

Sample & Analysis Information

Sample Information

Sample Name: Black Pepper Essential Oil**Botanical Name:** Piper nigrum**Lot Number:** 13259**Production Method:** Steam distilled**Sample Type:** EO - Single**Country of Origin:** India**Analysis Date:** 3/13/2025**Manufacture Date:** March 2025

GC/MS

Inst. ID: Shimadzu GCMS-QP2010Ultra**Injection Type:** Split**Split Ratio:** 24.4**Column Type:** ZB-5**Injection Volume:** 0.1 µL**Temperature Program:** 2C/min

Physical Data

ANALYSIS

Optical Rotation @20°C

Refractive Index @20°C

Specific Gravity @20°C

METHOD

USP[781]

USP[831]

USP[841]

RESULTS

-10.96

1.48165

0.87367

Ret. Time	Component	Ret. Idx.	Conc. %	
11.501	Tricyclene	921	0.01%	
11.649	alpha-Thujene	924	0.87%	
12.061	alpha-Pinene	931	10.22%	
12.843	alpha-Fenchene	946	0.01%	
12.935	Camphene	947	0.24%	
14.198	Sabinene	971	9.11%	
14.499	beta-Pinene	976	9.35%	
14.794	Camphene isomer	982	0.01%	
14.977	para-Menth-3-ene	985	0.01%	
15.110	Myrcene	987	2.09%	
15.719	delta-2-Carene	999	0.01%	
16.011	Pseudolimonene	1003	0.06%	
16.159	alpha-Phellandrene	1006	1.16%	
16.318	delta-3-Carene	1008	10.44%	
16.667	1,4-Cineole	1013	0.01%	
16.807	alpha-Terpinene	1016	0.17%	
16.966	ortho-Cymene	1018	0.02%	
17.289	para-Cymene	1023	0.45%	
17.613	Limonene	1028	14.8%	IFRA
17.700	beta-Phellandrene	1029	1.01%	
17.760	1,8-Cineole	1030	0.04%	
17.983	cis-beta-Ocimene	1034	0.02%	
18.655	trans-beta-Ocimene	1044	0.12%	
19.095	gamma-Terpinene analogue	1051	0.02%	
19.430	gamma-Terpinene	1056	0.18%	
20.202	trans-Sabinene hydrate	1068	0.09%	
20.958	Isoterpinolene	1080	0.1%	
21.218	Terpinolene	1084	0.51%	
21.543	para-Cymenene	1089	0.01%	
22.165	Linalool	1098	0.35%	IFRA
22.240	cis-Sabinene hydrate	1099	0.05%	
22.815	Unidentified	1108	0.01%	
23.657	trans-para-Mentha-2,8-dienol	1120	0.01%	
23.847	cis-para-Menth-2-en-1-ol	1123	0.01%	
24.951	trans-Pinocarveol	1139	0.02%	
25.077	trans-para-Menth-2-en-1-ol	1141	0.02%	
26.452	para-Mentha-1,5-dien-8-ol	1161	0.02%	
27.329	Unidentified	1173	0.01%	
27.697	Terpinen-4-ol	1179	0.23%	
28.129	para-Cymen-8-ol	1185	0.02%	

Ret. Time	Component	Ret. Idx.	Conc. %	
28.246	Unidentified	1187	0.01%	
28.705	alpha-Terpineol	1193	0.07%	
29.245	alpha-Phellandrene epoxide	1201	0.02%	
37.091	Unidentified	1317	0.03%	
37.894	Elemene isomer	1330	0.08%	
38.130	delta-Elemene	1333	1.88%	
38.899	alpha-Cubebene	1345	0.18%	
40.283	Cyclosativene	1366	0.1%	
40.775	alpha-Copaene	1374	2.99%	
41.557	beta-Cubebene	1386	0.27%	
41.663	beta-Elemene	1387	0.33%	
41.893	Unidentified	1391	0.01%	
42.616	cis-beta-Caryophyllene	1402	0.03%	
42.781	alpha-Gurjunene	1404	0.06%	
43.626	beta-Caryophyllene	1418	26.07%	
44.080	Unidentified	1425	0.02%	
44.209	beta-Copaene	1427	0.13%	
44.553	alpha-Guaiene	1433	0.04%	
45.400	Cadina-3,5-diene	1446	0.06%	
45.671	trans-beta-Farnesene	1451	0.06%	
45.802	alpha-Humulene	1453	0.96%	
46.078	Alloaromodendrene	1457	0.02%	
46.522	Unidentified	1464	0.03%	
46.841	Cadina-1(6),4-diene	1470	0.04%	
47.022	gamma-Murolene	1472	0.06%	
47.129	Unidentified	1474	0.03%	
47.390	Germacrene D	1478	0.26%	
47.879	beta-Selinene	1486	0.18%	
48.036	gamma-Amorphene	1489	0.08%	
48.285	Bicyclogermacrene	1493	0.46%	
48.480	alpha-Murolene	1496	0.4%	
48.848	trans,trans-alpha-Farnesene	1502	0.02%	
49.056	beta-Bisabolene	1505	0.72%	
49.475	Cubebol	1512	0.18%	
49.663	delta-Cadinene	1516	1.02%	
49.859	trans-Calamenene	1519	0.05%	
50.509	trans-Cadine-1,4-diene	1530	0.05%	
51.009	trans-alpha-Bisabolene	1538	0.03%	
51.595	Unidentified	1548	0.03%	
52.044	Germacrene B	1556	0.01%	

Ret. Time	Component	Ret. Idx.	Conc. %	
52.205	trans-Nerolidol	1559	0.06%	
53.100	Spathulenol	1574	0.05%	
53.402	Caryophyllene oxide	1579	0.54%	
56.070	Unidentified	1625	0.16%	
56.972	epi-alpha-Murolol	1641	0.05%	
57.121	delta-Cadinol	1644	0.2%	

Total Identified Compounds **99.68 %**

