Date : January 16, 2018

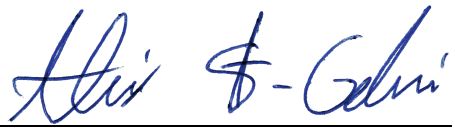
SAMPLE IDENTIFICATION

Internal code : 18A12-HBN2-1-CC
Customer identification : Frankincense Oil Carterii - #Lot: HBNO-170004420
Type : Essential oil
Source : *Boswellia carterii*
Customer : Health & Beauty Natural Oils

ANALYSIS

Method : PC-PA-001-15E06, "Analysis of the composition of a liquid essential oil by GC-FID" (in French). Identifications double-checked by GC-MS
Analyst : Sylvain Mercier, M. Sc., chimiste
Analysis date : 2018-01-15

Checked and approved by :



Alexis St-Gelais, M. Sc., chimiste 2013-174

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IDENTIFIED COMPOUNDS

Identification	Column: BP5			Column: WAX			Molecular Class
	R.T.	R.I.	%	%	R.I.	R.T.	
Toluene	1.32	759	0.06	45.72	957	1.08*	Simple phenolic
Unknown (m/z = 79, 78 (45), 91 (35), 77 (24)...)	1.99	826	0.02				
Tricyclene	3.22*	915	0.26	0.11	915	0.94	Monoterpene
Hashishene	3.22*	915	[0.26]	[45.72]	957	1.08*	Monoterpene
α-Thujene	3.33	921	2.93	3.23	962	1.10	Monoterpene
α-Pinene	3.50	931	45.69	[45.72]	957	1.08*	Monoterpene
Unknown (m/z = 91, 92 (49), 65 (12)... 134? (2))	3.67	941	0.03	0.02	1068	1.85	Monoterpene
α-Fenchene	3.70	943	0.08	0.12	985	1.24	Monoterpene
Camphene	3.73	944	1.51	1.48	993	1.29	Monoterpene
Thuja-2,4(10)-diene	3.82	950	0.47	3.29	1059	1.78*	Monoterpene
Sabinene	4.16	970	3.05	[3.29]	1059	1.78*	Monoterpene
β-Pinene	4.23	974	4.31	4.32	1039	1.63	Monoterpene
Myrcene	4.51	990	3.89	4.03	1113	2.32*	Monoterpene
Pseudolimonene	4.72	1002	0.19	[4.03]	1113	2.32*	Monoterpene
Δ3-Carene	4.79*	1006	3.50	1.38	1090	2.05	Monoterpene
α-Phellandrene	4.79*	1006	[3.50]	1.99	1105	2.22	Monoterpene
Octanal	4.87	1010	0.03	0.02	1234	3.87	Aliphatic aldehyde
α-Terpinene	4.96	1016	0.55	0.53	1118	2.38	Monoterpene
Limonene	5.25*	1031	22.11	17.80	1141	2.66	Monoterpene
para-Cymene	5.25*	1031	[22.11]	4.19	1207	3.49	Monoterpene
β-Phellandrene	5.26	1032	0.15	0.32	1144	2.69	Monoterpene
cis-β-Ocimene	5.37	1038	0.04	0.51	1181	3.19*	Monoterpene
trans-β-Ocimene	5.55	1048	0.02	0.02	1199	3.37	Monoterpene
γ-Terpinene	5.74	1058	0.47	[0.51]	1181	3.19*	Monoterpene
cis-Sabinene hydrate	6.08	1076	0.02	0.11	1410	6.56*	Monoterp. alcohol
Terpinolene	6.22*	1084	0.22	0.19	1219	3.65	Monoterpene
Octanol	6.22*	1084	[0.22]	0.05	1503	8.59	Aliphatic alcohol
para-Cymenene	6.45	1096	0.25	0.23	1365	5.80	Monoterpene
Perillene	6.63	1103	0.01	0.02	1348	5.54	Monoterp. ether
Linalool	6.73	1107	0.08	0.06	1495	8.35	Monoterp. alcohol
β-Thujone	7.03	1118	0.03	0.02	1370	5.88	Monoterp. ketone
α-Campholenal	7.29	1127	0.16				Monoterp. aldehyde
trans-Pinocarveol	7.65	1140	0.38	0.38	1567	10.67	Monoterp. alcohol
trans-para-Menth-2-en-1-ol	7.79	1145	0.02	0.02	1561	10.48	Monoterp. alcohol
trans-Verbenol	7.86	1148	0.12	0.12	1608	12.25	Monoterp. alcohol
α-Phellandren-8-ol analog	8.02	1153	0.18				Monoterp. alcohol
Pinocarvone	8.17	1159	0.07	0.05	1472	7.82	Monoterp. ketone
meta-Mentha-4,6-dien-8-ol	8.25	1162	0.13				Monoterp. alcohol
Borneol	8.70	1178	0.03	0.01	1614	12.53	Monoterp. alcohol

α-Phellandren-8-ol	8.80	1182	0.33				Monoterp. alcohol
Terpinen-4-ol	8.85	1184	0.49	0.68	1524	9.29*	Monoterp. alcohol
para-Cymen-8-ol	9.23	1197	0.08	0.14	1764	20.64	Monoterp. alcohol
Myrtenal	9.36	1200	0.17	[0.68]	1524	9.29*	Monoterp. aldehyde
Myrtenol	9.45	1202	0.13	0.13	1702	16.83	Monoterp. alcohol
α-Terpineol	9.54	1204	0.34	0.26	1620	12.78	Monoterp. alcohol
α-Phellandrene epoxide	9.81	1210	0.05	0.05	1720	17.90	Monoterpene
Verbenone	9.86	1211	0.35	0.34	1596	11.66	Monoterp. ketone
Octyl acetate	9.96	1213	0.22	0.20	1417	6.70	Aliphatic ester
Methyl decyl ether	10.41	1223	0.12	0.10	1312	5.01	Aliphatic ether
trans-Carveol	10.55	1226	0.12	0.13	1750	19.79	Monoterp. alcohol
Methyl (*E*)-2-decenyl ether	11.45	1246	0.18				Aliphatic ether
3,5-Dimethoxytoluene	12.67	1273	0.02				Simple pheonlic
Bornyl acetate	12.95	1279	0.23	0.20	1499	8.47	Monoterp. ester
Methyl undecyl ether	15.68	1326	0.06	0.05	1422	6.81	Aliphatic ether
α-Cubebene	16.04	1331	0.04	[0.11]	1410	6.56*	Sesquiterpene
α-Copaene	17.77	1357	0.23	0.25	1420	6.76	Sesquiterpene
β-Bourbonene	18.20	1364	0.07	0.08	1457	7.52	Sesquiterpene
β-Elemene	19.02	1376	0.17	0.17	1512	8.89	Sesquiterpene
Geranyl acetate	19.42	1382	0.01	0.01	1688	16.00	Monoterp. ester
α-Gurjunene	19.74	1387	0.01	0.02	1465	7.68	Sesquiterpene
β-Caryophyllene	20.71	1401	1.09	1.09	1509	8.79	Sesquiterpene
trans-α-Bergamotene	22.24	1419	0.07	[0.68]	1524	9.29*	Sesquiterpene
6,9-Guaiadiene	22.65	1424	0.02	0.02	1540	9.78	Sesquiterpene
α-Humulene	23.50	1434	0.18	0.18	1589	11.36	Sesquiterpene
allo-Aromadendrene	23.74	1437	0.04	0.06	1548	10.04	Sesquiterpene
trans-Cadina-1(6),4-diene	25.17	1454	0.04	0.05	1593	11.51	Sesquiterpene
γ-Muurolene	25.58	1459	0.09	0.06	1601	11.92	Sesquiterpene
Germacrene D	25.71	1460	0.05	0.07	1612	12.41	Sesquiterpene
β-Selinene	26.35	1468	0.09	0.12	1625	13.03	Sesquiterpene
α-Selinene	26.99	1475	0.06	0.05	1631	13.31	Sesquiterpene
α-Muurolene	27.77	1485	0.04	0.03	1641	13.80	Sesquiterpene
γ-Cadinene	28.83	1497	0.15	0.16	1654	14.38	Sesquiterpene
δ-Cadinene	29.47	1506	0.31	0.28	1660	14.68	Sesquiterpene
α-Elemol	32.77	1553	0.02	0.02	1993	35.52	Sesquiterp. alcohol
Caryophyllene oxide	33.92	1569	0.31	0.28	1833	25.38	Sesquiterp. ether
Viridiflorol	34.95	1584	0.29	0.27	1967	34.01	Sesquiterp. alcohol
τ-Cadinol	37.64	1639	0.22	0.24	2058	37.81	Sesquiterp. alcohol
τ-Muurolol	37.74	1642	0.02	0.02	2087	38.83	Sesquiterp. alcohol
α-Muurolol	37.87	1645	0.02	0.02	2097	39.12	Sesquiterp. alcohol
β-Eudesmol	37.97	1648	0.03	0.04	2106	39.35	Sesquiterp. alcohol
α-Cadinol	38.19	1653	0.05	0.05	2122	39.79	Sesquiterp. alcohol
Dimer of α-phellandrene II	42.38	1772	0.03	0.02	1841	25.90	Diterpene
(3*E*)-Cembrene A	46.74	1930	0.02	0.02	2130	40.03*	Diterpene

meta-Camphorene	46.98	1940	0.01	[0.02]	2130	40.03*	Diterpene
Serratol	51.52*	2133	0.19	0.16	2559	49.63	Diterp. alcohol
Incensole	51.52*	2133	[0.19]	0.04	2684	51.99	Diterp. alcohol
Total identified			**97.87%**	**96.48%**			

*: Two or more compounds are coeluting on this column

[xx]: Duplicate percentage due to coelutions, not taken account in the identified total

Note: no correction factor was applied

Other Data

Physical aspect : Faintly yellow liquid
Refractive index : 1.4710 ± 0.0003 (20 °C)

Conclusion

No adulterant, contaminant or diluent were detected using this method. As specific test conducted for the determination of fatty acids methyl esters after derivatization did not reveal any significant presence of a vegetable oil.

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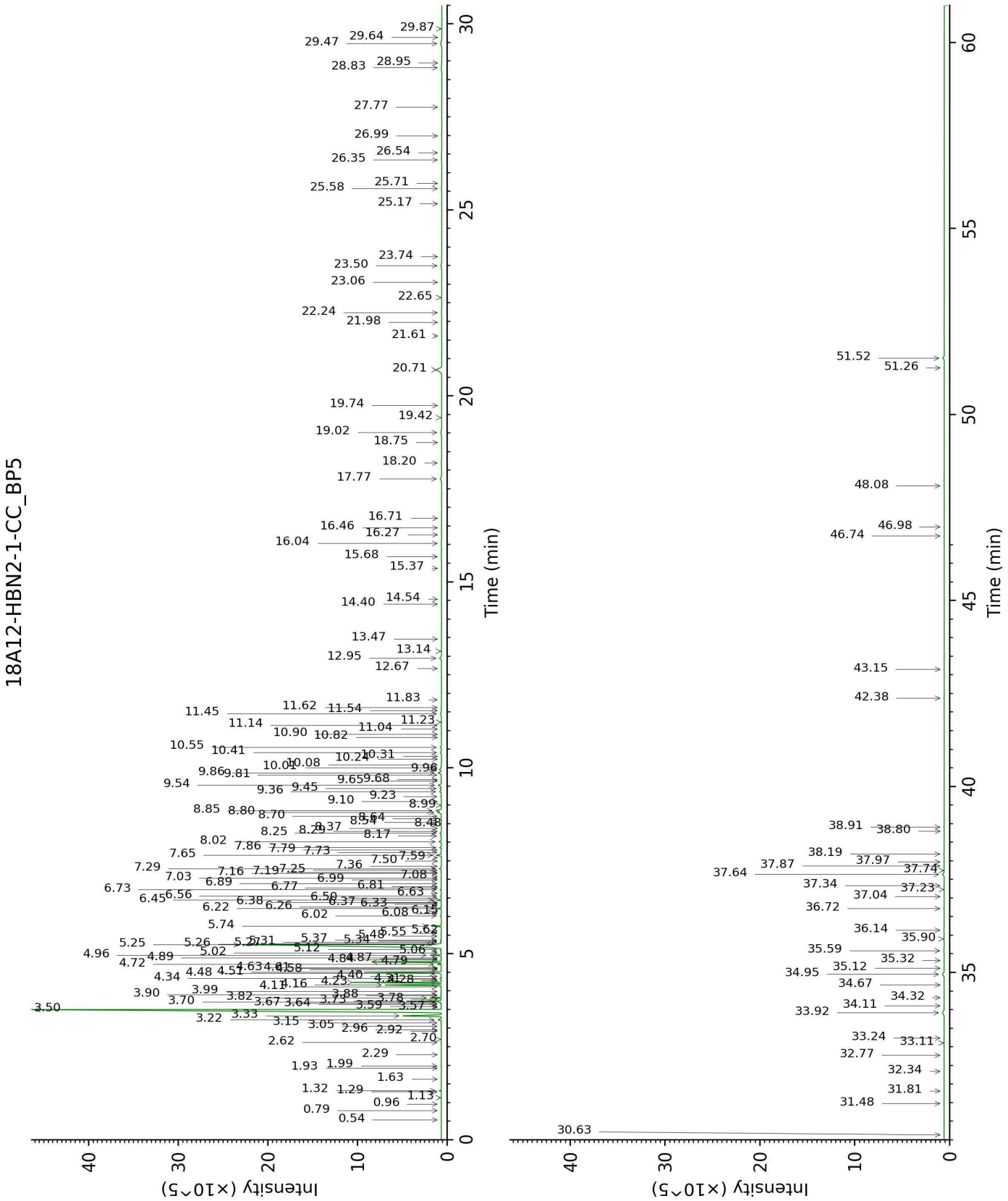
18A12-HBN2-1-CC_BP5
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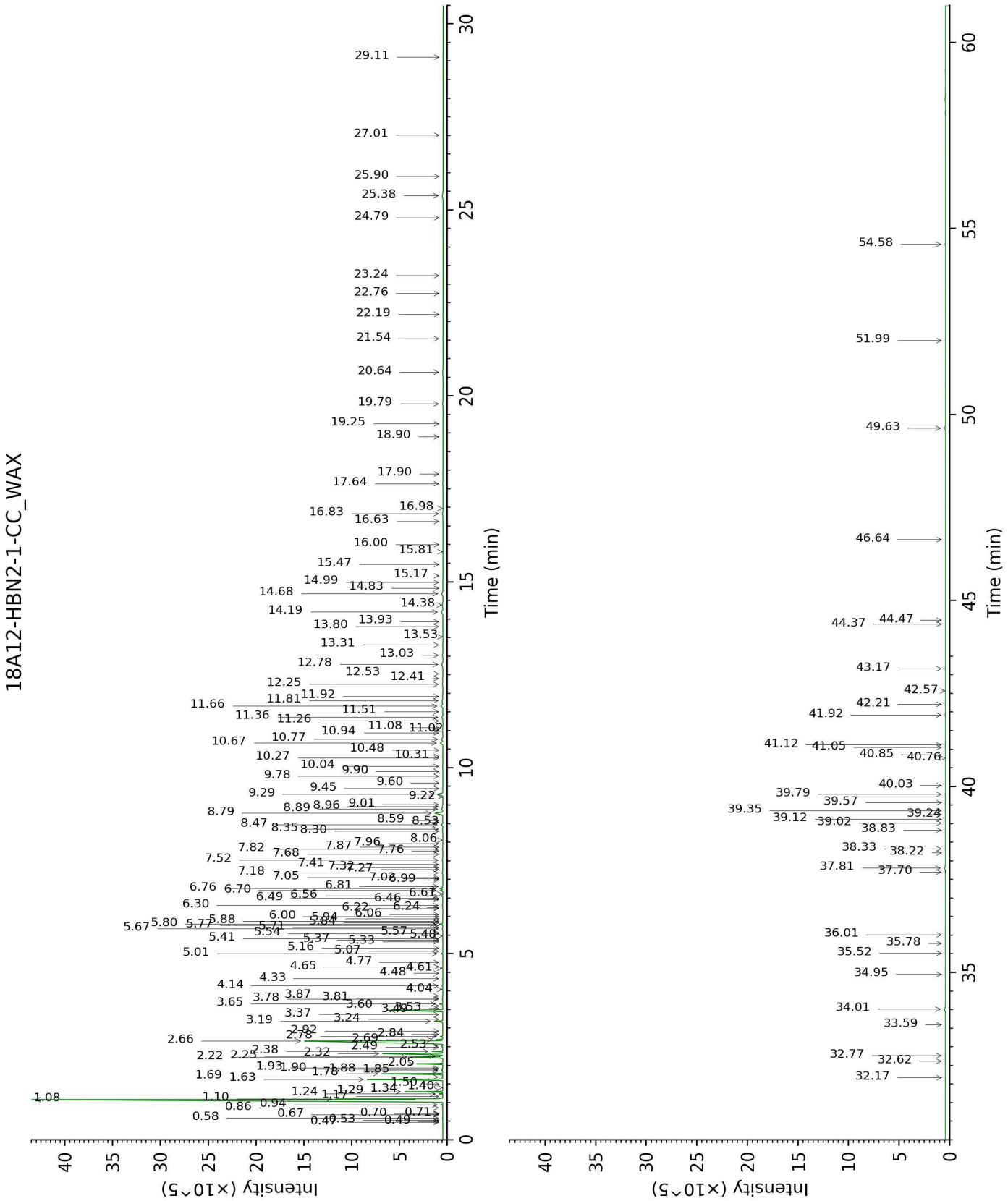
Time (min)
Intensity (×10^5)
Time (min)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Intensity (×10^5)
Time (min)
Intensity (×10^5)
Time (min)