

Supplementary Table 1: The sensor response values of E-noses to different cultivation methods of *G. elata*

Sensor Name	TW				AS			
	YCWH	SZWH	SCWH	HZH	YCWH	SZWH	SCWH	HZH
W1C	1.84	1.289	1.304	1.267	1.296	1.318	1.436	1.304
W5S	20.777	36.024	13.405	9.892	24.829	67.344	20.931	31.596
W3C	1.062	1.074	1.078	1.068	1.082	1.078	1.123	1.082
W6S	1.089	1.216	1.136	1.811	1.518	2.436	1.187	1.067
W5C	1.031	1.04	1.043	1.037	1.045	1.04	1.066	1.047
W1S	2.402	2.492	2.702	2.422	2.9	2.493	3.721	2.687
W1W	19.283	32.656	23.403	9.601	24.558	39.234	56.769	38.134
W2S	2.622	2.754	2.608	2.421	3.077	2.809	3.672	2.93
W2W	12.921	20.195	15.003	7.287	15.744	22.529	33.185	22.982
W3S	1.019	1.036	1.035	1.061	1.057	1.053	1.082	1.037

Supplementary Table 2: Volatile components of *G. elata* under different cultivation methods

Array Sequence Number	Substance Name	RT / min	Classification	TW average relative content / %				AS average relative content / %			
				YCWH	SZWH	SCWH	HZH	YCWH	SZWH	SCWH	HZH
1	Hexanal	4.11	Aldehyde	0.10	0.27	0.13	0.16	0.12	0.11	0.00	0.11
2	Methylpyrazine	4.7	Aromatic	0.04	0.15	1.00	0.00	0.00	0.00	0.26	0.23
3	(2R,3R)-2,3-Butanediol	4.81	Alcohols	0.00	0.00	0.00	0.00	0.00	0.00	3.78	2.32
4	(2S,3S)-2,3-Butanediol	4.94	Alcohols	0.37	0.40	0.00	0.77	1.25	1.13	2.04	2.32
5	Furfural	5.04	Aldehyde	1.33	1.22	2.85	1.71	1.55	0.17	0.00	2.76
6	2-Pentylfuran	5.57	Aromatic	0.27	0.57	0.00	0.35	0.22	0.32	0.00	0.00
7	2-Ethyl-6-methylpyrazine	6.38	Aromatic	0.00	0.00	0.00	0.12	0.07	0.03	0.01	0.17
8	2-Ethyl-5-methylpyrazine	6.48	Aromatic	0.00	0.16	0.00	0.00	0.46	0.00	0.00	0.00
9	3-Phenyl-1,2,4-trioxolane	6.53	Aromatic	0.00	0.00	0.42	0.34	0.00	0.00	0.00	0.00
10	5-Methylfurfural	6.86	Aldehyde	0.64	0.59	1.14	0.64	0.76	0.21	0.82	1.27
11	3-Ethyl-2,5-dimethylpyrazine	7.22	Aromatic	0.00	0.21	0.15	0.00	0.39	0.00	0.39	0.64
12	Tetramethylpyrazine	7.29	Aromatic	0.00	2.23	0.00	1.59	6.30	8.08	8.95	2.97
13	Nonanal	7.51	Aldehyde	0.41	0.34	0.26	0.43	0.00	0.23	0.00	0.27
14	6-Ethyl-2,3,5-trimethylpyrazine	8.01	Aromatic	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.73
15	2-Methyl-3,5-diethylpyrazine	8.03	Aromatic	0.00	0.38	0.00	0.00	0.56	0.00	0.00	0.00
16	1-(3,4-Dihydro-2H-pyrrol-5-yl)ethanone	8.37	Aromatic	0.00	0.00	0.00	0.00	0.00	0.43	1.32	1.76
17	Decanal	8.54	Aldehyde	1.77	1.48	1.13	1.36	0.74	0.00	0.00	0.00
18	Maltol	8.63	Ketones	0.00	0.00	0.00	0.50	0.97	3.24	3.50	1.38
19	3-Hydroxy-2-methyl-4H-pyran-4-one	9.01	Ketones	3.66	1.39	7.91	4.71	1.70	2.27	3.07	11.25

20	1-(1,2,3,4-Tetrahydropyridin-1-yl)ethanone	9.24	Aromatic	0.00	0.00	0.00	0.00	0.03	0.60	0.00	0.00
21	1-Methyl-1H-pyrrole-2-carbaldehyde	9.37	Aldehyde	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.35
22	Undecanal	9.46	Aldehyde	0.00	1.33	0.96	0.00	0.00	0.98	0.00	0.00
23	3,5-Dihydroxy-2-methyl-4H-pyran-4-one	9.59	Phenol	0.00	0.00	0.41	0.42	0.00	0.00	0.00	0.68
24	(2E,4E)-Deca-2,4-dienal	10.08	Aldehyde	2.11	4.25	3.26	2.55	1.20	0.00	0.00	0.00
25	2-Methoxy-4-vinylphenol	10.6	Phenol	0.00	0.76	0.00	0.00	0.77	0.00	1.30	1.29
26	3,6,6-Trimethyl-2-(3-oxobutyl)cyclohex-2-en-1-peroxol	10.74	Alcohols	0.12	0.00	0.13	0.07	0.00	0.11	0.00	0.00
27	5-(Hydroxymethyl)furfural	10.96	Aldehyde	3.82	5.00	9.64	8.30	3.01	1.19	0.00	6.57
28	3,3-Diethyltridecane	12.86	Alkanes	0.00	0.11	0.14	0.00	0.00	0.00	0.00	0.00
29	2,4-Di-tert-butylphenol	13.29	Phenol	1.24	1.03	1.80	2.22	0.77	1.08	1.21	1.15
30	3-Hydroxybenzyl alcohol	14.36	Alcohols	0.27	0.28	0.00	1.29	0.00	0.39	0.00	0.00
31	3-Methylheptadecane	15.61	Alkanes	0.42	0.31	0.54	0.47	0.00	0.29	0.39	0.38
32	Pentadecan-2-one	16.42	Ketones	5.38	5.33	4.05	4.69	0.44	2.65	2.82	1.97
33	Isopropyl tetradecanoate	19.61	Esters	0.28	0.26	0.32	0.23	0.01	0.14	0.32	0.17
34	2-Ethylhexyl 2-hydroxybenzoate	20.97	Esters	0.12	0.10	0.00	0.11	0.00	0.00	0.09	0.00
35	6,10,14-Trimethylpentadecan-2-one	21.45	Ketones	0.30	0.32	0.00	0.25	0.04	0.26	0.30	0.00
36	Tetradecanoic acid	22.09	Carboxylic Acid	0.19	0.00	0.30	0.23	0.28	0.15	0.27	0.28
37	3-Methylnonadecane	22.7	Alkanes	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.13
38	Methyl hexadecanoate	23.57	Esters	0.27	0.51	0.42	0.42	0.09	0.90	1.14	0.91
39	5,5-Diethylheptadecane	23.94	Alkanes	0.00	0.16	0.00	0.22	0.00	0.00	0.00	0.00
40	Isopropyl 12-methyltetradecanoate	24.51	Esters	0.00	0.00	0.00	0.00	0.21	0.64	0.43	0.34
41	Pentadecanoic acid	25.49	Carboxylic Acid	1.02	0.94	0.90	0.80	0.63	1.45	1.58	1.12
42	Ethyl hexadecanoate	25.76	Esters	1.39	0.15	0.00	0.06	0.07	0.94	0.38	0.31

43	L-Ascorbyl dipalmitate	27.55	Esters	0.00	0.00	0.00	0.00	0.06	0.37	0.24	0.23
44	Hexadecanoic acid	29.21	Carboxylic Acid	0.00	11.77	7.06	0.01	0.00	14.47	9.40	8.49
45	7,9-Di-tert-butyl-2,8-dioxo-1-oxaspiro[4.5]deca-6,9-diene	30.2	Ketones	0.39	0.33	0.37	0.63	0.20	0.00	0.04	0.24
46	Ethyl (9Z,12Z)-octadeca-9,12-dienoate	32.84	Esters	2.75	0.66	0.00	0.00	0.00	0.00	0.00	0.00
47	Heptadecanoic acid	33.29	Carboxylic Acid	0.00	0.18	0.00	0.02	0.00	0.06	0.10	0.08
48	Ethyl (9Z,12Z,15Z)-octadeca-9,12,15-trienoate	33.43	Esters	0.23	0.00	0.00	0.00	0.00	0.27	0.17	0.00
49	5-Dodecyldihydrofuran-2(3H)-one	35.19	Ketones	0.77	0.00	0.78	0.74	0.17	0.79	0.66	0.65
50	2-Ethylhexyl 3-(4-methoxyphenyl)prop-2-enoate	35.45	Esters	0.15	0.00	0.19	0.00	0.01	0.00	0.18	0.00
51	(9Z,12Z)-Octadeca-9,12-dienoic acid	35.81	Carboxylic Acid	0.01	8.13	5.19	6.80	0.00	8.94	6.66	7.20
52	Squalene	36.36	Alkenes	1.99	1.04	1.14	0.85	1.76	0.66	0.00	0.00
53	(Z)-Octadec-9-enenitrile	42.87	Nitrile	0.06	0.18	0.17	0.23	0.00	0.09	0.11	0.10

Supplementary Table 3: Analysis of total relative contents of volatile compound categories in different *G. elata* under different cultivation methods

Classification	TW average relative content / %				AS average relative content / %			
	YCWH	SZWH	SCWH	HZH	YCWH	SZWH	SCWH	HZH
Alcohols	0.76	0.68	0.13	2.13	1.25	1.63	5.82	4.64
Aromatic	0.31	3.7	1.57	2.4	8.03	10.45	10.93	6.5
Phenol	1.24	1.79	2.21	2.64	1.54	1.08	2.51	3.12
Nitrile	0.06	0.18	0.17	0.23	0	0.09	0.11	0.1
Aldehyde	10.18	14.48	19.37	15.15	7.38	2.89	1.18	11.33
Carboxylic Acid	1.22	21.02	13.45	7.86	0.91	25.07	18.01	17.17
Ketones	10.5	7.37	13.11	11.52	3.52	9.21	10.39	15.49
Alkanes	0.42	0.58	0.81	0.69	0	0.29	0.39	0.51
Alkenes	1.99	1.15	1.28	0.85	1.76	0.66	0	0
Esters	5.19	1.68	0.93	0.82	0.45	3.26	2.95	1.96