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# Supplementary Materials

*Research Article*

## Enantioselective gas chromatographic analysis of Cupressaceae foliar essential oils: *Callitropsis nootkatensis, Calocedrus decurrens, Sequoia sempervirens,* and *Thuja plicata*

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**Table S1.** Instrument details for the gas chromatographic analyses of Cupressaceae species.

| | |
|---|---|
| **Gas Chromatography - Mass Spectrometry (GC-MS)** | |
| Instrument | Shimadzu GC-MS-QP2010 Ultra (Shimadzu Scientific Instruments, Columbia, MD, USA) |
| GC Column | Zebron ZB-5ms fused silica capillary column (60 m × 0.25 mm × 0.25 μm film thickness) (Phenomenex, Torrance, CA, USA) |
| MS Detector Conditions | Electron impact (EI) mode, electron energy = 70 eV, a scan = 40–400 atomic mass units, scan rate = 3.0 scans/second |
| Carrier Gas, Conditions | Helium, column head pressure = 208.3 kPa, flow rate = 2.00 mL/min |
| Injector, Detector Temperatures | Injector temperature = 260 °C, interface temperature = 260 °C, ion source temperature = 260 °C |
| GC Oven Temperature Program | Initial temperature = 50 °C, ramp 2 °C/min to 260 °C, hold 260 °C for 5 min |
| Sample Concentration, Volume Injected | 5% (in dichloromethane), 0.1 μL volume |
| Split Mode | 24.5 : 1.0 |
| **Chiral Gas Chromatography - Mass Spectrometry** | |
| Instrument | Shimadzu GCMS-QP2010S (Shimadzu Scientific Instruments, Columbia, MD, USA) |
| GC Column | Restek B-Dex 325 chiral GC column (30 m × 0.25 mm × 0.25 μm film thickness) (Restek Corp., Bellefonte, PA, USA) |
| MS Detector Conditions | Electron impact (EI) mode, electron energy = 70 eV, a scan = 40–400 atomic mass units, scan rate = 3.0 scans/second |
| Carrier Gas, Conditions | Helium, column head pressure = 53.6 kPa, flow rate = 1.00 mL/min |
| Injector, Detector Temperatures | Injector temperature = 240 °C, interface temperature = 240 °C, ion source temperature = 240 °C |
| GC Oven Temperature Program | Initial temperature = 50 °C, hold for 5 min, ramp 1 °C/min to 100 °C, ramp 2 °C/min to 220 °C |
| Sample Concentration, Volume Injected | 5% (in dichloromethane), 0.3 μL volume |
| Split Mode | 24.0 : 1.0 |

**Table S2.** Chemical composition of the foliar essential oils of *Callitropsis nootkatensis*.

| $RI_{calc}$ | $RI_{db}$ | Compounds | *C.n.* Oregon | *C.n.* Washington |
|---|---|---|---|---|
| 801 | 801 | Hexanal | 0.1 | tr |
| 850 | 850 | (2*E*)-Hexenal | 0.4 | 0.1 |
| 852 | 853 | (3*Z*)- Hexenol | 0.1 | 0.3 |
| 882 | 882 | Cyclofenchene | tr | tr |
| 893 | 892 | Isopropyl isovalerate | - | tr |
| 907 | 906 | Bornylene | 0.1 | 0.1 |
| 923 | 923 | Tricyclene | 0.1 | 0.1 |
| 926 | 925 | α-Thujene | 0.2 | 0.1 |
| 933 | 933 | α-Pinene | 33.5 | 16.4 |
| 948 | 948 | α-Fenchene | 1.1 | 1.3 |
| 949 | 950 | Camphene | 0.4 | 0.2 |
| 971 | 970 | 3,7,7-Trimethyl-1,3,5-cycloheptatriene | 0.3 | 0.2 |
| 972 | 971 | Sabinene | 0.3 | 0.2 |
| 978 | 978 | β-Pinene | 3.7 | 1.5 |
| 989 | 989 | Myrcene | 4.2 | 2.7 |
| 1008 | 1007 | α-Phellandrene | 0.1 | tr |
| 1009 | 1008 | δ-3-Carene | 28.3 | 30.2 |
| 1017 | 1017 | α-Terpinene | 0.7 | 0.2 |

**Table S2.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compounds | *C.n.* Oregon | *C.n.* Washington |
|---|---|---|---|---|
| 1020 | 1022 | *m*-Cymene | 0.1 | 0.1 |
| 1024 | 1024 | Sylvestrene | 0.1 | 0.4 |
| 1025 | 1025 | *p*-Cymene | 0.7 | 0.2 |
| 1030 | 1030 | Limonene | 4.2 | 34.4 |
| 1032 | 1031 | β-Phellandrene | 6.1 | 0.7 |
| 1032 | 1032 | 1,8-Cineole | 0.1 | tr |
| 1036 | 1034 | (*Z*)-β-Ocimene | tr | tr |
| 1046 | 1045 | (*E*)-β-Ocimene | tr | tr |
| 1058 | 1057 | γ-Terpinene | 0.3 | 0.2 |
| 1070 | 1069 | *cis*-Sabinene hydrate | 0.1 | tr |
| 1080 | 1080 | Methyl phenethyl ether | tr | tr |
| 1081 | 1082 | *p*-Mentha-2,4(8)-diene | 0.4 | 0.3 |
| 1086 | 1086 | Terpinolene | 2.7 | 2.9 |
| 1089 | 1090 | Fenchone | 0.1 | 0.5 |
| 1090 | 1091 | *p*-Cymenene | 0.7 | 0.6 |
| 1100 | 1101 | Linalool | tr | - |
| 1101 | 1101 | *trans*-Sabinene hydrate | 0.1 | - |
| 1105 | 1104 | Nonanal | tr | tr |
| 1107 | 1105 | α-Thujone | tr | - |
| 1113 | 1113 | *p*-Mentha-1,3,8-triene | tr | tr |
| 1114 | 1114 | 3-Methyl-3-butenyl 3-methylbutanoate | - | 0.3 |
| 1119 | 1120 | *trans*-4-Methoxythujane | 0.2 | 0.3 |
| 1124 | 1124 | *cis*-*p*-Menth-2-en-1-ol | 0.2 | tr |
| 1130 | 1131 | Terpin-3-en-1-ol | tr | tr |
| 1133 | 1132 | *cis*-Limonene oxide | tr | tr |
| 1134 | 1135 | 2-Vinylanisole | tr | tr |
| 1143 | 1142 | *trans*-*p*-Menth-2-en-1-ol | 0.1 | tr |
| 1146 | 1150 | Pentyl pentanoate | - | 0.2 |
| 1147 | 1145 | Camphor | 0.2 | 0.1 |
| 1150 | 1150 | *neo*-*iso*-Thujol | tr | tr |
| 1155 | 1156 | Camphene hydrate | 0.1 | tr |
| 1156 | 1157 | Myrtenyl methyl ether | 0.1 | - |
| 1163 | 1162 | *p*-Mentha-1,5-dien-8-ol | 0.1 | 0.1 |
| 1169 | 1169 | Umbellulone | 0.6 | 0.1 |
| 1176 | 1176 | *cis*-Pinocamphone | tr | tr |
| 1181 | 1180 | Terpinen-4-ol | 0.7 | 0.5 |
| 1186 | 1185 | Dill ether | tr | tr |
| 1187 | 1186 | *p*-Cymen-8-ol | 0.1 | 0.1 |
| 1188 | 1188 | (*E*)-β-Ocimenol | 0.1 | 0.1 |
| 1194 | 1194 | (4*Z*)-Decenal | 0.3 | 0.1 |
| 1195 | 1195 | α-Terpineol | 0.4 | 0.2 |
| 1207 | 1205 | Verbenone | 0.1 | tr |
| 1217 | 1217 | *endo*-Fenchyl acetate | tr | - |
| 1229 | 1229 | Thymyl methyl ether | - | tr |
| 1238 | 1239 | Carvacryl methyl ether | tr | tr |
| 1247 | 1246 | Car-3-en-2-one | tr | tr |
| 1254 | 1254 | Piperitone | 0.5 | 0.3 |
| 1264 | 1265 | 3,5-Dimethoxytoluene | - | tr |

**Table S2.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compounds | *C.n.* Oregon | *C.n.* Washington |
|---|---|---|---|---|
| 1271 | 1270 | *iso*-Pulegyl acetate | tr | - |
| 1284 | 1282 | Bornyl acetate | 0.6 | tr |
| 1285 | 1285 | (*E*)-Anethole | - | tr |
| 1317 | 1318 | (2*E*,4*E*)-Decadienal | tr | 0.1 |
| 1333 | 1331 | 4-Terpinyl acetate | 0.5 | |
| 1337 | 1339 | Piperitenone | tr | tr |
| 1346 | 1346 | α-Terpinyl acetate | 0.7 | - |
| 1347 | 1346 | α-Cubebene | 0.1 | tr |
| 1375 | 1375 | α-Copaene | 0.2 | 0.1 |
| 1393 | 1394 | Benzyl isovalerate | - | 0.1 |
| 1394 | 1396 | Methyl perillate | tr | tr |
| 1429 | 1430 | β-Copaene | tr | tr |
| 1445 | 1446 | *cis*-Muurola-3,5-diene | 0.1 | tr |
| 1452 | 1452 | (*E*)-β-Farnesene | tr | - |
| 1461 | 1463 | *cis*-Muurola-4(14),5-diene | 0.1 | tr |
| 1471 | 1472 | *trans*-Cadina-1(6),4-diene | tr | tr |
| 1474 | 1475 | γ-Muurolene | tr | tr |
| 1477 | 1478 | γ-Curcumene | 0.1 | tr |
| 1480 | 1480 | *ar*-Curcumene | 0.4 | 0.1 |
| 1489 | 1493 | Phenethyl isovalerate | - | tr |
| 1491 | 1492 | *trans*-Muurola-4(14),5-diene | tr | tr |
| 1494 | 1494 | β-Alaskene | tr | tr |
| 1495 | 1497 | *epi*-Cubebol | 0.1 | - |
| 1498 | 1497 | α-Muurolene | - | tr |
| 1508 | 1508 | β-Bisabolene | tr | - |
| 1509 | 1509 | β-Curcumene | 0.3 | 0.1 |
| 1511 | 1512 | α-Alaskene | tr | tr |
| 1513 | 1512 | γ-Cadinene | 0.1 | tr |
| 1518 | 1518 | δ-Cadinene | 0.3 | 0.2 |
| 1520 | 1519 | *trans*-Calamenene | 0.1 | tr |
| 1561 | 1560 | (*E*)-Nerolidol | 0.4 | 0.2 |
| 1609 | 1606 | Cedrol | tr | - |
| 1615 | 1616 | 1,10-di-*epi*-Cubenol | tr | tr |
| 1628 | 1628 | 1-*epi*-Cubenol | 0.1 | tr |
| 1642 | 1640 | τ-Cadinol | 0.2 | 0.1 |
| 1644 | 1641 | τ-Muurolol | 0.1 | 0.1 |
| 1656 | 1655 | α-Cadinol | 0.5 | 0.3 |
| 1687 | 1688 | α-Bisabolol | 0.4 | - |
| 1932 | 1933 | Beyerene | - | 0.2 |
| 1963 | 1960 | Pimaradiene | 0.2 | 0.3 |
| 1968 | 1968 | Kaur-15-ene | - | 0.1 |
| 1992 | 1994 | Manoyl oxide | tr | tr |
| 1996 | 1997 | 9β-Isopimara-7,15-diene | 0.1 | tr |
| 2019 | 2015 | Kaur-16-ene | - | 0.1 |
| 2049 | 2049 | Abietatriene | 0.4 | 0.3 |
| 2053 | 2053 | Manool | - | 0.1 |
| 2083 | 2086 | Abietadiene | 0.1 | 0.1 |
| 2214 | 2212 | Phyllocladanol | - | 1.3 |

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**Table S2.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compounds | *C.n.* Oregon | *C.n.* Washington |
|---|---|---|---|---|
| 2301 | 2302 | *trans*-Totarol | 0.4 | 0.2 |
| | | **Compound classes** | | |
| | | Monoterpene hydrocarbons | 88.2 | 92.6 |
| | | Oxygenated monoterpenoids | 5.5 | 2.2 |
| | | Sesquiterpene hydrocarbons | 1.6 | 0.4 |
| | | Oxygenated sesquiterpenoids | 1.7 | 0.7 |
| | | Diterpenoids | 1.3 | 2.6 |
| | | Benzenoid aromatics | traces | 0.1 |
| | | Others | 0.9 | 1.2 |
| | | Total identified | 99.2 | 99.8 |

$RI_{calc}$ = Retention index values determined with respect to a homologous series of *n*-alkanes on a ZB-5ms column. $RI_{db}$ = Reference retention index values from the databases. tr = trace (< 0.05%).

**Table S3.** Chemical composition of the foliar essential oils of *Calocedrus decurrens*.

| $RI_{calc}$ | $RI_{db}$ | Compounds | *C.d.* #1 | *C.d.* #2 | *C.d.* #3 |
|---|---|---|---|---|---|
| 802 | 801 | Hexanal | tr | tr | tr |
| 849 | 850 | (2*E*)-Hexenal | 0.3 | 0.1 | 0.1 |
| 851 | 853 | (3Z)-Hexenol | 0.1 | tr | - |
| 881 | 882 | Cyclofenchene | tr | tr | tr |
| 885 | 883 | 3,5-Diethenylcyclpent-1-ene | 1.2 | 0.3 | 0.4 |
| 907 | 906 | Bornylene | tr | tr | tr |
| 923 | 923 | Tricyclene | 0.1 | 0.1 | 0.1 |
| 926 | 927 | α-Thujene | 0.1 | 0.1 | 0.2 |
| 934 | 933 | α-Pinene | 7.9 | 4.1 | 5.0 |
| 948 | 948 | α-Fenchene | 0.9 | 0.5 | 0.3 |
| 949 | 950 | Camphene | 0.2 | 0.1 | 0.2 |
| 961 | 959 | Verbenene | tr | 1.5 | 1.9 |
| 970 | 970 | 3,7,7-Trimethyl-1,3,5-cycloheptatriene | 0.2 | 0.1 | 0.1 |
| 972 | 971 | Sabinene | 0.4 | 0.9 | 0.8 |
| 978 | 978 | β-Pinene | 0.6 | 0.2 | 0.3 |
| 989 | 991 | Myrcene | 6.7 | 5.9 | 5.5 |
| 1004 | 1006 | 3-Ethenyl-1,2-dimethyl-1,4-cyclohexadiene | - | 0.1 | 0.1 |
| 1008 | 1007 | α-Phellandrene | 0.1 | 0.1 | 0.1 |
| 1011 | 1009 | δ-3-Carene | 28.6 | 14.3 | 11.0 |
| 1017 | 1018 | α-Terpinene | 0.3 | 0.6 | 0.6 |
| 1020 | 1022 | *m*-Cymene | 0.1 | tr | tr |
| 1024 | 1024 | Sylvestrene | 0.9 | 0.4 | 0.2 |
| 1025 | 1025 | *p*-Cymene | tr | 0.1 | 0.3 |
| 1030 | 1030 | Limonene | 14.7 | 38.7 | 44.4 |
| 1031 | 1031 | β-Phellandrene | 1.5 | 0.8 | 0.6 |
| 1057 | 1057 | γ-Terpinene | 0.6 | 1.1 | 1.1 |
| 1070 | 1069 | *cis*-Sabinene hydrate | 0.1 | 0.1 | 0.1 |
| 1078 | 1080 | 2-Methoxyethylbenzene | 0.1 | tr | tr |
| 1081 | 1082 | *p*-Mentha-2,4(8)-diene | 0.7 | 0.3 | 0.2 |
| 1086 | 1086 | Terpinolene | 10.0 | 6.4 | 5.4 |
| 1088 | 1090 | Fenchone | 0.1 | 1.2 | 1.0 |
| 1089 | 1091 | *p*-Cymenene | 0.4 | 0.2 | 0.2 |
| 1098 | 1097 | α-pinene oxide | - | 0.1 | 0.1 |
| 1099 | 1101 | Linalool | 0.3 | 0.3 | 0.2 |

**Table S3.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compounds | *C.d.* #1 | *C.d.* #2 | *C.d.* #3 |
|---|---|---|---|---|---|
| 1101 | 1101 | *trans*-Sabinene hydrate | - | 0.1 | 0.1 |
| 1104 | 1107 | Nonanal | tr | 0.1 | 0.1 |
| 1112 | 1113 | 1,3,8-*p*-Menthatriene | tr | tr | tr |
| 1118 | 1118 | β-Thujone | - | tr | tr |
| 1124 | 1124 | *cis*-*p*-Menth-2-en-1-ol | 0.1 | 0.1 | 0.1 |
| 1126 | 1126 | α-Campholenal | 0.1 | 0.1 | 0.1 |
| 1132 | 1132 | *cis*-Limonene oxide | tr | tr | tr |
| 1140 | 1139 | (3*Z*)-Ethylidene-1-methyl-1,4-cycloheptadiene | - | tr | tr |
| 1142 | 1142 | *trans*-*p*-Menth-2-en-1-ol | 0.1 | 0.1 | 0.1 |
| 1147 | 1145 | Camphor | 0.1 | 0.2 | 0.2 |
| 1155 | 1156 | Camphene hydrate | 0.1 | 0.1 | 0.1 |
| 1162 | 1162 | *p*-Mentha-1,5-dien-8-ol | 0.1 | - | - |
| 1162 | 1164 | Pinocarvone | - | tr | tr |
| 1175 | 1175 | (3*E*,5*E*)-Undeca-1,3,5-triene | - | tr | tr |
| 1179 | --- | 3,4-Undecadiene-2,10-dione [a] | 0.8 | 0.4 | 0.4 |
| 1180 | 1180 | Terpinen-4-ol | 1.9 | 3.5 | 2.8 |
| 1186 | 1186 | *p*-Cymen-8-ol | 0.6 | 1.0 | 0.4 |
| 1188 | 1188 | (*E*)-β-Ocimenol | - | 0.1 | 0.1 |
| 1193 | 1196 | (4*Z*)-Decenal | 0.4 | 0.1 | 0.3 |
| 1195 | 1195 | α-Terpineol | 0.4 | 0.7 | 0.6 |
| 1209 | 1211 | 4-Methlyeneisophorone | 0.1 | - | - |
| 1217 | 1217 | *endo*-Fenchyl acetate | 0.2 | 0.1 | 0.1 |
| 1219 | --- | Methyl pin-2-en-8-oate [a] | 2.1 | 1.9 | 3.6 |
| 1228 | 1229 | Thymyl methyl ether | 0.1 | tr | tr |
| 1231 | 1231 | *trans*-Chrysanthenyl acetate | - | 0.8 | 1.0 |
| 1243 | 1242 | Carvone | - | 0.1 | 0.1 |
| 1244 | 1246 | *cis*-Linalool oxide acetate (Furanoid) | 0.1 | 0.1 | - |
| 1253 | 1252 | Piperitone | 0.2 | 0.3 | 0.2 |
| 1283 | 1282 | Bornyl acetate | 0.5 | 0.2 | 0.2 |
| 1294 | 1294 | Methyl myrtenate | 1.7 | 0.1 | 0.1 |
| 1321 | 1326 | Myrtenyl acetate | 0.1 | 1.0 | 0.9 |
| 1326 | --- | Pin-2-en-8-yl acetate [a] | 3.2 | - | - |
| 1332 | 1331 | 4-Terpinyl acetate | 0.6 | 0.2 | 0.2 |
| 1345 | 1346 | α-Terpinyl acetate | 5.0 | 6.8 | 4.9 |
| 1388 | 1390 | *trans*-β-Elemene | 0.1 | 0.1 | 0.1 |
| 1394 | 1395 | Methyl perillate | tr | 0.1 | - |
| 1418 | 1417 | (*E*)-β-Caryophyllene | 0.1 | 0.1 | 0.1 |
| 1434 | 1433 | *cis*-Thujopsene | 0.1 | 0.1 | 0.1 |
| 1487 | 1487 | β-Selinene | 0.1 | tr | tr |
| 1494 | 1497 | α-Selinene | 0.1 | tr | tr |
| 1505 | 1508 | β-Bisabolene | tr | tr | tr |
| 1611 | 1610 | Cedrol | 0.6 | 0.3 | 0.4 |
| | | **Compound classes** | | | |
| | | Monoterpene hydrocarbons | 75.0 | 76.7 | 78.5 |
| | | Oxygenated monoterpenoids | 18.3 | 19.7 | 17.3 |
| | | Sesquiterpene hydrocarbons | 0.4 | 0.3 | 0.2 |
| | | Oxygenated sesquiterpenoids | 0.6 | 0.3 | 0.4 |
| | | Benzenoid aromatics | 0.1 | tr | tr |
| | | Others | 2.4 | 0.9 | 1.0 |
| | | Total identified | 96.8 | 97.8 | 97.4 |

$RI_{calc}$ = Retention index values determined with respect to a homologous series of *n*-alkanes on a ZB-5ms column. $RI_{db}$ = Reference retention index values from the databases. tr = trace (< 0.05%). [a] Identification tentative; reference RI value not available.

**Table S4.** Chemical composition of the foliar essential oil of *Sequoia sempervirens*.

| $RI_{calc}$ | $RI_{db}$ | Compounds | *S.s.* #1 | *S.s.* #2 | *S.s.* #3 |
|---|---|---|---|---|---|
| 801 | 801 | Hexanal | 0.2 | 0.4 | 0.1 |
| 848 | 849 | (2*E*)-Hexenal | 0.4 | 0.6 | 0.2 |
| 850 | 853 | (3Z)-Hexenol | - | 0.1 | 0.1 |
| 923 | 923 | Tricyclene | 0.1 | 0.1 | tr |
| 925 | 925 | α-Thujene | 0.7 | 0.6 | 0.3 |
| 934 | 933 | α-Pinene | 18.8 | 16.4 | 10.1 |
| 947 | 948 | α-Fenchene | tr | tr | tr |
| 949 | 950 | Camphene | 0.2 | 0.2 | 0.1 |
| 972 | 972 | Sabinene | 4.4 | 3.5 | 2.2 |
| 977 | 978 | β-Pinene | 1.5 | 1.3 | 0.9 |
| 989 | 989 | Myrcene | 6.7 | 6.0 | 3.4 |
| 1007 | 1007 | α-Phellandrene | 0.6 | 0.7 | 0.2 |
| 1009 | 1009 | δ-3-Carene | 0.1 | 0.1 | 0.1 |
| 1015 | 1015 | 1,4-Cineole | 0.1 | tr | tr |
| 1017 | 1018 | α-Terpinene | 1.2 | 1.2 | 0.3 |
| 1024 | 1025 | *p*-Cymene | 0.9 | 0.7 | 3.1 |
| 1030 | 1030 | Limonene | 8.5 | 8.7 | 6.2 |
| 1032 | 1031 | β-Phellandrene | 7.0 | 6.8 | 3.5 |
| 1034 | 1034 | (*Z*)-β-Ocimene | tr | tr | tr |
| 1045 | 1045 | (*E*)-β-Ocimene | 0.4 | 0.4 | 0.2 |
| 1058 | 1057 | γ-Terpinene | 7.2 | 6.3 | 2.5 |
| 1065 | 1064 | 3-Methylbut-2-enyl butanoate | 0.1 | 0.1 | 0.1 |
| 1087 | 1087 | Terpinolene | 2.3 | 2.2 | 1.1 |
| 1092 | 1091 | *p*-Cymenene | tr | tr | 0.1 |
| 1101 | 1101 | Linalool | tr | tr | 0.1 |
| 1126 | 1124 | *cis*-*p*-Menth-2-en-1-ol | 0.5 | 0.4 | 0.6 |
| 1144 | 1142 | *trans*-*p*-Menth-2-en-1-ol | 0.4 | 0.3 | 0.5 |
| 1183 | 1180 | Terpinen-4-ol | 4.1 | 3.9 | 5.3 |
| 1188 | 1186 | *p*-Cymen-8-ol | 0.1 | tr | 0.5 |
| 1197 | 1195 | α-Terpineol | 0.9 | 1.0 | 1.4 |
| 1207 | 1208 | Decanal | 0.1 | 0.1 | 0.1 |
| 1255 | 1254 | Piperitone | 0.2 | 0.2 | 0.3 |
| 1260 | 1272 | 4-Pentenyl hexanoate | 0.3 | 0.3 | 0.4 |
| 1271 | 1271 | 1-Decanol | - | - | 0.2 |
| 1285 | 1285 | Bornyl acetate | 0.3 | 0.4 | 0.6 |
| 1288 | 1287 | *iso*-Bornyl acetate | tr | tr | tr |
| 1293 | 1293 | 2-Undecanone | 0.1 | tr | 0.1 |
| 1333 | 1330 | Bicycloelemene | 0.1 | 0.1 | tr |
| 1336 | 1335 | δ-Elemene | 0.9 | 1.1 | 0.6 |
| 1347 | 1346 | α-Terpinyl acetate | 2.4 | 2.5 | 3.8 |
| 1358 | 1361 | Neryl acetate | 0.4 | 0.4 | 0.7 |
| 1377 | 1375 | α-Copaene | 0.3 | 0.2 | 0.4 |
| 1378 | 1378 | Geranyl acetate | 0.1 | 0.1 | 0.2 |
| 1383 | 1383 | *cis*-β-Elemene | 0.1 | 0.1 | 0.1 |
| 1387 | 1384 | (5Z)-Decenyl acetate | tr | 0.1 | 0.1 |
| 1390 | 1390 | *trans*-β-Elemene | 1.4 | 1.6 | 2.1 |
| 1409 | 1409 | Dodecanal | 0.1 | 0.1 | 0.1 |
| 1420 | 1418 | (*E*)-β-Caryophyllene | 1.1 | 1.3 | 1.7 |
| 1430 | 1430 | γ-Elemene | 2.2 | 2.7 | 3.2 |

**Table S4.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compounds | *S.s.* #1 | *S.s.* #2 | *S.s.* #3 |
|---|---|---|---|---|---|
| 1453 | 1452 | (*E*)-β-Farnesene | 0.1 | 0.1 | 0.2 |
| 1456 | 1454 | α-Humulene | 0.3 | 0.4 | 0.5 |
| 1473 | 1473 | *trans*-Cadina-1(6),4-diene | tr | tr | tr |
| 1474 | 1475 | Selina-4,11-diene | 0.1 | 0.1 | 0.1 |
| 1475 | 1478 | γ-Muurolene | 0.2 | 0.2 | 0.3 |
| 1478 | 1482 | γ-Curcumene | 0.3 | 0.3 | 0.3 |
| 1480 | 1482 | α-Amorphene | tr | 0.1 | 0.1 |
| 1482 | 1483 | Germacrene D | 2.6 | 3.6 | 3.3 |
| 1485 | 1490 | γ-Amorphene | tr | tr | - |
| 1487 | 1489 | δ-Selinene | 0.1 | 0.1 | 0.1 |
| 1490 | 1492 | β-Selinene | 0.3 | 0.4 | 0.6 |
| 1492 | 1496 | *trans*-Muurola-4(14),5-diene | 0.1 | 0.1 | 0.1 |
| 1495 | 1497 | Bicyclogermacrene | 0.1 | 0.1 | tr |
| 1496 | 1497 | α-Selinene | 0.3 | 0.3 | 0.5 |
| 1499 | 1500 | α-Muurolene | 0.4 | 0.4 | 0.6 |
| 1503 | 1506 | δ-Amorphene | 0.1 | 0.1 | - |
| 1513 | 1512 | γ-Cadinene | 0.1 | 0.2 | 0.2 |
| 1518 | 1518 | δ-Cadinene | 0.7 | 0.9 | 1.2 |
| 1537 | 1540 | Selina-4(15),7(11)-diene | 0.1 | 0.2 | 0.3 |
| 1542 | 1542 | Selina-3,7(11)-diene | 0.1 | 0.2 | 0.3 |
| 1549 | 1549 | α-Elemol | 1.6 | 1.7 | 2.9 |
| 1560 | 1557 | Germacrene B | 5.4 | 6.2 | 8.2 |
| 1562 | 1560 | (*E*)-Nerolidol | 0.1 | 0.1 | - |
| 1584 | 1484 | Gleenol | tr | tr | 1.5 |
| 1607 | 1607 | 5-*epi*-7-*epi*-α-Eudesmol | 0.1 | 0.2 | 0.2 |
| 1622 | 1620 | 10-*epi*-γ-Eudesmol | 0.2 | 0.3 | 0.5 |
| 1628 | 1629 | *iso*-Spathulenol | tr | tr | 0.9 |
| 1632 | 1632 | γ-Eudesmol | 3.6 | 4.2 | 6.5 |
| 1638 | 1644 | *allo*-Aromadendrene epoxide | - | - | 0.4 |
| 1642 | 1643 | τ-Cadinol | 0.2 | 0.2 | 0.4 |
| 1644 | 1645 | τ-Muurolol | 0.3 | 0.4 | 0.7 |
| 1647 | 1651 | α-Muurolol (= δ-Cadinol) | 0.1 | 0.1 | 0.2 |
| 1655 | 1656 | β-Eudesmol | 1.6 | 1.8 | 5.5 |
| 1656 | 1655 | α-Eudesmol | 2.6 | 2.6 | 3.1 |
| 1658 | 1660 | Selin-11-en-4α-ol | tr | tr | 0.4 |
| 1659 | 1655 | α-Cadinol | 0.5 | 0.8 | - |
| 1699 | 1698 | Juniper camphor | 0.2 | 0.3 | 0.4 |
| 1990 | 1994 | Manoyl oxide | 0.1 | 0.1 | 0.2 |
| | | **Compound classes** | | | |
| | | Monoterpene hydrocarbons | 60.5 | 55.0 | 34.2 |
| | | Oxygenated monoterpenoids | 9.4 | 9.2 | 13.9 |
| | | Sesquiterpene hydrocarbons | 17.5 | 21.1 | 24.9 |
| | | Oxygenated sesquiterpenoids | 11.1 | 12.8 | 23.7 |
| | | Diterpenoids | 0.1 | 0.1 | 0.2 |
| | | Others | 1.3 | 1.7 | 1.7 |
| | | Total identified | 99.9 | 99.8 | 98.5 |

$RI_{calc}$ = Retention index values determined with respect to a homologous series of *n*-alkanes on a ZB-5ms column. $RI_{db}$ = Reference retention index values from the databases. tr = trace (< 0.05%).

**Table S5.** Chemical composition of the foliar essential oil of *Thuja plicata*.

| $RI_{calc}$ | $RI_{db}$ | Compounds | *T.p.* #1 | *T.p.* #2 |
|---|---|---|---|---|
| 842 | 842 | Ethyl 2-methyl butyrate | 0.3 | 0.3 |
| 845 | 846 | (*Z*)-Salvene | tr | tr |
| 848 | 849 | (2*E*)-Hexenal | 0.1 | 0.1 |
| 923 | 923 | Tricyclene | tr | tr |
| 925 | 925 | α-Thujene | 0.3 | 0.3 |
| 933 | 933 | α-Pinene | 1.1 | 1.4 |
| 947 | 948 | α-Fenchene | tr | tr |
| 949 | 950 | Camphene | tr | tr |
| 972 | 971 | Sabinene | 3.2 | 2.6 |
| 977 | 978 | β-Pinene | 0.1 | 0.1 |
| 989 | 989 | Myrcene | 1.5 | 1.8 |
| 998 | 997 | Ethyl hexanoate | tr | tr |
| 1007 | 1007 | α-Phellandrene | tr | tr |
| 1017 | 1017 | α-Terpinene | 0.7 | 0.6 |
| 1019 | 1017 | (2*E*)-Hexenyl acetate | tr | tr |
| 1020 | 1022 | Ethyl 3-methyl-3-butenyl carbonate | tr | tr |
| 1024 | 1025 | *p*-Cymene | 0.8 | 0.6 |
| 1026 | 1026 | 2-Acetyl-3-methylfuran | tr | tr |
| 1028 | 1030 | Limonene | 0.8 | 0.9 |
| 1030 | 1031 | β-Phellandrene | 0.1 | tr |
| 1034 | 1037 | 5-Methyl-(5*E*)-octen-2-one | 0.1 | 0.1 |
| 1056 | 1057 | γ-Terpinene | 1.1 | 1.1 |
| 1070 | 1069 | *cis*-Sabinene hydrate | 0.2 | 0.3 |
| 1085 | 1086 | Terpinolene | 0.4 | 0.3 |
| 1091 | 1091 | *p*-Cymenene | tr | tr |
| 1091 | 1090 | 6,7-Epoxymyrcene | tr | tr |
| 1095 | 1093 | Ethyl sorbate | 0.1 | tr |
| 1099 | 1098 | Perillene | 0.1 | tr |
| 1105 | 1101 | Linalool | tr | 0.1 |
| 1107 | 1105 | α-Thujone | 65.9 | 62.5 |
| 1120 | 1118 | β-Thujone | 10.2 | 12.1 |
| 1123 | 1122 | *trans*-*p*-Mentha-2,8-dien-1-ol | tr | tr |
| 1125 | 1124 | *cis*-*p*-Menth-2-en-1-ol | 0.2 | 0.1 |
| 1127 | 1127 | α-Campholenal | tr | tr |
| 1142 | 1142 | *trans*-*p*-Menth-2-en-1-ol | 0.1 | 0.1 |
| 1147 | 1145 | Camphor | tr | tr |
| 1157 | 1157 | Sabina ketone | 0.2 | 0.1 |
| 1170 | 1169 | Ethyl benzoate | tr | tr |
| 1172 | 1171 | *p*-Mentha-1,5-dien-8-ol | tr | tr |
| 1175 | 1176 | *trans*-Isopulegone | tr | tr |
| 1181 | 1180 | Terpinen-4-ol | 3.4 | 3.1 |
| 1187 | 1186 | *p*-Cymen-8-ol | 0.2 | 0.2 |
| 1195 | 1195 | α-Terpineol | 0.1 | 0.1 |
| 1196 | 1196 | Ethyl octanoate | 0.1 | 0.1 |
| 1198 | 1197 | Methyl chavicol (= Estragole) | 0.7 | 0.7 |
| 1201 | --- | 4-Hydroxy-α-thujone [a] | 0.7 | 0.6 |
| 1207 | 1205 | Verbenone | 0.1 | 0.1 |
| 1242 | 1242 | Cuminal | 0.1 | tr |

**Table S5.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compounds | *T.p.* #1 | *T.p.* #2 |
|---|---|---|---|---|
| 1244 | 1242 | Carvone | tr | tr |
| 1247 | 1250 | Ethyl (2*E*)-octenoate | tr | tr |
| 1249 | 1248 | Carvotanacetone | tr | tr |
| 1261 | 1260 | *trans*-Sabinene hydrate acetate | 0.2 | 0.2 |
| 1269 | 1267 | *neo*-3-Thujyl acetate | 0.3 | 0.2 |
| 1277 | 1280 | Phellandral | tr | tr |
| 1283 | 1282 | Bornyl acetate | tr | tr |
| 1288 | 1286 | *trans*-Sabinyl acetate | 0.1 | 0.1 |
| 1290 | 1293 | 3-Thujanyl acetate | 0.1 | 0.1 |
| 1291 | 1290 | Menthyl acetate | 0.4 | 0.6 |
| 1298 | 1300 | Carvacrol | 0.1 | 0.1 |
| 1316 | 1322 | Myrtenyl acetate | 0.1 | 0.1 |
| 1336 | 1335 | 4-Terpinyl acetate | 0.1 | 0.1 |
| 1346 | 1346 | α-Terpinyl acetate | 0.3 | 0.3 |
| 1349 | 1349 | Citronellyl acetate | tr | tr |
| 1357 | 1361 | Neryl acetate | tr | tr |
| 1377 | 1378 | Geranyl acetate | 0.5 | 0.4 |
| 1388 | 1390 | β-Elemene | tr | tr |
| 1394 | 1395 | Ethyl decanoate | tr | tr |
| 1399 | 1403 | Methyl eugenol | tr | tr |
| 1424 | 1426 | Cuminyl acetate | tr | tr |
| 1444 | 1445 | (*E*)-Cinnamyl acetate | tr | tr |
| 1448 | --- | *p*-Methoxypropiophenone [a] | 0.1 | tr |
| 1463 | 1258 | Sabinyl isovalerate | 0.2 | 0.2 |
| 1494 | 1495 | Tridecan-2-one | tr | tr |
| 1497 | 1497 | α-Muurolene | tr | tr |
| 1520 | 1520 | δ-Cadinene | 0.1 | 0.1 |
| 1563 | 1560 | Longicamphenylone | 0.1 | 0.1 |
| 1577 | 1578 | Furopelargone B | 0.1 | tr |
| 1602 | 1600 | α-Oplopenone | tr | tr |
| 1641 | 1643 | τ-Cadinol | tr | 0.1 |
| 1643 | 1644 | τ-Muurolol | 0.1 | 0.1 |
| 1654 | 1655 | α-Cadinol | 0.3 | 0.3 |
| 1732 | 1735 | Oplopanone | 0.1 | 0.2 |
| 1896 | 1896 | Rimuene | 0.9 | 0.7 |
| 1932 | 1931 | Beyerene | 0.6 | 0.9 |
| 1990 | 1989 | Manoyl oxide | tr | tr |
| 1994 | 1997 | Kaur-15-ene | tr | tr |
| 2036 | --- | Atis-16-ene [a] | tr | tr |
| 2050 | 2049 | Abietatriene | tr | tr |
| 2158 | --- | Monogynol, methyl ether [a] | tr | 0.1 |
| 2225 | --- | Sandaracopimarinol [a] | tr | tr |
| 2301 | 2315 | *trans*-Totarol | 0.1 | 0.4 |
| 2319 | --- | 15-Beyeren-19-ol acetate [a] | 1.8 | 3.7 |
| | | **Compound classes** | | |
| | | Monoterpene hydrocarbons | 10.1 | 9.8 |
| | | Oxygenated monoterpenoids | 83.8 | 81.9 |
| | | Sesquiterpene hydrocarbons | 0.1 | 0.1 |
| | | Oxygenated sesquiterpenoids | 0.6 | 0.7 |

**Table S5.** *(Continued).*

| $RI_{calc}$ | $RI_{db}$ | Compound classes | *T.p.* #1 | *T.p.* #2 |
|---|---|---|---|---|
| | | Diterpenoids | 3.4 | 5.7 |
| | | Benzenoid aromatics | 0.8 | 0.7 |
| | | Others | 0.8 | 0.6 |
| | | Total identified | 99.5 | 99.5 |

$RI_{calc}$ = Retention index values determined with respect to a homologous series of *n*-alkanes on a ZB-5ms column. $RI_{db}$ = Reference retention index values from the databases. tr = trace (< 0.05%). [a] Identification tentative; reference RI value not available.

**Table S6.** Enantiomeric distributions (averages) of chiral monoterpenoids in members of the Cupressaceae.

| Enantiomers | *Callitropsis nootkatensis* (this study) | *Calocedrus decurrens* (this study) | *Chamaecyparis lawsoniana* [32] | *Juniperus horizontalis* [45] | *Juniperus occidentalis* [46] | *Juniperus osteosperma* [47] | *Juniperus scopulorum* [45] | *Sequoia sempervirens* (this study) | *Thuja plicata* (this study) | *Thuja plicata* [34] | *Thuja plicata* [32] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (+)-α-Thujene | - | - | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| (−)-α-Thujene | - | - | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| (−)-α-Pinene | 81.8 | 61.3 | 11.4 | 18.6 | 14.7 | 0.3 | 8.3 | 91.6 | 2.3 | 17.4 | 2.2 |
| (+)-α-Pinene | 18.2 | 38.7 | 88.6 | 81.4 | 85.3 | 99.7 | 91.7 | 8.4 | 97.7 | 82.6 | 97.8 |
| (−)-Camphene | 76.7 | - | - | 37.3 | 11.2 | 6.7 | 48.0 | 76.2 | - | - | - |
| (+)-Camphene | 23.3 | - | - | 62.7 | 88.8 | 93.2 | 52.0 | 23.8 | - | - | - |
| (+)-Sabinene | 33.6 | 76.2 | 99.5 | 100.0 | 100.0 | 100.0 | 100.0 | 96.1 | 100.0 | 100.0 | 100.0 |
| (−)-Sabinene | 66.4 | 23.8 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 3.9 | 0.0 | 0.0 | 0.0 |
| (+)-β-Pinene | 4.9 | 0.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 11.1 | - | 84.6 | - |
| (−)-β-Pinene | 95.1 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 88.9 | - | 15.4 | - |
| (+)-δ-3-Carene | 100.0 | 100.0 | - | 100.0 | 100.0 | - | 100.0 | - | - | - | - |
| (−)-δ-3-Carene | 0.0 | 0.0 | - | 0.0 | 0.0 | - | 0.0 | - | - | - | - |
| (−)-α-Phellandrene | - | - | - | - | - | - | - | 55.1 | - | - | - |
| (+)-α-Phellandrene | - | - | - | - | - | - | - | 44.9 | - | - | - |
| (−)-Limonene | 10.3 | 7.6 | 0.2 | 17.2 | 6.3 | 1.9 | 9.9 | 12.1 | 3.5 | 3.7 | 3.0 |
| (+)-Limonene | 89.7 | 92.4 | 99.8 | 82.8 | 93.7 | 98.1 | 90.1 | 87.9 | 96.5 | 96.3 | 97.0 |
| (−)-β-Phellandrene | 55.4 | 91.3 | - | 69.1 | 100.0 | 100.0 | 53.1 | 68.7 | - | - | - |
| (+)-β-Phellandrene | 44.6 | 8.7 | - | 30.9 | 0.0 | 0.0 | 46.9 | 31.3 | - | - | - |
| (+)-cis-Sabinene hydrate | - | - | 100.0 | 97.7 | 100.0 | 95.0 | 95.9 | - | 100.0 | 95.2 | 97.2 |
| (−)-cis-Sabinene hydrate | - | - | 0.0 | 2.3 | 0.0 | 5.0 | 4.1 | - | 0.0 | 4.8 | 2.8 |
| (+)-α-Thujone | - | - | - | - | - | - | - | - | 0.0 | 0.0 | 0.0 |
| (−)-α-Thujone | - | - | - | - | - | - | - | - | 100.0 | 100.0 | 100.0 |
| (+)-β-Thujone | - | - | - | - | - | - | - | - | 100.0 | 100.0 | 100.0 |
| (−)-β-Thujone | - | - | - | - | - | - | - | - | 0.0 | 0.0 | 0.0 |
| (−)-Linalool | - | 82.4 | - | 38.79 | - | - | 12.4 | - | - | - | - |
| (+)-Linalool | - | 17.6 | - | 61.21 | - | - | 87.6 | - | - | - | - |
| (+)-trans-Sabinene hydrate | - | - | 95.6 | 97.8 | - | 97.5 | - | - | - | - | - |
| (−)-trans-Sabinene hydrate | - | - | 4.4 | 2.2 | - | 2.5 | - | - | - | - | - |
| (−)-Camphor | - | - | - | - | 0.0 | 0.2 | - | - | - | - | - |

**Table S6.** *(Contimued).*

| Enantiomers | *Callitropsis nootkatensis* (this study) | *Calocedrus decurrens* (this study) | *Chamaecyparis lawsoniana* [32] | *Juniperus horizontalis* [45] | *Juniperus occidentalis* [46] | *Juniperus osteosperma* [47] | *Juniperus scopulorum* [45] | *Sequoia sempervirens* (this study) | *Thuja plicata* (this study) | *Thuja plicata* [34] | *Thuja plicata* [32] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (+)-Camphor | - | - | - | - | 100.0 | 99.8 | - | - | - | - | - |
| (+)-Terpinen-4-ol | 36.6 | 54.2 | 69.8 | 66.6 | 67.7 | 67.4 | 53.0 | 70.4 | 73.7 | 73.5 | 73.3 |
| (–)-Terpinen-4-ol | 63.4 | 45.8 | 30.2 | 33.4 | 32.3 | 32.6 | 47.0 | 29.6 | 26.4 | 26.5 | 26.7 |
| (–)-Borneol | - | - | - | 100.0 | 100.0 | 100.0 | - | - | - | - | - |
| (+)-Borneol | - | - | - | 0.0 | 0.0 | 0.0 | - | - | - | - | - |
| (–)-α-Terpineol | 77.3 | 24.5 | 32.6 | 49.4 | 0.0 | 0.0 | 46.0 | 67.5 | 32.9 | 31.6 | 37.6 |
| (+)-α-Terpineol | 22.7 | 75.5 | 67.4 | 50.6 | 100.0 | 100.0 | 54.0 | 32.5 | 67.1 | 68.4 | 62.4 |
| (–)-Verbenone | - | - | - | - | - | 0.0 | - | - | - | - | - |
| (+)-Verbenone | - | - | - | - | - | 100.0 | - | - | - | - | - |
| (–)-Piperitone | 82.2 | 78.5 | - | - | - | - | - | - | - | - | - |
| (+)-Piperitone | 17.8 | 21.5 | - | - | - | - | - | - | - | - | - |

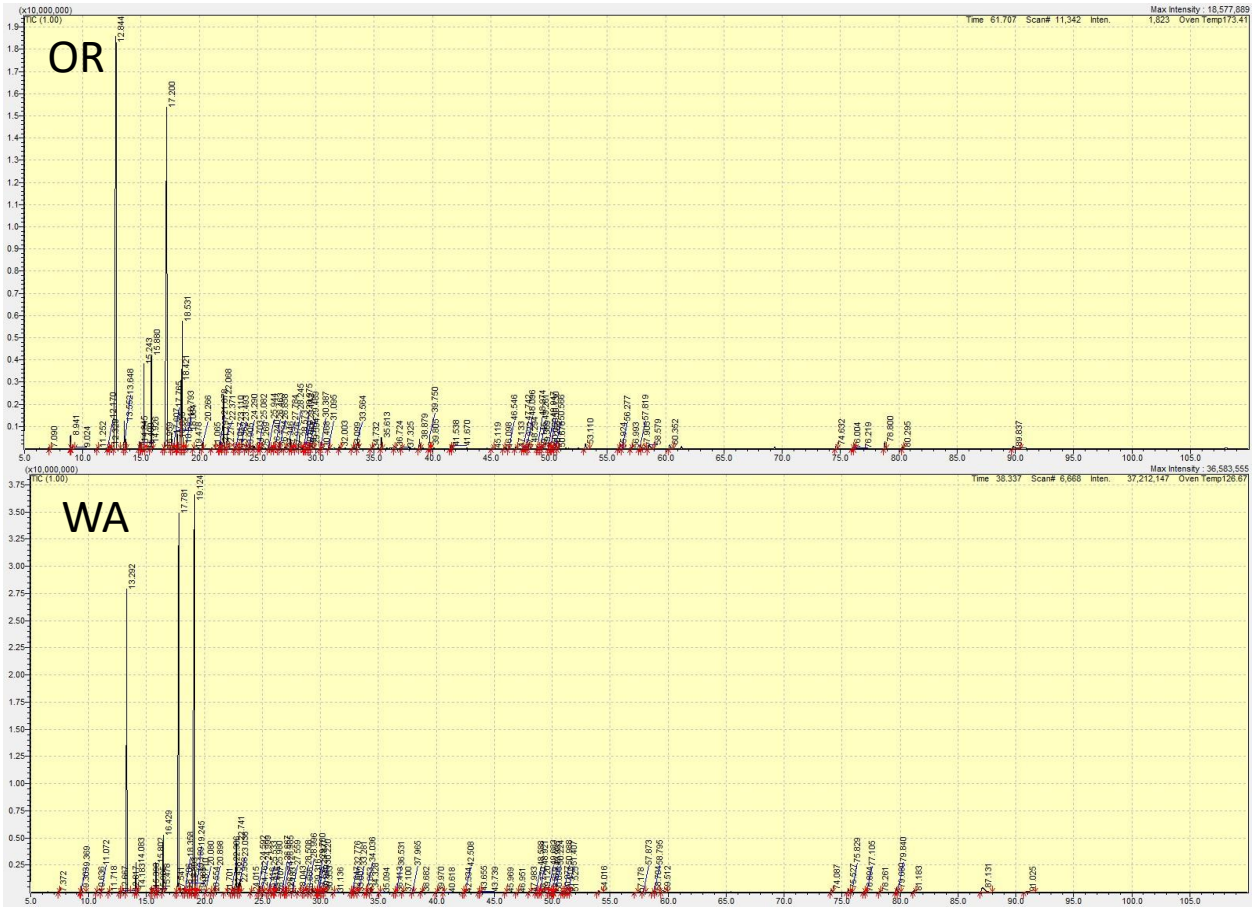


**Figure S1.** Gas chromatograms of *Callitropsis nootkatensis* foliar essential oils.

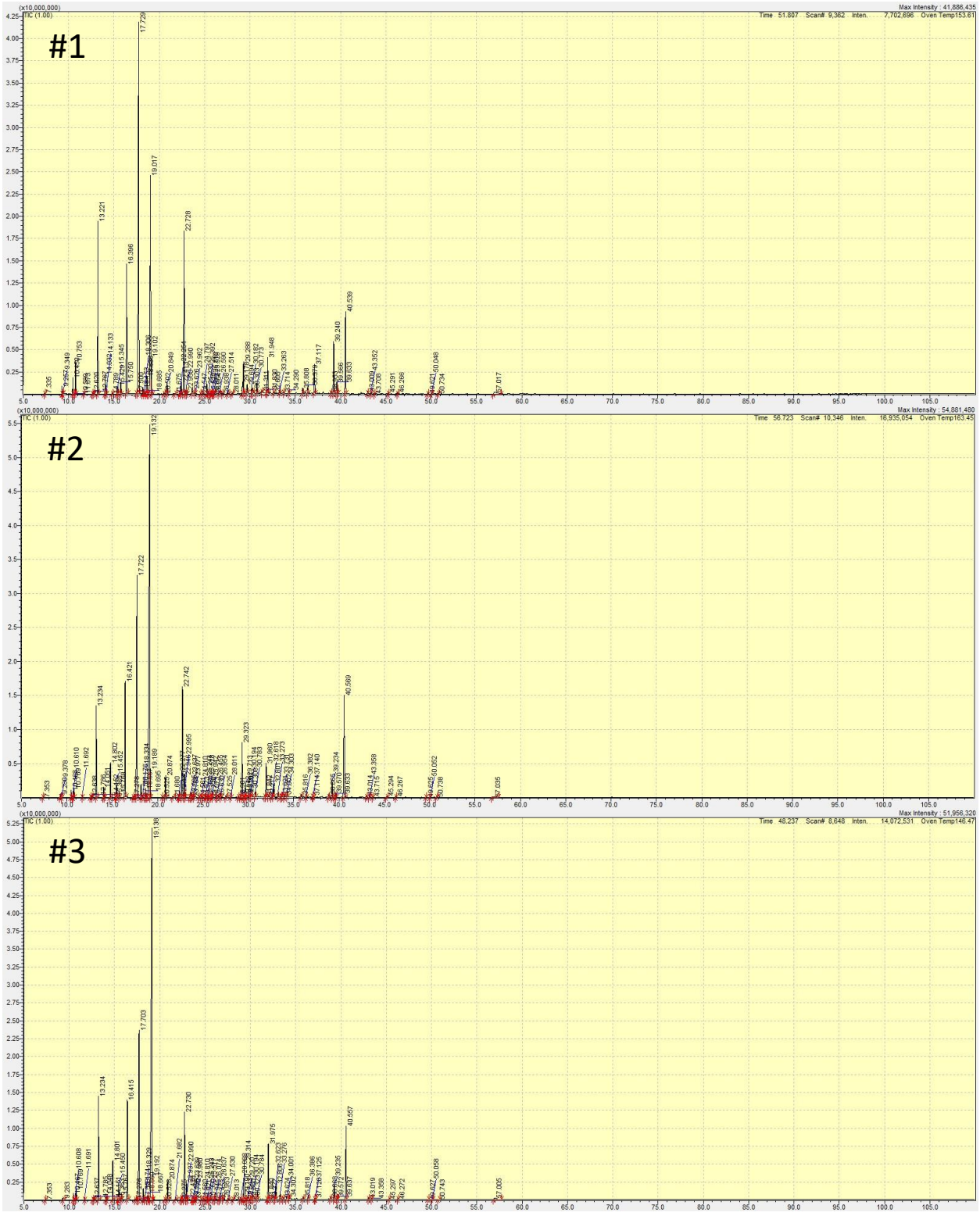


**Figure S2.** Gas chromatograms of *Calocedrus decurrens* foliar essential oils.

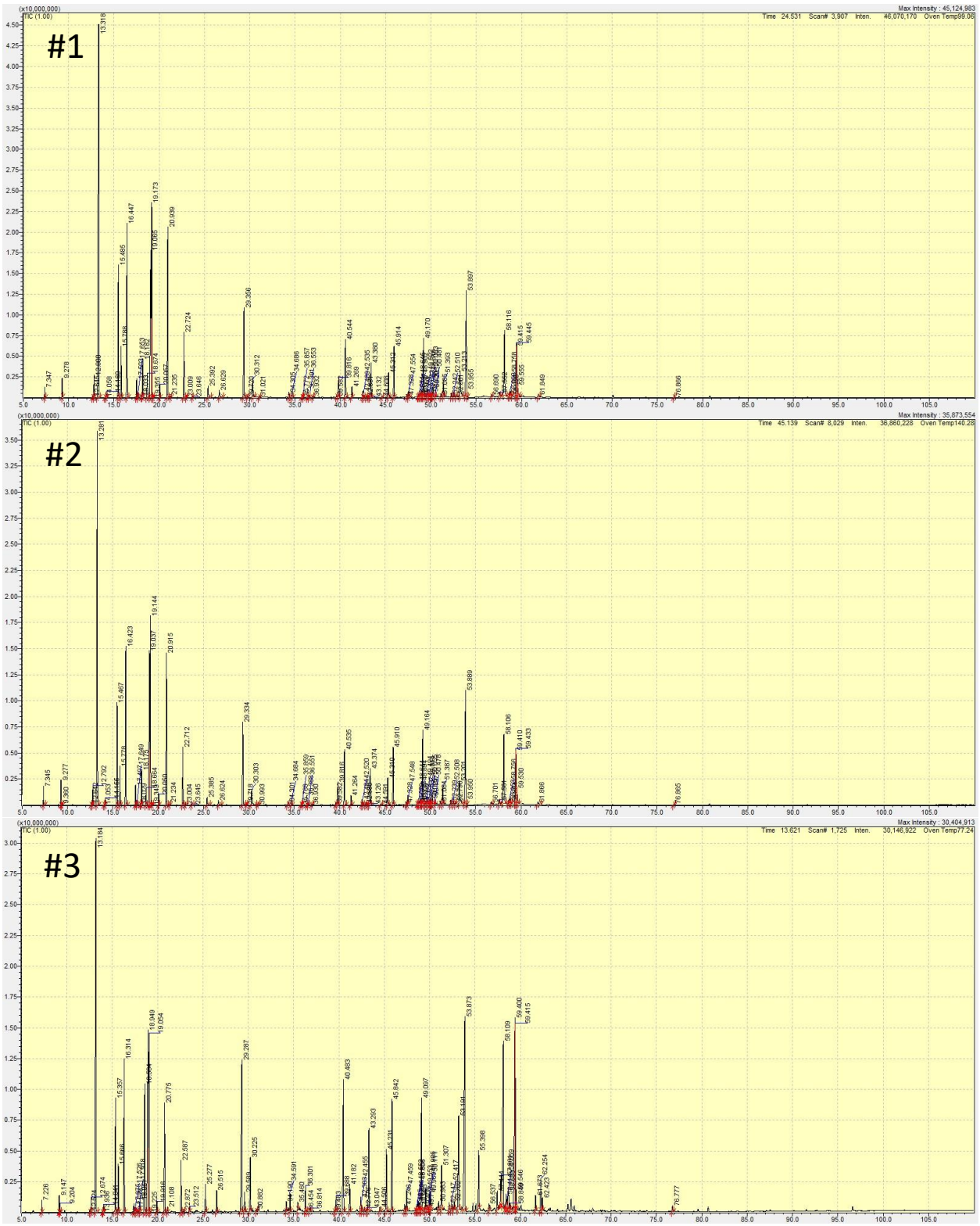


**Figure S3.** Gas chromatograms of *Sequoia sempervirens* foliar essential oils.

*https://doi.org/10.58985/jeopc.2025.v03i02.73*


**Figure S4.** Gas chromatograms of *Thuja plicata* foliar essential oils.