	+	+
24	(*E,E*)-2,4-Octadienal	1604	1572	34.92	2.52	898	906	6950	MS, RI	-	+	+	-	+	+
25	(*E,E*)-2,4-Nonadienal	1700	1683	39.25	2.59	916	925	3936	MS, RI	-	+	+	-	+	+
26	(*E,E*)-2,4-Decadienal	1811	1794	43.42	2.91	908	916	7343	MS, RI	-	+	+	-	+	+
27	Benzaldehyde	1520	1501	32.08	2.34	932	939	7949	MS, RI	+	+	+	+	+	+

28	3-Methylbenzaldehyde	1626	1597	35.92	2.53	863	904	5301	MS, RI	-	+	+	-	-	+
29	Benzeneacetaldehyde	1640	1622	36.92	2.35	858	883	6179	MS, RI	+	-	-	-	+	-
	Ketones (30)								MS, RI						
30	3-Hexanone	1053	992	11.67	2.85	900	905	7917	MS, RI	-	-	+	-	+	-
31	2-Hexanone	1083	1026	12.75	2.76	914	915	7096	MS, RI	-	+	+	-	+	+
32	3-Heptanone	1161	1118	16.00	3.16	866	883	6973	MS, RI	-	+	+	-	-	+
33	2-Heptanone	1182	1150	17.25	3.00	905	933	7257	MS, RI	+	+	+	+	+	+
34	4-Octanone	1234	1203	19.33	3.42	906	907	7788	MS, RI	-	+	+	-	+	+
35	2-Octanone	1287	1266	22.00	3.13	944	944	7737	MS, RI	-	+	+	-	+	+
36	2-Nonanone	1391	1376	26.75	3.23	917	944	7059	MS, RI	-	+	+	-	+	+
37	2-Decanone	1494	1479	31.17	3.31	924	925	7192	MS, RI	-	+	+	-	+	+
38	6-Undecanone	1558	1516	32.67	3.68	902	922	8372	MS, RI	-	-	+	-	-	-
39	2-Undecanone	1598	1586	35.50	3.34	925	932	6007	MS, RI	-	-	+	-	-	+
40	5-Methyl-3-heptanone	1265	1234	20.67	3.34	890	890	6195	MS, RI	-	+	+	-	+	+
41	1-Hydroxy-2-propanone	1303	1271	22.25	1.77	951	961	9129	MS, RI	+	-	+	+	+	+
42	1-Hydroxy-2-butanone	1388	1348	25.58	1.89	880	880	7978	MS, RI	-	+	+	-	+	+
43	1-Penten-3-one	1019	940	10.42	2.32	901	927	8639	MS, RI	-	+	+	-	+	+
44	3-Penten-2-one	1128	1082	14.67	2.37	892	911	6028	MS, RI	-	+	+	-	+	+
45	3-Hexen-2-one	1213	1186	18.67	2.60	901	918	3932	MS, RI	-	-	+	-	-	-
46	1-Octen-3-one	1300	1283	22.75	3.00	867	879	6199	MS, RI	-	+	+	-	+	+
47	2,3-Pentanedione	1058	1001	11.92	2.18	928	939	9436	MS, RI	+	+	+	-	+	+
48	(E)-3-Octen-2-one	1396	1391	27.42	2.88	902	902	5397	MS, RI	-	+	+	-	+	+
49	(E)-3-Nonen-2-one	1523	1495	31.83	2.94	870	870	4888	MS, RI	-	+	+	-	+	+
50	(E,E)-3,5-Octadien-2-one	1540	1501	32.08	2.63	855	860	4740	MS, RI	-	-	+	-	-	-
51	Cyclopentanone	1174	1146	17.08	2.70	906	913	8838	MS, RI	-	+	+	-	+	+
52	2-Methylcyclopentanone	1177	1156	17.50	2.94	919	931	6373	MS, RI	-	+	+	-	+	+
53	2-Ethylcyclopentanone	1314	1262	21.83	3.14	875	884	7201	MS, RI	-	-	+	-	-	-
54	Cyclohexanone	1291	1264	21.92	2.99	884	887	7041	MS, RI	-	+	+	-	+	+
55	2-Cyclopentenone	1345	1331	24.83	2.37	920	937	9089	MS, RI	-	+	+	-	+	+
56	3-Ethyl-2-cyclopenten-1-one	1600	1607	36.33	2.59	856	883	5407	MS, RI	-	-	-	-	-	+
57	3-Methylcyclopentane-1,2-dione	1781	1794	43.42	1.95	890	898	7163	MS, RI	-	-	-	-	+	+
58	3-Ethyl-2-hydroxy-2-cyclopenten-1-one	1894	1868	45.42	1.73	906	922	6680	MS, RI	-	+	+	-	+	+
59	Acetophenone	1649	1629	37.17	2.44	889	895	6425	MS, RI	+	+	-	+	+	+

	Alcohols (27)							MS, RI								
60	Butanol	1138	1101	15.33	1.85	926	928	8770	MS, RI	+	+	+	+	+	+
61	Pentanol	1250	1222	20.17	2.05	972	979	7637	MS, RI	+	+	+	+	+	+
62	Glycerin	1355	1335	25.00	2.03	898	899	3592	MS, RI	-	+	-	+	-	-
63	Octanol	1565	1538	33.58	2.19	901	905	3760	MS, RI	+	+	+	+	+	+
64	Heptanol	1457	1436	29.33	2.11	915	916	6230	MS, RI	+	+	+	+	+	+
65	Nonanol	1660	1642	37.67	2.27	900	900	3080	MS, RI	-	+	+	-	+	+
66	Cyclohexanol	1403	1379	26.92	2.18	894	894	5156	MS, RI	-	-	-	-	+	-
67	3-Hexanol	1198	1165	17.83	2.12	876	878	7385	MS, RI	-	-	+	-	-	-
68	2-Hexanol	1220	1192	18.92	2.12	862	874	4053	MS, RI	-	-	-	-	-	+
69	4-Heptanol	1281	1261	21.83	2.23	881	886	5378	MS, RI	-	-	+	-	-	-
70	3-Heptanol	1290	1275	22.42	2.26	893	904	7203	MS, RI	-	+	+	-	+	+
71	2-Heptanol	1320	1300	23.50	2.17	929	930	4661	MS, RI	-	+	+	-	-	-
72	4-Octanol	1376	1364	26.25	2.35	895	895	7432	MS, RI	-	+	+	-	+	+
73	3-Octanol	1393	1377	26.83	2.36	880	893	8177	MS, RI	-	+	+	-	+	+
74	2-Ethylhexanol	1491	1471	30.83	2.21	894	905	6818	MS, RI	+	+	-	+	+	-
75	1-Penten-3-ol	1159	1120	16.08	1.88	902	909	6724	MS, RI	+	+	+	+	+	+
76	(*Z*)-3-Penten-1-ol	1307	1281	22.67	1.93	906	907	3986	MS, RI	-	+	+	-	+	+
77	(*E*)-2-Penten-1-ol	1312	1289	23.00	1.87	914	915	5443	MS, RI	-	-	+	-	-	-
78	(*Z*)-2-Penten-1-ol	1318	1296	23.33	1.87	934	934	7374	MS, RI	-	+	+	-	+	+
79	(*E*)-2-Hexen-1-ol	1405	1385	27.17	1.98	886	886	6983	MS, RI	-	-	-	-	-	+
80	1-Octen-3-ol	1450	1432	29.17	2.14	897	897	6172	MS, RI	+	+	+	+	+	+
81	(*E*)-2-Octen-1-ol	1614	1592	35.75	2.13	893	893	3703	MS, RI	-	+	+	-	+	+
82	(*Z*)-3-Nonen-1-ol	1682	1666	38.58	2.22	871	874	2294	MS, RI	-	-	+	-	-	-
83	1-Ethoxypropan-2-ol	1163	1126	16.33	2.08	866	866	7916	MS, RI	+	-	-	+	-	-
84	1-Propoxypropan-2-ol	1264	1216	19.92	2.24	906	909	8120	MS, RI	+	-	-	+	-	-
85	Diethylene glycol	1972	1932	46.75	1.49	887	904	8966	MS, RI	-	-	-	+	-	-
	Hydrocarbons (18)							MS, RI								
86	Decane	1000	922	10.0	0.26	899	907	4137	MS, RI	-	+	+	+	-	+
87	Undecane	1100	1062	14.00	0.97	899	906	3605	MS, RI	-	+	+	-	+	+
88	Dodecane	1200	1177	18.33	1.31	891	900	1582	MS, RI	-	-	-	+	-	+
89	Tridecane	1300	1294	23.25	1.12	920	925	2942	MS, RI	-	+	+	+	+	+
90	Tetradecane	1400	1396	27.67	1.09	914	921	1699	MS, RI	-	-	+	-	-	-

91	Decene	1050	983	11.42	4.79	910	913	2331	MS, RI	-	+	+	-	-	+
92	Decyne	1229	1207	19.50	3.44	874	874	2760	MS, RI	-	-	-	+	-	-
93	Toluene	1042	968	11.08	2.75	946	946	5573	MS, RI	+	-	-	+	-	-
94	Ethylbenzene	1129	1077	14.50	3.24	921	923	6514	MS, RI	+	+	-	+	+	-
95	p-Xylene	1138	1099	15.25	3.14	922	932	3056	MS, RI	+	+	-	+	+	-
96	o-Xylene	1186	1150	17.25	3.16	918	939	4117	MS, RI	+	+	+	+	+	+
97	(-)-Limonene	1199	1165	17.83	4.28	906	920	7113	MS, RI	-	-	-	+	+	+
98	Propylbenzene	1212	1180	18.42	3.53	888	918	7196	MS, RI	+	+	+	-	-	+
99	Isopropylbenzene	1226	1197	19.08	3.51	886	923	5493	MS, RI	+	+	-	+	-	-
100	Styrene	1261	1232	20.58	2.75	924	924	3509	MS, RI	+	-	-	+	+	-
101	1,3,5,7-Cyclooctatetraene	1244	1252	21.42	2.64	900	919	4125	MS, RI	+	-	+	-	-	-
102	3-Ethylstyrene	1424	1420	28.67	3.15	870	881	1723	MS, RI	-	-	+	-	-	-
103	Azulene	1729	1717	40.50	2.78	878	893	6082	MS, RI	+	+	+	+	+	+
	Phenols (2)								MS, RI						
104	Butylated Hydroxytoluene	1909	1893	46.08	2.09	887	900	8959	MS, RI	+	-	-	+	-	-
105	p-Cresol	2080	2038	48.17	1.44	867	879	5043	MS, RI	+	-	-	-	-	-
	Esters (14)								MS, RI						
106	Amyl acetate	1176	1142	16.92	3.16	891	910	8629	MS, RI	-	+	+	-	+	+
107	Butyl butyrate	1220	1183	18.58	1.14	903	903	1864	MS, RI	+	+	+	-	+	+
108	Hexyl formate	1352	1199	19.17	2.83	910	915	6967	MS, RI	-	+	+	-	+	+
109	Dimethyl oxalate	1395	1385	27.17	2.08	905	919	8422	MS, RI	-	+	+	-	+	+
110	Pentyl hexanoate	1501	1501	32.08	3.98	883	885	7261	MS, RI	-	-	+	-	-	+
111	Octyl formate	1778	1743	41.50	2.35	871	899	2892	MS, RI	-	-	+	-	-	-
112	γ-Valerolactone	1616	1586	35.50	2.23	922	925	8495	MS, RI	-	+	+	-	+	+
113	γ-Butyrolactone	1632	1601	36.08	2.13	967	972	9848	MS, RI	+	+	+	+	+	+
114	γ-Caprolactone	1694	1681	39.17	2.36	937	958	9144	MS, RI	+	+	+	+	+	+
115	δ-Hexalactone	1791	1765	42.33	2.39	916	918	8136	MS, RI	-	+	+	-	+	+
116	δ-Valerolactone	1784	1776	42.75	2.30	916	919	9077	MS, RI	-	+	+	-	+	+
117	γ-Heptalactone	1787	1779	42.83	2.41	888	888	7033	MS, RI	-	+	+	-	+	+
118	γ-Octalactone	1910	1890	46.00	1.80	900	904	7590	MS, RI	-	+	+	-	-	+
119	γ-Nonalactone	2024	2000	47.75	1.63	880	907	7178	MS, RI	-	-	+	-	-	+
	Acids (7)								MS, RI						
120	Acetic acid	1449	1422	28.75	1.52	937	937	9762	MS, RI	+	+	+	+	+	+

121	Formic acid	1504	1428	29.00	1.58	929	944	9620	MS, RI	-	+	+	-	+	+
122	Propanoic acid	1535	1511	32.50	1.62	897	905	9841	MS, RI	+	+	+	+	+	+
123	Pentanoic acid	1733	1696	37.83	1.74	890	943	7925	MS, RI	-	+	+	-	+	+
124	Hexanoic acid	1846	1807	41.67	1.75	907	909	7428	MS, RI	-	+	+	-	+	+
125	Heptanoic acid	1950	1909	44.67	1.66	880	884	7815	MS, RI	-	-	+	-	-	-
126	Nonanoic acid	2171	2116	48.58	1.49	896	914	8107	MS, RI	-	+	+	-	+	+
	O-, N- or S-containing compounds (24)								MS, RI						
127	2-Ethylfuran	950	897	8.25	2.38	930	931	7208	MS, RI	-	-	-	-	+	-
128	2-Propylfuran	1026	988	10.83	2.82	891	893	9267	MS, RI	-	+	+	-	+	+
129	2-Butylfuran	1123	1094	15.08	3.19	890	891	7604	MS, RI	-	+	+	-	+	+
130	2-Pentylfuran	1231	1209	19.58	3.46	931	932	8285	MS, RI	+	+	+	-	+	+
131	Tetrahydro-2-furanmethanol	1296	1246	21.17	4.27	867	884	4986	MS, RI	-	-	+	-	-	-
132	2-Hexylfuran	1321	1316	24.17	3.57	878	883	6802	MS, RI	-	+	+	-	+	+
133	3-Furaldehyde	1458	1406	28.08	1.98	881	889	9717	MS, RI	-	-	-	+	-	-
134	2-Heptylfuran	1421	1421	28.67	3.69	886	890	7743	MS, RI	-	-	+	-	-	+
135	Furfural	1462	1440	29.50	1.99	910	910	9778	MS, RI	+	+	+	+	+	+
136	2-Octylfuran	1520	1524	33.00	3.77	878	878	7022	MS, RI	-	-	-	-	-	+
137	5-Methyl-2(5H)-furanone	1669	1653	38.08	2.05	886	888	8851	MS, RI	-	+	+	-	+	+
138	3,4-Dimethyl-2,5-furandione	1714	1707	40.17	2.14	889	889	8040	MS, RI	-	-	+	-	-	+
139	2(5H)-Furanone	1742	1725	40.83	1.96	901	909	9666	MS, RI	-	+	+	+	+	+
140	2H-Pyran-2-one	1765	1738	41.33	2.02	900	911	9388	MS, RI	-	+	+	-	+	+
141	Pyridine	1185	1146	17.08	2.34	923	924	8944	MS, RI	+	+	-	+	+	+
142	Pyrazine	1212	1177	18.33	2.22	887	914	7828	MS, RI	-	-	-	-	+	-
143	3-Ethylpyridine	1378	1360	26.08	2.80	930	937	8863	MS, RI	-	+	-	-	+	+
144	Pyrrole	1514	1489	31.58	1.71	864	877	8737	MS, RI	+	-	-	-	-	-
145	Benzonitrile	1589	1582	35.33	2.25	922	925	9743	MS, RI	+	+	-	+	+	-
146	Pyrrolidinecarboxaldehyde	1691	1725	40.83	2.49	883	904	8986	MS, RI	-	-	-	+	-	-
147	2-Piperidinone	2060	2092	48.75	1.59	919	920	9218	MS, RI	-	-	-	+	-	-
148	2-Propylthiophene	1226	1228	20.42	3.31	869	869	8246	MS, RI	-	-	-	+	-	-
149	2-Thiophenecarboxaldehyde	1684	1668	38.67	2.20	854	893	7645	MS, RI	-	-	-	+	+	+
150	Dimethyl sulfone	1903	1871	45.50	1.61	855	903	9712	MS, RI	+	-	-	-	+	-

Note: –, not detectable; +, detectable.

[a] RI: retention index on DB-Wax capillary column, RI was obtained from https://webbook.nist.gov/.

[b] RI_{exp}*: calculated using n-alkanes (C_7–C_{40}) with a DB-Wax (100% polyethyleneglycol) column, as part of a DB-Wax × DB-17 ms ([50%-phenyl]-methylpolysiloxane) column set.

[c] Identification method: MS, compared with NIST 2.0 Mass Spectra Database.

Fig. S1. Dry fractionation of fat from yellow-feathered chicken into saturated and unsaturated fat fractions