SUPPLEMENTARY MATERIAL

Sideritis romana L. subsp. purpurea (Tal. ex Benth.) Heywood, a new chemotype from Montenegro

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Section 1. Experimental

Plant Material

Aerial parts (herba) of wild growing SP were collected in June 2016 in a suburban area Kuće Rakića near the Cijevna river canyon (42°22'52.1"N, 19°16'26.7"E) about 5 km from Podgorica city (Montenegro) during the time of flowering (Figure S2). Air-drying of the collected plant was performed in a shady place for approximately 20 days, packed in paper bags and kept in a dark and cool place until analysis. Voucher specimen (No. SDCT-SP/01) has been deposited in the Department of Drug Chemistry and Technology at Sapienza University of Rome. Taxonomic identification was conducted according to the official European flora (Tutin et al., 1968).

EO Extraction

EOs have been isolated by direct steam distillation using a 62 L steel distillator apparatus (Albrigi Luigi E0131, Verona, Italy). Similarly as previously reported (Božović et al. 2017a, 2017b, Garzoli et al. 2015, 2017), dried material (1.5 kg) was subjected to steam distillation apparatus, and the EOs were separated at interval times of 1, 2, 3, 6, 12 and 24 hours. At each interval, the accumulated oil/water double phase was extracted 3 times with 20 mL of diethyl ether. The organic layers were dried over anhydrous sodium sulfate (Na2SO4), filtered and deprived of the solvent in vacuo to furnish oils. The prepared oils were stored in tightly closed dark vials at 4°C until further analysis.
**EO Analysis**

The gas chromatographic/mass spectrometric (GC/MS) analysis was carried out with a GC-MS and GC-FID using a turbomass Clarus 500 GC-MS/GC-FID from Perkin Elmer instruments (Waltham, MA, USA). A Stabilwax fused-silica capillary column (Restek, Bellefonte, PA, USA) (60 m × 0.25 mm, 0.25 mm film thickness) was used with helium as carrier gas (1.0 mL/min). GC oven temperature was kept at 60 °C for 5 min and programmed to 220 °C at a rate of 5 °C/min, and kept constant at 220 °C for 30 min. Solvent delay 0–2 min and scan time 0.2 s. MS was taken at 70 eV. Mass range was from 30 to 350 m/z. 1 μL of the extract was diluted in 1 mL of methanol and 1 μL of the solution was injected into the GC injector at the temperature of 280 °C.

The main components of the EO were identified at first by comparison of their MS spectra with those present in the NIST/NBS and Wiley libraries. A second confirmation was achieved by calculating the GC linear retention indeces (LRI) in accord with the definition of Van den Dool and Kratz from temperature-programming measurements. Relative percentages of the components separated were calculated by electronic integration peak areas utilizing the same instrumentation with a FID detector configuration.

**Antimicrobial Assay**

As previously reported, the minimum inhibitory concentration (MIC) was determined by micro-broth dilution method (microsterile plate) according to the Clinical and Laboratory Standards Institute/National Committee for Clinical Laboratory Standards (Božović et al. 2017a). Miconazole (0.5 mg/mL), used as positive control, was prepared by dissolving the agent in endotoxin free water. EO solutions (100 mg/mL) were prepared in RPMI 1640.
Shortly, to determine the MIC of FVEOs extracted at different times and in
different months, or miconazole, RPMI-1640 supplemented with MOPS at pH 7 was
used. EO was diluted in RPMI-1640 supplemented with Tween 80 (final concentration
of 0.001% v/v). Dilutions, 11 increasing concentrations, ranging from 0.012 to 12.48
mg/mL of the EO, were prepared in 96 well plates. The inoculum size was about $2.5 \times$
103 cells/mL. The plates were incubated at 30 °C for 24–48 h.

Section 2. Other sources of $\gamma$-elemene and spathulenol, two main compounds of
SPEO from Montenegro

According to the available literature, $\gamma$-elemene is usually not present at high percentage
in EOs. There are only a few reports with significant $\gamma$-elemene amount: Glechoma
hederacea L. (Mockute et al. 2007), Lantana camara L. (Khan et al. 2002; Sousa et al.
2012), Ocimum basilicum L. (Vieira et al. 2014), Agastache foeniculum (Pursh)
Kuntze (Tirillini et al. 1997), Pistacia lentiscus L. (Burham et al. 2011), Eugenia selloi
Jacks. (Martins et al. 1999) and Steganotaenia araliacea Hochest. (Noudjou et al. 2006).
The survey on literature concerning other Sideritis species revealed the presence of
other structural isomers, but nothing regarding $\gamma$-elemene. Furthermore, the isomers
were present in far lower amounts: $\beta$-elemene (up to 2%) has been reported for S.
montana L., S. scardica Griseb. and S. syriaca L. (Aligiannis et al. 2001; Todorova et al.
2000), while $\delta$-elemene (up to 5.6%) was found in the oils from S. montana L., S.
scardica Griseb., S. syriaca L. and S. curvidens Stapf (Kirimer et al. 2000; Todorova et
al. 2000).

Spathulenol is a colorless, viscous liquid has an earthly-aromatic odor and a bitter
herbal flavor (Juell 1976), and it was first reported for the EO of Eucalyptus spathulata
Hook. from which its name was derived (Bowyer and Jefferies 1963). Some other
Myrtaceae species from Callistemon (Brophy et al. 1997), Eugenia (Sousa et al. 2010),
Marlierea (Limberger et al. 2004), Xanthostemon (Brophy et al. 2006) and Melaleuca (Brophy and Lassak 1992) genera have also significant amounts of spathulenol. It has been reported in EOs from different Asteraceae species from Artemisia (Juell 1976; Kazemi et al. 2009), Conyza (Rustaiyan et al. 2004), Ambrosia (Pino et al. 2005), Anthemis (Rezaee et al. 2006) and Centaurea (Salmanpour et al. 2009) genera, as well as some Lamiaceae species from Nepeta (Baser et al. 2000), Salvia (Rustaiyan et al. 2005), Stachys (Jamzad et al. 2009), Hymenocrater (Masoudi et al. 2009), Micromeria (Palić et al. 2010) and Teucrium (Arnold et al. 1991) genera. Significant amount of spathulenol has also been found for some Eryngium (Brophy et al. 2003), Thapsia (Avato et al. 1996), Aloysia (Crabas et al. 2003), Lantana (Sousa et al. 2010) and Pistacia (Taran et al. 2010) species, but the ones with its predominance are: Citrus australasica Muell. (98%) (Ruberto et al. 2000), Xylopia aromatica (Lam.) Mart. (64.4%) (Pino et al. 2000), X. brasiliensis Spreng. (40.8%) (Lago et al. 2003), Baccharis semiserrata DC. (up to 51%) (Zunino et al. 2004), Bauhinia unguulata L. (47.7%) (Gramosa et al. 2009), Talauma ovata L. (up to 46.8%) (Stefanello et al. 2008) and Annona vepretorum Mart. (43.7%) (Araújo et al. 2015). Spathulenol has been reported for some Sideritis species as well, but usually not in such high amount: S. taurica Steph. ex Wild. and S. hololeuca Boiss. & Heldr. from Turkey (6.4% and 2%, respectively) (Kirimer et al. 1999), S. montana L. subsp. montana and subsp. remota (d'Urv) Ball., S. lanata L. and S. curvidens Stapf, all from Turkey (1.1%, 4.8%, 9.4% and 12.4%, respectively) (Kirimer et al. 2000), S. raeseri Boiss. & Heldr. and S. syriaca L. (2.2% and 1.5%, respectively) from Greece (Aligiannis et al. 2001), S. scardica Griseb. (2%) from FYR Macedonia (Tadić et al. 2012b) and S. pusilla (Lange) Pau subsp. osteoxylla (Pau) Pallarés from Spain (3.7%) (Rodríguez-García et al. 2004). Spathulenol has also
been identified in some animal tissue: soft coral from the genus Sinularia (Goud et al. 2002).

Section 3. Additional references

Aligiannis N, Kalpoutzakis E, Chinou I, Mitakou S. 2001. Composition and antimicrobial activity of the essential oils of five taxa of Sideritis from Greece. J. Agric. Food Chem. 49 (2001) 811–815.

Araújo CDS, De Oliveira AP, Lima RN, Alves PB, Diniz TC, Da Silva Almeida JRG. 2015. Chemical constituents and antioxidant activity of the essential oil from leaves of Annona vepretorum Mart. (Annonaceae). Pharmacogn. Mag. 11: 615–618. doi:10.4103/0973-1296.160462.

Arnold N, Bellomaria B, Valentini G, Rafaiani SM, Comparative study on essential oil of some Teucrium species from Cyprus. J. Ethnopharmacol. 35: 105–113. doi:10.1016/0378-8741(91)90062-I.

Avato P, Trabace G, Smitt UW. 1996. Essential oils from fruits of three types of Thapsia villosa. Phytochemistry 43: 609–612. doi:10.1016/0031-9422(96)00300-7.

Baser KHC, Kirimer N, Kurkcuoglu M, Demirci B. 2000. Essential oils of Nepeta species growing in Turkey. Chem. Nat. Compd. 36: 356–359. doi:10.1076/1388-0209(200004)38:2;1-FT106.

Brophy JJ, Foster PI, Goldsack RJ, Hibbert DB, Punruckvong A. 1997. Variation in Callistemon viminalis (Myrtaceae): New evidence from leaf essential oils. Aust. Syst. Bot. 10: 1–13. doi:10.1071/SB96021.

Brophy JJ, Goldsack RJ, Copeland LM, Palá-Paúl J. 2003. Essential Oil of Eryngium L. Species from New South Wales (Australia). J. Essent. Oil Res. 15: 392–397. doi:10.1080/10412905.2003.9698619.
Brophy JJ, Goldsack RJ, Forster PI. 2006. A Preliminary Examination of the Leaf Oils of the Genus Xanthostemon (Myrtaceae) in Australia. J. Essent. Oil Res. 18: 222–230.

Bowyer RC, Jefferies PR. 1963. Structure of spathulenol. Chem. Ind. 1245–1246.

Brophy JJ, Lassak EV. 1992. Steam volatile leaf oils of some Melaleuca species from Western Australia. Flavour Fragr. J. 7: 27–31.

Burham B, El-Kamali HH, El-Egami A. 2011. Volatile components of the resin of Pistacia lentiscus “Mistica” used in Sudanese Traditional medicine. J. Chem. Pharm. Res. 3: 478–482.

Crabas N, Marongiu B, Piras A, Pivetta T, Porcedda S. 2003. Extraction, Separation and Isolation of Volatiles and Dyes from Calendula officinalis L. and Aloysia triphylla (L’Her.) Britton by Supercritical CO2. J. Essent. Oil Res. 15: 350–355. doi:10.1080/10412905.2003.9712141.

Goud TV, Reddy NS, Krishnaiah P, Venkateswarlu Y. 2002. Spathulenol: a rare sesquiterpene from soft coral Sinularia kavarattiensis: Biochemical Systematics and Ecology. Biochem. Syst. Ecol. 30: 493–495.

Gramosa NV, De Freitas JVB, De Lima Neto MN, Silveira ER, Nunes EP. 2009. Volatile Components of the Essential Oil From Bauhinia ungulata L. J. Essent. Oil Res. 21: 495–496.

Jamzad M, Akbari MT, Rustaiyan A, Masoudi S, Azad L. 2009. Chemical Composition of Essential Oils of Three Stachys Species Growing Wild in Iran: Stachys asterocalyx Rech. f. Stachysobtusicrena Boiss. and Stachys multicaulis Benth. J. Essent. Oil Res. 21: 101–104.

Juell S. 1976. New substances isolated from the essential oils of various Artemisia species: spathulenol, an azulenic sesquiterpene alcohol. Arch. Pharm. 309: 458–466.
Kazemi M, Tabatabaei-Anaraki M, Rustaiyan A, Motevalizadeh A, Masoudi S. 2009. Chemical composition of the essential oils obtained from the flower, leaf and stem of Artemisia campestris L. from Iran. J. Essent. Oil Res. 21: 197–199. doi:10.1080/10412905.2009.9700147.

Kirimer N, Tabanca N, Ozek T, Tümén G, Baser KH. 2000. Essential oils of annual Sideritis species growing in Turkey. Pharm. Biol. 38: 106–111. doi:10.1076/1388-0209(200004)38:2;1-1;FT106.

Kirimer N, Tabanca N, Tümén G, Duman H, Baser KHC. 1999. Composition of the essential oils of four endemic Sideritis species from Turkey. Flavour Fragr. J. 14: 421–425. Khan M, Srivastava SK, Syamasundar KV, Singh M, Naqvi AA. 2002. Chemical composition of leaf and flower essential oil of Lantana camara from India. Flavour Fragr. J. 17: 75–77. doi:10.1002/ffj.1047.

Lago JHG, Moreira IC, Tanizaki TM, Moreno PRH, Roque NF, Limberger RP, Apel MA, Henriques AT. 2003. Mono and Sesquiterpenes from the Leaf Essential Oil of Xylopia brasiliensis Spreng. (Annonaceae). J. Essent. Oil Res. 15: 406–407.

Limberger RP, Simões-Pires CA, Sobral M, Henriques AT. 2004. Essential Oils of Marlierea Species. J. Essent. Oil Res. 16: 479–482.

Martins RCC, Alegrio LV, Castro RN, Godoy RLO. 1999. Constituents of the essential oil of Eugenia nitida Camb. (Myrtaceae). J. Essent. Oil Res. 11: 724–726. doi:10.1080/10412905.1999.9712005.

Masoudi S, Azad L, Arabshahi B. 2009. Volatile constituents of Micromeria persica Boiss., Hymenocrater platystegius Rech.f. and Scutellaria pinnatifida A. Hamilt. subsp. pinnatifida, three Labiatae herbs growing wild in Iran. J. Essent. Oil Res. 21: 515–518. doi:10.1080/10412905.2009.9700232.

Mockute D, Bernotiene G, Judzentiene A. 2007.
The Essential Oil of Ground Ivy (Glechoma hederacea L.) Growing Wild In Eastern Lithuania. J. Essent. Oil Res. 19: 449–451.

Noudjou F, Ngassoum MB, Mapongmetsem PM, Marlier M, Verscheure M, Lognay GC. 2006. Analysis by GC/FID and GC/MS of Essential Oil of Leaflets of Steganotaenia araliacea Hochst from Cameroon. J. Essent. Oil Res. 18: 305–307.

Palić I, Ursić-Jancović J, Stojanović G. 2010. Essential Oil Composition of Three Balkan Micromeria Species. J. Essent. Oil Res. 22: 40–44.

Pino JA, Bello A, Urquiola A, García S, Rosado A. 2000. Leaf Oil of Xylopia aromatica (Lam.) Mart. from Cuba. J. Essent. Oil Res. 12: 751–752.

Pino JA, Marbot R, Payo A, Chao D, Herrera P, Marti MP. 2005. Leaf oils of two Cuban Asteraceae species: Pluchea carolinensis Jacq. and Ambrosia hispida Pursh. J. Essent. Oil Res. 17: 318–320.

Rezaee MB, Jaimand K, Assareh MH. 2006. Chemical constituents of the leaf and flower oils from Anthemis altissima L. var. altissima from Iran. J. Essent. Oil Res. 18: 152–153.

Rodríguez-García I, Muñoz-Dorado M, Gómez-Mercado F, García-Maroto F, Guil-Guerrero JL. 2004. Essential Oil Composition of Sideritis pusilla (Lange) Pau ssp. J. Essent. Oil Res. 16: 535–538.

Ruberto G, Rocco C, Rapisarda P. 2000. Chemical Composition of the Peel Essential Oil of Microcitrus australasica var. sanguinea (F.M. Bail) Swing. J. Essent. Oil Res. 12: 379–382. doi:10.1080/10412905.2000.9699540.

Rustaiyan A, Akhgar MR, Masoudi S, Nematollahi F. 2005. Chemical composition of essential oils of three Salvia species growing wild in Iran: Salvia rhytidea Benth., Salvia limbata C.A.Mey. and Salvia palaestina Benth. J. Essent. Oil Res. 17: 522–524.
Rustaiyan A, Azar PA, Moradalizadeh M, Masoudi S, Ameri N. 2004. Volatile Constituents of Three Compositae Herbs: Anthemis altissima L. var. altissima, Conyza canadensis (L.) Cronq. and Grantina aucheri Boiss. Growing Wild in Iran. J. Essent. Oil Res. 16: 579–581. doi:10.1080/10412905.2004.9698802.

Salmanpour S, Khalilzadeh MA, Sadeghifar H. 2009. Chemical Composition of the Essential Oils From Leaves, Flowers, Stem and Root of Centaurea zuvandica Sosn. J. Essent. Oil Res. 21: 357–359. doi:10.1080/10412905.2009.9700191.

Sousa E, Barreto F, Rodrigues F, Campos AR, Costa J. 2012. Chemical composition of the essential oils of Lantana camara L. and Lantana montevidensis Briq. and their synergistic antibiotic effects on aminoglycosides. J. Essent. Oil Res. 24: 447–452. doi:10.1080/10412905.2012.703494.

Sousa EO, Colares AV, Rodrigues FFG, Campos AR, Lima SG, Costa JGM. 2010. Effect of collection time on essential oil composition of Lantana camara Linn (Verbenaceae) growing in Brazil Northeastern. Rec. Nat. Prod. 4: 31–37.

Stefanello MÉA, Salvador MJ, Ito IY, Wisniewski A, Simionatto EL, De Mello-Silva R. 2008. Chemical Composition, Seasonal Variation and Evaluation of Antimicrobial Activity of Essential Oils of Talauma ovata A. St. Hill (Magnoliaceae). J. Essent. Oil Res. 20: 565–569.

Taran M, Sharifi M, Azizi E, Khanahmadi M. 2010. Antimicrobial activity of the leaves of Pistacia khinjuk. J. Med. Plants. 9: 81–85.

Tirillini B, Menghini A, Pellegrino R. 1997. Constituents of the Leaf Secretory Hairs of Agastache foeniculum Kuntze. J. Essent. Oil Res. 9: 19–21.

Todorova MN, Christov RC, Evstatieva LN. 2000. Essential Oil Composition of Three Sideritis Species from Bulgaria. J. Essent. Oil Res. 12: 418–420.
Vieira PRN, De Morais SM, Bezerra FHQ, Travassos Ferreira PA, Oliveira ÍR, Silva MGV 2014. Chemical composition and antifungal activity of essential oils from Ocimum species. Ind. Crops Prod. 55: 267–271. doi:10.1016/j.indcrop.2014.02.032.

Zunino MP, Lopez ML, Zygadlo JA, Lopez AG. 2004. Essential oil composition of Baccharis articulata (Lam.) Pers. J. Essent. Oil Res. 16: 29–30.

Figure S1. SP on its natural habitat in Montenegro (photo by Mijat Božović)
Figure S2. Map view of the area where SP was collected (Kuće Rakića, Podgorica, Montenegro).

Figure S3. Yield histogram for SP; values are in w/w %.
**Table S1.** Yield % of SPEOs.

* Extraction hour;

1 Relative yield % of SPEOs over time;

2 Yield % calculated on the dried SP plant material.

**Table S2.** Chemical composition (%) of SPEOs.

| #  | Name         | Sample 2 |
|----|--------------|----------|
|    |              | LRI3     | LRIlit |
|    |              | 4        | 1h     | 2h     | 3h     | 6h     | 12h    | 24h    |
| 1  | o-cymene     | 1282     | 1279    | 1.2    | 0.4    | 0.3    | 0.5    | 0.5    | 0.6    |
| 2  | menthone     | 1489     | 1474    | 0.3    | 0.4    | 0.6    | 1.2    | 2.2    | 2.8    |
| 3  | elixene+     | 1494     | 1514    | 8.6    | 2.7    | 1.7    | 0.6    | 0.3    | 0.4    |
| 4  | isomenthone  | 1517     | 1484    | -      | -      | -      | 0.7    | 1.1    | 1.4    |
| 5  | β-linalool   | 1536     | 1540    | -      | -      | -      | 0.4    | 0.4    | 0.4    |
| 6  | isopulegone  | 1611     | 1592    | -      | -      | -      | 0.6    | 0.8    | 0.9    |
| 7  | δ-cadinol*   | 1599     | -       | 6.5    | 0.7    | -      | -      | -      | -      |
|   | Compound          | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|-------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|   |                   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|  8 | 4-terpineol       | 1616 | 1606 | 1.0 | 0.8 | 0.7 | 1.1 | 1.3 | 1.2 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|  9 | iso-caryophyllene | 1627 | 1627 | 1.3 | 4.2 | 2.9 | 2.6 | 2.4 | 2.8 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 10 | menthol+         | 1645 | 1631 | -   | -   | -   | 1.3 | 1.7 | 1.8 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 11 | pulegone         | 1611 | 1637 | 5.1 | 6.7 | 9.0 | 13.1 | 15.7 | 16.1 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 12 | Isoledene*       | 1742 | -   | 8.3 | 8.6 | 5.9 | 4.2 | 3.5 | 4.5 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 13 | γ-elemene*       | 1770 | -   | 22.2 | 25.2 | 14.4 | 9.0 | 6.2 | 6.7 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 14 | verbenone        | 1970 | 1730 | -   | -   | 6.4 | 8.3 | 11.3 | 13.8 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 15 | δ-cadinene       | 1778 | 1770 | 1.6 | 1.2 | 1.1 | 0.9 | 0.9 | 1.3 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 16 | cis-sabinol*     | 1823 | -   | 3.8 | 4.9 | 0.7 | 9.0 | 9.6 | 8.3 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 17 | p-cymen-8-ol     | 1857 | 1850 | -   | -   | -   | 3.0 | 3.4 | 3.0 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 18 | globulol         | 2108 | 2104 | -   | 4.3 | 5.9 | 3.2 | 2.5 | 2.0 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 19 | ledol            | 2116 | 2062 | -   | 3.4 | 5.0 | 2.3 | 1.3 | 1.0 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 20 | spathulenol      | 2152 | 2136 | 18.1 | 27.7 | 26.7 | 14.9 | 10.3 | 8.9 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 21 | thymol           | 2224 | 2189 | -   | 3.8 | 6.2 | 7.1 | 8.0 | 8.3 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 22 | myristicin       | 2297 | 2262 | 3.5 | 3.2 | 4.3 | 3.0 | 3.1 | 3.6 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 23 | apiol+           | 2396 | 2431 | 8.5 | 1.6 | 2.6 | 2.1 | 2.7 | 3.8 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

|               | Monoterpene hydrocarbons | Oxygenated monoterpenes | Sesquiterpene hydrocarbons | Oxygenated sesquiterpenes | Others |
|---------------|--------------------------|--------------------------|----------------------------|---------------------------|--------|
| TOT           | 1.2 0.4 0.3 0.5 0.5 0.6  | 10.2 16.6 23.6 45.8 55.5 58 | 42 41.9 26 17.3 13.3 15.7 | 24.6 36.1 37.6 20.4 14.1 11.9 | 1.2 0.4 0.3 0.5 0.5 0.6 |
| Un1           | 2.1 0.2 2.3 4.1 7.0 0.7  | 10.0 0.2 5.6 10.9 10.8 6.4 |                           |                           |        |
| Un2           | 4.2 3.3 6.8 3.8 5.7 2.7  |                           |                           |                           |        |
| Un3           | 3.7                             |                           |                           |                           |        |
1 # indicates the compound identification number; 2 samples names indicate the extraction time as reported in Table S1. 3 Linear Retention indices measured on polar column; 4 Linear Retention indices from literature; *LRIIlit not available; +Normal alkane RI;

**Table S3.** Anti-Candida albicans activities of 6 SPEO samples

| Sample 1 | MIC mg/mL | 24h | 48h |
|----------|-----------|-----|-----|
| 1h       | na        | na  | na  |
| 2h       | na        | na  | na  |
| 3h       | na        | na  | na  |
| 6h       | na        | na  | na  |
| 12h      | na        | na  | na  |
| 24h      | 12.48     |     | na  |

1 sample names indicate the extraction time; na - non active; standard deviation (SD = 0) was obtained from triplicate experiments.