**Table S1.** Terpenes profile of hemp inflorescences ethanolic extract. Values in mg/mL of extract are reported as mean ± standard deviation of three independent replicates (n=3).

| Terpenoid | mg/mL of extract | % on the total |
|---|---|---|
| ***Monoterpenoids*** | | |
| β-Pinene | 1.69 ± 0.45 | 28.17 |
| Limonene | 0.41 ± 0.06 | 6.78 |
| α-Pinene | 0.30 ± 0.24 | 4.95 |
| Linalool | 0.23 ± 0.02 | 3.88 |
| γ-Terpineol | 0.15 ± 0.01 | 2.50 |
| Borneol | 0.06 ± 0.01 | 1.07 |
| Fenchol | 0.04 ± 0.02 | 0.63 |
| Camphor | 0.02 ± 0.00 | 0.37 |
| Terpinolene | 0.02 ± 0.00 | 0.32 |
| Menthol | 0.01 ± 0.00 | 0.10 |
| *Sum* | 2.92 ± 0.78 | 48.76 |
| ***Sesquiterpenoids*** | | |
| Cedrol | 0.87 ± 0.07 | 14.49 |
| β-Caryophyllene | 0.72 ± 0.06 | 12.08 |
| α-Bisabolol | 0.48 ± 0.07 | 8.03 |
| Eudesmol | 0.33 ± 0.04 | 5.45 |
| α-Humulene | 0.26 ± 0.02 | 4.30 |
| *cis*-Nerolidol | 0.20 ± 0.02 | 3.30 |
| *Sum* | 2.86 ± 0.13 | 47.65 |
| ***Diterpenoids*** | | |
| Phytol | 0.22 ± 0.03 | 3.59 |
| *Total* | 6.00 ± 0.73 | |

**Table S2.** Main lipid classes (g/100 g oil) in bulk oil without antioxidants (CO), with hemp extract (HO) and with α-tocopherol (EO). Values are reported as mean ± standard deviation of three independent replicates (n=3).

| | Day | CO | HO | EO | Sig. |
|---|---|---|---|---|---|
| Free Fatty Acids (FFAs) | 0 | 1.16 ± 0.03 $^{c}$ | 1.23 ± 0.01 | 1.20 ± 0.02 $^{d}$ | n.s. |
| | 0.25 | 1.17 ± 0.09 $^{bc}$ | 1.16 ± 0.03 | 1.10 ± 0.09 $^{d}$ | n.s. |
| | 1 | 1.19 ± 0.05 $^{bc}$ | 1.23 ± 0.03 | 1.22 ± 0.03 $^{d}$ | n.s. |
| | 2 | 1.18 ± 0.06 $^{bcY}$ | 1.25 ± 0.05 $^{XY}$ | 1.38 ± 0.01 $^{cX}$ | * |
| | 3 | 1.43 ± 0.03 $^{aXY}$ | 1.27 ± 0.01 $^{Y}$ | 1.56 ± 0.08 $^{bX}$ | * |
| | 5 | 1.32 ± 0.06 $^{abY}$ | 1.21 ± 0.04 $^{Y}$ | 1.80 ± 0.08 $^{aX}$ | ** |
| | 7 | 1.34 ± 0.08 $^{aY}$ | 1.20 ± 0.01 $^{Y}$ | 1.71 ± 0.11 $^{abX}$ | * |
| | *Sig.* | * | n.s. | *** | |
| Free Sterols | 0 | 0.32 ± 0.01 | 0.31 ± 0.01 | 0.33 ± 0.01 | n.s. |
| | 0.25 | 0.31 ± 0.03 | 0.33 ± 0.03 | 0.33 ± 0.02 | n.s. |
| | 1 | 0.33 ± 0.02 | 0.31 ± 0.01 | 0.33 ± 0.02 | n.s. |
| | 2 | 0.33 ± 0.00 | 0.33 ± 0.01 | 0.35 ± 0.02 | n.s. |
| | 3 | 0.33 ± 0.03 | 0.31 ± 0.01 | 0.36 ± 0.09 | n.s. |
| | 5 | 0.34 ± 0.01 | 0.32 ± 0.01 | 0.36 ± 0.04 | n.s. |
| | 7 | 0.34 ± 0.01 | 0.32 ± 0.00 | 0.34 ± 0.01 | n.s. |
| | *Sig.* | n.s. | n.s. | n.s. | |
| Diacylglycerols (DAGs) | 0 | 3.75 ± 0.05 $^{c}$ | 3.92 ± 0.06 | 3.78 ± 0.21 $^{e}$ | n.s. |
| | 0.25 | 3.79 ± 0.07 $^{c}$ | 3.94 ± 0.19 | 3.87 ± 0.04 $^{de}$ | n.s. |
| | 1 | 3.88 ± 0.26 $^{bc}$ | 4.05 ± 0.01 | 4.27 ± 0.39 $^{cde}$ | n.s. |
| | 2 | 4.18 ± 0.12 $^{abcXY}$ | 3.85 ± 0.13 $^{Y}$ | 4.51 ± 0.03 $^{cdX}$ | * |
| | 3 | 4.51 ± 0.22 $^{aXY}$ | 4.05 ± 0.11 $^{Y}$ | 4.70 ± 0.18 $^{bcX}$ | * |
| | 5 | 4.27 ± 0.08 $^{ab}$ | 4.26 ± 0.16 | 5.22 ± 0.58 $^{ab}$ | n.s. |
| | 7 | 4.50 ± 0.26 $^{aY}$ | 4.25 ± 0.25 $^{Y}$ | 5.40 ± 0.04 $^{aX}$ | * |
| | *Sig.* | * | n.s. | ** | |
| Esterified Sterols | 0 | 2.10 ± 0.22 | 2.02 ± 0.25 | 1.97 ± 0.17 | n.s. |
| | 0.25 | 2.09 ± 0.25 | 2.04 ± 0.58 | 2.15 ± 0.67 | n.s. |
| | 1 | 1.92 ± 0.23 | 1.71 ± 0.01 | 1.74 ± 0.01 | n.s. |
| | 2 | 2.25 ± 0.38 | 2.01 ± 0.54 | 2.05 ± 0.44 | n.s. |
| | 3 | 2.06 ± 0.25 | 1.81 ± 0.12 | 2.00 ± 0.37 | n.s. |
| | 5 | 2.33 ± 0.28 | 1.97 ± 0.44 | 2.02 ± 0.25 | n.s. |
| | 7 | 2.20 ± 0.22 | 2.03 ± 0.02 | 2.37 ± 0.30 | n.s. |
| | *Sig.* | n.s. | n.s. | n.s. | |
| Triacylglycerols (TAGs) | 0 | 92.67 ± 0.15 $^{a}$ | 92.52 ± 0.31 | 92.72 ± 0.07 $^{a}$ | n.s. |
| | 0.25 | 92.64 ± 0.06 $^{a}$ | 92.52 ± 0.32 | 92.54 ± 0.24 $^{ab}$ | n.s. |
| | 1 | 92.68 ± 0.05 $^{a}$ | 92.70 ± 0.00 | 92.44 ± 0.43 $^{ab}$ | n.s. |
| | 2 | 92.06 ± 0.20 $^{b}$ | 92.56 ± 0.63 | 91.71 ± 0.39 $^{bc}$ | n.s. |
| | 3 | 91.68 ± 0.04 $^{bY}$ | 92.56 ± 0.01 $^{X}$ | 91.38 ± 0.36 $^{cdY}$ | * |
| | 5 | 91.75 ± 0.31 $^{bXY}$ | 92.24 ± 0.33 $^{X}$ | 90.60 ± 0.45 $^{deY}$ | * |
| | 7 | 91.61 ± 0.12 $^{bX}$ | 92.21 ± 0.29 $^{X}$ | 90.18 ± 0.14 $^{eY}$ | ** |
| | *Sig.* | ** | n.s. | *** | |

Data were analyzed by one-way ANOVA. n.s. = not significant; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$.
Different lowercase letter in the same column denotes significant differences between the days of storage ($p < 0.05$; Duncan's test); different uppercase letter in the same row denotes significant differences between the bulk oils ($p < 0.05$; Duncan's test)

**Table S3.** Content of cannabidiol (CBD) (g/100 g oil) in bulk oil with hemp extract (HO). Values are reported as mean ± standard deviation of three independent replicates (n=3) and results of ANOVA analysis with Duncan's test ($p < 0.05$)

| Day | CBD |
|---|---|
| 0 | 0.40 ± 0.08 |
| 0.25 | 0.39 ± 0.01 |
| 1 | 0.41 ± 0.07 |
| 2 | 0.41 ± 0.06 |
| 3 | 0.40 ± 0.05 |
| 5 | 0.42 ± 0.10 |
| 7 | 0.41 ± 0.06 |
| *Sig.* | n.s. |

n.s. = not significant

**Table S4.** Total fatty acid methyl esters (FAMEs; g/100 g oil) in bulk oil without antioxidants (CO), during the storage treatment. Values are reported as mean ± standard deviation of three independent replicates (n=3).

| FAME | Day 0 | Day 0.25 | Day 1 | Day 2 | Day 3 | Day 5 | Day 7 | *Sig.* |
|---|---|---|---|---|---|---|---|---|
| C16:0 | 5.51 ± 0.01 $^{ab}$ | 5.51 ± 0.02 $^{ab}$ | 5.51 ± 0.02 $^{c}$ | 5.52 ± 0.01 $^{ab}$ | 5.64 ± 0.03 $^{a}$ | 5.55 ± 0.02 $^{ab}$ | 5.56 ± 0.02 $^{b}$ | ** |
| C18:0 | 4.42 ± 0.01 | 4.44 ± 0.03 | 4.44 ± 0.01 | 4.43 ± 0.02 | 4.60 ± 0.08 | 4.46 ± 0.03 | 4.48 ± 0.03 | n.s. |
| C20:0 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.14 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.00 | n.s. |
| C22:0 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.01 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.01 | n.s. |
| C18:1 *n*-9 | 16.98 ± 0.00 $^{b}$ | 16.97 ± 0.07 $^{b}$ | 17.01 ± 0.01 $^{b}$ | 17.02 ± 0.04 $^{ab}$ | 17.03 ± 0.02 $^{ab}$ | 17.06 ± 0.03 $^{ab}$ | 17.11 ± 0.04 $^{a}$ | * |
| C18:1 *n*-7 | 0.72 ± 0.01 | 0.73 ± 0.03 | 0.73 ± 0.00 | 0.73 ± 0.00 | 0.73 ± 0.01 | 0.73 ± 0.01 | 0.73 ± 0.01 | n.s. |
| C20:1 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | n.s. |
| C18:2 *n*-6 | 44.62 ± 0.00 | 44.54 ± 0.02 | 44.59 ± 0.04 | 44.58 ± 0.02 | 44.41 ± 0.05 | 44.53 ± 0.07 | 44.54 ± 0.05 | n.s. |
| C18:3 *n*-3 | 26.70 ± 0.03 $^{a}$ | 26.68 ± 0.07 $^{a}$ | 26.65 ± 0.00 $^{ab}$ | 26.63 ± 0.03 $^{ab}$ | 26.46 ± 0.04 $^{c}$ | 26.56 ± 0.07 $^{bc}$ | 26.45 ± 0.06 $^{c}$ | ** |
| C18:3$\gamma$ | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.10 ± 0.00 | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.10 ± 0.00 | n.s. |
| ΣCLA | 0.01 ± 0.00 | 0.01 ± 0.00 | 0.01 ± 0.01 | 0.02 ± 0.01 | 0.03 ± 0.03 | 0.03 ± 0.02 | 0.02 ± 0.02 | n.s. |
| ΣCLnA | 0.03 ± 0.00 | 0.08 ± 0.06 | 0.05 ± 0.00 | 0.04 ± 0.01 | 0.05 ± 0.01 | 0.05 ± 0.02 | 0.05 ± 0.01 | n.s. |
| Others | 0.54 ± 0.01 | 0.57 ± 0.02 | 0.55 ± 0.01 | 0.55 ± 0.00 | 0.57 ± 0.01 | 0.55 ± 0.02 | 0.57 ± 0.01 | n.s. |

ΣCLA, conjugated linoleic acid isomers; ΣCLnA, conjugated linolenic acid isomers; n.s. = not significant; * = $p < 0.05$; ** = $p < 0.01$. Data were analyzed by one-way ANOVA. Different letter in the same row denotes significant differences between the days of storage ($p < 0.05$; Duncan's test)

**Table S5.** Total fatty acid methyl esters (FAMEs; g/100 g oil) in bulk oil with hemp extract antioxidants (HO), during the storage treatment. Values are reported as mean ± standard deviation of three independent replicates (n=3).

| FAME | Day 0 | Day 0.25 | Day 1 | Day 2 | Day 3 | Day 5 | Day 7 | *Sig.* |
|---|---|---|---|---|---|---|---|---|
| C16:0 | 5.50 ± 0.02 | 5.49 ± 0.04 | 5.52 ± 0.02 | 5.51 ± 0.02 | 5.48 ± 0.10 | 5.52 ± 0.01 | 5.52 ± 0.05 | n.s. |
| C18:0 | 4.41 ± 0.01 | 4.40 ± 0.04 | 4.43 ± 0.02 | 4.42 ± 0.02 | 4.41 ± 0.11 | 4.43 ± 0.02 | 4.43 ± 0.05 | n.s. |
| C20:0 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.27 ± 0.20 | 0.13 ± 0.00 | 0.13 ± 0.00 | 0.13 ± 0.00 | n.s. |
| C22:0 | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.01 | 0.10 ± 0.02 | n.s. |
| C18:1 *n*-9 | 16.96 ± 0.00 | 16.93 ± 0.07 | 16.99 ± 0.01 | 16.96 ± 0.04 | 17.02 ± 0.01 | 16.98 ± 0.01 | 17.00 ± 0.04 | n.s. |
| C18:1 *n*-7 | 0.73 ± 0.01 | 0.73 ± 0.01 | 0.73 ± 0.00 | 0.73 ± 0.00 | 0.73 ± 000 | 0.73 ± 0.01 | 0.74 ± 0.00 | n.s. |
| C20:1 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | n.s. |
| C18:2 *n*-6 | 44.59 ± 0.01 | 44.59 ± 0.04 | 44.58 ± 0.04 | 44.39 ± 0.06 | 44.59 ± 0.16 | 44.53 ± 0.04 | 44.50 ± 0.02 | n.s. |
| C18:3 *n*-3 | 26.71 ± 0.00 | 26.78 ± 0.12 | 26.67 ± 0.01 | 26.56 ± 0.01 | 26.67 ± 0.07 | 26.68 ± 0.01 | 26.64 ± 0.04 | n.s. |
| C18:3$\gamma$ | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.10 ± 0.00 | n.s. |
| ΣCLA | 0.02 ± 0.01 | 0.01 ± 0.01 | 0.02 ± 0.01 | 0.02 ± 0.01 | 0.02 ± 0.01 | 0.03 ± 0.00 | 0.06 ± 0.05 | n.s. |
| ΣCLnA | 0.05 ± 0.00 | 0.04 ± 0.02 | 0.04 ± 0.00 | 0.21 ± 0.24 | 0.05 ± 0.01 | 0.05 ± 0.01 | 0.06 ± 0.03 | n.s. |
| Others | 0.56 ± 0.00 | 0.55 ± 0.01 | 0.55 ± 0.00 | 0.58 ± 0.02 | 0.56 ± 0.00 | 0.56 ± 0.01 | 0.55 ± 0.01 | n.s. |

ΣCLA, sum of conjugated linoleic acid isomers; ΣCLnA, sum of conjugated linolenic acid isomers; n.s. = not significant; data were analyzed by one-way ANOVA ($p < 0.05$; Duncan's test)

**Table S6.** Total fatty acid methyl esters (FAMEs; g/100 g oil) in bulk oil with α-tocopherol (EO) during the storage treatment. Values are reported as mean ± standard deviation of three independent replicates (n=3).

| FAME | Day 0 | Day 0.25 | Day 1 | Day 2 | Day 3 | Day 5 | Day 7 | *Sig.* |
|---|---|---|---|---|---|---|---|---|
| C16:0 | 5.49 ± 0.00 $^{d}$ | 5.51 ± 0.02 $^{de}$ | 5.53 ± 0.02 $^{de}$ | 5.55 ± 0.01 $^{cd}$ | 5.57 ± 0.02 $^{bc}$ | 5.62 ± 0.02 $^{a}$ | 5.61 ± 0.03 $^{ab}$ | ** |
| C18:0 | 4.41 ± 0.00 $^{d}$ | 4.43 ± 0.01 $^{cd}$ | 4.44 ± 0.01 $^{bcd}$ | 4.46 ± 0.01 $^{bc}$ | 4.48 ± 0.03 $^{ab}$ | 4.53 ± 0.03 $^{a}$ | 4.53 ± 0.03 $^{a}$ | ** |
| C20:0 | 0.13 ± 0.00 $^{b}$ | 0.13 ± 0.00 $^{ab}$ | 0.13 ± 0.00 $^{ab}$ | 0.13 ± 0.00 $^{ab}$ | 0.13 ± 0.00 $^{ab}$ | 0.13 ± 0.00 $^{ab}$ | 0.14 ± 0.00 $^{a}$ | * |
| C22:0 | 0.13 ± 0.00 $^{b}$ | 0.13 ± 0.00 $^{b}$ | 0.13 ± 0.00 $^{b}$ | 0.13 ± 0.00 $^{ab}$ | 0.13 ± 0.00 $^{ab}$ | 0.13 ± 0.00 $^{ab}$ | 0.15 ± 0.02 $^{a}$ | n.s. |
| C18:1 *n*-9 | 16.99 ± 0.00 $^{e}$ | 17.01 ± 0.00 $^{de}$ | 17.05 ± 0.00 $^{d}$ | 17.11 ± 0.01 $^{c}$ | 17.19 ± 0.02 $^{b}$ | 17.32 ± 0.05 $^{a}$ | 17.30 ± 0.03 $^{a}$ | *** |
| C18:1 *n*-7 | 0.73 ± 0.00 | 0.72 ± 0.00 | 0.73 ± 0.00 | 0.74 ±0.01 | 0.75 ± 0.00 | 0.74 ± 0.01 | 0.74 ± 0.01 | n.s. |
| C20:1 | 0.11 ± 0.00 $^{a}$ | 0.11 ± 0.00 $^{ab}$ | 0.11 ± 0.00 $^{ab}$ | 0.11 ± 0.00 $^{ab}$ | 0.11 ± 0.00 $^{ab}$ | 0.12 ± 0.00 $^{ab}$ | 0.12 ± 0.00 $^{b}$ | n.s. |
| C18:2 *n*-6 | 44.63 ± 0.02 $^{a}$ | 44.61 ± 0.04 $^{ab}$ | 44.59 ± 0.04 $^{ab}$ | 44.59 ± 0.04 $^{ab}$ | 44.57 ± 0.01 $^{ab}$ | 44.60 ± 0.04 $^{ab}$ | 44.54 ± 0.02 $^{b}$ | * |
| C18:3 *n*-3 | 26.68 ± 0.00 $^{a}$ | 26.64 ± 0.02 $^{a}$ | 26.56 ± 0.01 $^{b}$ | 26.45 ± 0.02 $^{c}$ | 26.29 ± 0.01 $^{d}$ | 26.08 ± 0.06 $^{e}$ | 26.12 ± 0.01 $^{e}$ | *** |
| C18:3$\gamma$ | 0.10 ± 0.00 | 0.11 ± 0.00 | 0.11 ± 0.00 | 0.10 ± 0.00 | 0.10 ± 0.00 | 0.10 ± 0.00 | 0.10 ± 0.00 | n.s. |
| ΣCLA | 0.01 ± 0.00 | 0.01 ± 0.00 | 0.01 ± 0.01 | 0.02 ± 0.00 | 0.01 ± 0.01 | 0.01 ± 0.00 | 0.04 ± 0.03 | n.s. |
| ΣCLnA | 0.04 ± 0.02 | 0.05 ± 0.03 | 0.05 ± 0.00 | 0.04 ± 0.00 | 0.07 ± 0.06 | 0.05 ± 0.02 | 0.05 ± 0.02 | n.s. |
| Others | 0.56 ± 0.00 | 0.55 ± 0.01 | 0.56 ± 0.01 | 0.56 ± 0.01 | 0.57 ± 0.00 | 0.57 ± 0.01 | 0.57 ± 0.00 | n.s. |

ΣCLA, sum of conjugated linoleic acid isomers; ΣCLnA, sum of conjugated linolenic acid isomers; n.s. = not significant; * = $p < 0.05$; ** = $p < 0.01$; *** = $p < 0.001$. Data were analyzed by one-way ANOVA. Different letter in the same row denotes significant differences between the days of storage ($p < 0.05$; Duncan's test)

**Table S7.** Peroxide value (meq $O_2$/kg oil) in bulk oil without antioxidants (CO), with hemp extract (HO) and with α-tocopherol (EO). Values are reported as mean ± standard deviation of three independent replicates (n=3).

| Day | CO | HO | EO | *Sig.* |
|---|---|---|---|---|
| 0 | 2.45 ± 0.02 $^{d}$ | 3.26 ± 0.18 $^{d}$ | 3.91 ± 0.66 $^{d}$ | n.s. |
| 0.25 | 3.14 ± 0.11 $^{dX}$ | 2.92 ± 0.06 $^{dX}$ | 7.63 ± 0.52 $^{cY}$ | *** |
| 1 | 6.71 ± 0.22 $^{dX}$ | 8.24 ± 1.77 $^{cdX}$ | 25.22 ± 0.94 $^{bY}$ | *** |
| 2 | 17.83 ± 0.95 $^{cX}$ | 13.65 ± 2.20 $^{bcX}$ | 45.46 ± 0.74 $^{aY}$ | *** |
| 3 | 30.95 ± 8.03 $^{b}$ | 17.57 ± 3.17 $^{ab}$ | n.a. | n.s. |
| 5 | 37.52 ± 2.62 $^{b}$ | 16.02 ± 2.97 $^{ab}$ | n.a. | * |
| 7 | 49.57 ± 0.22 $^{a}$ | 21.19 ± 1.44 $^{a}$ | n.a. | *** |
| *Sig.* | *** | *** | *** | |

Data were analyzed by one-way ANOVA. n.s. = not significant; * = $p < 0.05$; *** = $p < 0.001$.
Different lowercase letter in the same column denotes significant differences between the days of storage ($p < 0.05$; Duncan's test); different uppercase letter in the same row denotes significant differences between the bulk oils ($p < 0.05$; Duncan's test)

**Table S8.** Formation of hexanal (mmol/kg oil) in bulk oil without antioxidants (CO), with hemp extract (HO) and with α-tocopherol (EO). Values are reported as mean ± standard deviation of three independent replicates (n=3).

| Day | CO | HO | EO | *Sig.* |
|---|---|---|---|---|
| 0 | 8.71 ± 0.13 $^{cd}$ | 6.43 ± 2.71 | 3.57 ± 0.66 $^{d}$ | n.s. |
| 0.25 | 7.93 ± 0.34 $^{d}$ | 7.21 ± 0.81 | 4.48 ± 0.52 $^{d}$ | n.s. |
| 1 | 11.77 ± 0.02 $^{cdX}$ | 3.34 ± 0.52 $^{Y}$ | 5.34 ± 0.94 $^{dY}$ | ** |
| 2 | 15.20 ± 0.58 $^{cX}$ | 5.72 ± 1.52 $^{Y}$ | 5.29 ± 0.74 $^{dY}$ | ** |
| 3 | 41.88 ± 2.76 $^{bX}$ | 6.32 ± 0.46 $^{Y}$ | 8.45 ± 1.01 $^{cY}$ | *** |
| 5 | 42.17 ± 3.04 $^{bX}$ | 3.15 ± 0.11 $^{Z}$ | 13.28 ± 0.82 $^{bY}$ | *** |
| 7 | 69.02 ± 5.98 $^{aX}$ | 7.67 ± 0.95 $^{Z}$ | 26.53 ± 0.54 $^{aY}$ | *** |
| *Sig.* | *** | n.s. | *** | |

Data were analyzed by one-way ANOVA. n.s. = not significant; ** = $p < 0.01$; *** = $p < 0.001$.
Different lowercase letter in the same column denotes significant differences between the days of storage ($p < 0.05$; Duncan's test); different uppercase letter in the same row denotes significant differences between the bulk oils ($p < 0.05$; Duncan's test)

**Table S9.** Identified volatile compounds (as peak area amount) in thermoxidized stripped oil samples without hemp extract or α-tocopherol (CO) for 0, 0.25, 1, 2, 3, 5 and 7 days.

| Volatile compounds | Day 0 | Day 0.25 | Day 1 | Day 2 | Day 3 | Day 5 | Day 7 |
|---|---|---|---|---|---|---|---|
| Decane | 400869 ± 58740 | 410047 ± 3354 | 445648 ± 53702 | 566379 ± 116280 | 651843 ± 29739 | 79214 ± 6019 | 683713 ± 210444 |
| α-Pinene | nd | nd | nd | nd | nd | nd | nd |
| 2-Butenal | 32702 ± 9129 | 48816 ± 3844 | 150348 ± 139743 | 639210 ± 105457 | 766814 ± 150897 | 1042673 ± 273808 | 3229981 ± 1038232 |
| Hexanal | 333841 ± 83488 | 139904 ± 20848 | 589491 ± 32656 | 711505 ± 105123 | 1933731 ± 165095 | 866977 ± 212103 | 2901713 ± 652714 |
| Undecane | 227830 ± 68259 | 239583 ± 62069 | 285235 ± 19203 | 332507 ± 18168 | 378527 ± 50361 | 291806 ± 11704 | 373007 ± 76911 |
| β-Pinene | nd | nd | nd | nd | nd | nd | nd |
| p-Xylene | nd | nd | nd | nd | nd | nd | nd |
| 3-Carene | nd | nd | nd | nd | nd | nd | nd |
| β-Myrcene | nd | nd | nd | nd | nd | nd | nd |
| Limonene | nd | nd | nd | nd | nd | nd | nd |
| o-Cymene | nd | nd | nd | nd | nd | nd | nd |
| 2,4-Nonadiene | 5477 ± 1597 | 8219 ± 1315 | 13813 ± 1236 | 31434 ± 5230 | 61782 ± 26220 | 87594 ± 20660 | 314009 ± 137858 |
| *trans*-3-Caren-2-ol | nd | nd | nd | nd | nd | nd | nd |
| 4-Carene | nd | nd | nd | nd | nd | nd | nd |
| Hexadecane | 80097 ± 44910 | 148725 ± 6778 | 118930 ± 26777 | 25655 ± 5721 | 64871 ± 27255 | 58484 ± 39342 | 26502 ± 498 |
| 2,4-Diethyl-1-heptanol | 23770 ± 1319 | 33390 ± 3381 | 34804 ± 9131 | 28018 ± 5083 | 33383 ± 8270 | 33777 ± 7478 | 22929 ± 754 |
| 6-Methyl-5-heptene | nd | nd | nd | nd | nd | nd | nd |
| 1-Hexanol | 1041476 ± 113776 | 1060787 ± 40497 | 1189612 ± 48266 | 1351131 ± 133259 | 1529637 ± 117991 | 1347319 ± 250761 | 1312877 ± 428929 |
| 4-Hydroxy-4-methyl-2-pentanone | 148178 ± 131356 | 117772 ± 71046 | 295933 ± 217530 | 419647 ± 274190 | 92975 ± 43092 | 201889 ± 214631 | 125350 ± 54888 |
| Nonanal | 50390 ± 11162 | 296020 ± 104774 | 133199 ± 17417 | 172258 ± 59927 | 47727 ± 12034 | 72562 ± 14394 | 36079 ± 793 |
| Fenchone | nd | nd | nd | nd | nd | nd | nd |
| Butanoic acid, hexyl ester | nd | nd | nd | nd | nd | nd | nd |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Di-tert-butylbenzene | 235373 | ± | 49979 | 263899 | ± | 50326 | 301203 | ± | 10658 | 286335 | ± | 32803 | 258242 | ± | 51697 | 254983 | ± | 19740 | 234302 | ± | 4243 |
| *trans*-Linalool oxide | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| Acetic acid | 139423 | ± | 34288 | 145521 | ± | 27142 | 180310 | ± | 76342 | 430721 | ± | 16594 | 531045 | ± | 41269 | 566291 | ± | 117680 | 1646080 | ± | 53594 |
| 2,4-Heptadienal | 24206 | ± | 12357 | 43645 | ± | 1949 | 75157 | ± | 46513 | 233865 | ± | 62225 | 332770 | ± | 156845 | 370722 | ± | 103052 | 1160636 | ± | 619028 |
| Formic acid | 45757 | ± | 59357 | 33086 | ± | 35746 | 90401 | ± | 116803 | 1157315 | ± | 288803 | 1308826 | ± | 609514 | 1722387 | ± | 1369303 | 7695097 | ± | 2721224 |
| β-Linalool | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| *trans*-2-Pinanol | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| 2-Norbornanol | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| Camphene hydrate | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| Caryophyllene | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| β-Farnesene | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| Ipsedienol | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| α-Humulene | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| α-Terpineol | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |
| Borneol | 188347 | ± | 23041 | 234595 | ± | 40961 | 258567 | ± | 10269 | 257979 | ± | 30498 | 244629 | ± | 42190 | 223214 | ± | 24329 | 217915 | ± | 10459 |
| Guaiol | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | |

The results are expressed as mean ± standard deviation. Abbreviations: nd, not detected

**Table S10.** Identified volatile compounds (as peak area amount) in thermoxidized stripped oil samples containing hemp extract (HO) for 0, 0.25, 1, 2, 3, 5 and 7 days.

| **Volatile compounds** | **Day 0** | | | **Day 0.25** | | | **Day 1** | | | **Day 2** | | | **Day 3** | | | **Day 5** | | | **Day 7** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Decane | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | |
| α-Pinene | 471329 | ± | 48905 | 523860 | ± | 3941 | 584049 | ± | 16983 | 570395 | ± | 15957 | 567174 | ± | 55016 | 698279 | ± | 167422 | 656200 | ± | 239173 |
| 2-Butenal | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | |
| Hexanal | 139991 | ± | 8698 | 506292 | ± | 280274 | 175174 | ± | 20476 | 388634 | ± | 207229 | 353925 | ± | 246322 | 145191 | ± | 50883 | 279995 | ± | 130296 |
| Undecane | 169104 | ± | 89198 | 182212 | ± | 44335 | 258377 | ± | 29694 | 285737 | ± | 23026 | 306225 | ± | 66111 | 506952 | ± | 427063 | 281789 | ± | 969 |
| β-Pinene | 1428932 | ± | 606208 | 1465797 | ± | 513654 | 1554376 | ± | 442639 | 1837414 | ± | 1039875 | 1832421 | ± | 440010 | 1763933 | ± | 156693 | 1525635 | ± | 717534 |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| p-Xylene | 133178 | ± | 5154 | 131944 | ± | 19462 | 148306 | ± | 33596 | 165702 | ± | 26787 | 169493 | ± | 30506 | 158903 | ± | 65923 | 144139 | ± | 9499 |
| 3-Carene | 57695 | ± | 34 | 62602 | ± | 14066 | 76952 | ± | 10583 | 77637 | ± | 15481 | 77752 | ± | 13186 | 57622 | ± | 4748 | 67268 | ± | 5372 |
| β-Myrcene | 15520832 | ± | 5382425 | 15576341 | ± | 4380295 | 17171609 | ± | 3517797 | 18452524 | ± | 9024216 | 19789881 | ± | 3588207 | 17612008 | ± | 798436 | 17611918 | ± | 6629021 |
| Limonene | 5681981 | ± | 1084186 | 5753071 | ± | 854382 | 6187013 | ± | 375838 | 6776789 | ± | 2258475 | 7182218 | ± | 155093 | 6720827 | ± | 870052 | 6219773 | ± | 1441535 |
| o-Cymene | 153353 | ± | 17977 | 185349 | ± | 2526 | 156285 | ± | 16632 | 191015 | ± | 63817 | 198233 | ± | 9554 | 187009 | ± | 50582 | 167277 | ± | 23125 |
| 2,4-Nonadiene | 8198 | ± | 2010 | 6392 | ± | 975 | 8645 | ± | 950 | 13494 | ± | 754 | 17943 | ± | 2246 | 21130 | ± | 3065 | 25619 | ± | 2203 |
| *trans*-3-Caren-2-ol | 247884 | ± | 5611 | 227695 | ± | 14356 | 220754 | ± | 25451 | 233282 | ± | 63702 | 282942 | ± | 59334 | 248745 | ± | 99044 | 221231 | ± | 25554 |
| 4-Carene | 91504 | ± | 10063 | 98097 | ± | 5532 | 90637 | ± | 6437 | 90723 | ± | 14122 | 102505 | ± | 22770 | 86822 | ± | 22193 | 92698 | ± | 7570 |
| Hexadecane | 241786 | ± | 17872 | 375160 | ± | 192808 | 274925 | ± | 28201 | 281794 | ± | 11565 | 334329 | ± | 17900 | 329250 | ± | 91207 | 309451 | ± | 43860 |
| 2,4-Diethyl-1-heptanol | 36709 | ± | 8880 | 34200 | ± | 3678 | 43937 | ± | 7984 | 39426 | ± | 6424 | 46400 | ± | 16118 | 32976 | ± | 6251 | 55100 | ± | 4214 |
| 6-Methyl-5-heptene | 21206 | ± | 1860 | 21642 | ± | 392 | 21806 | ± | 6418 | 44428 | ± | 840 | 58053 | ± | 20613 | 34263 | ± | 3225 | 43214 | ± | 8331 |
| 1-Hexanol | 801031 | ± | 49965 | 774719 | ± | 102506 | 849659 | ± | 168532 | 961544 | ± | 234061 | 1114824 | ± | 329376 | 1245213 | ± | 868081 | 802940 | ± | 84064 |
| 4-Hydroxy-4-methyl-2-pentanone | 126656 | ± | 53124 | 126238 | ± | 17052 | 164099 | ± | 95558 | 53633 | ± | 28290 | 378312 | ± | 179686 | 197097 | ± | 7450 | 104532 | ± | 9643 |
| Nonanal | 65687 | ± | 42269 | 414744 | ± | 525384 | 35183 | ± | 3869 | 63914 | ± | 2179 | 39710 | ± | 13054 | 177767 | ± | 203221 | 30855 | ± | 744 |
| Fenchone | 751715 | ± | 18664 | 731240 | ± | 90796 | 789556 | ± | 90148 | 846515 | ± | 155996 | 908933 | ± | 145090 | 812938 | ± | 229275 | 704212 | ± | 73833 |
| Butanoic acid, hexyl ester | 152572 | ± | 34066 | 172982 | ± | 26397 | 177968 | ± | 13074 | 196988 | ± | 51598 | 219829 | ± | 9328 | 203456 | ± | 36659 | 185963 | ± | 44879 |
| 1,3-Di-tert-butylbenzene | 292090 | ± | 18718 | 302992 | ± | 62525 | 301849 | ± | 67309 | 297012 | ± | 19481 | 320757 | ± | 87430 | 265866 | ± | 41750 | 274376 | ± | 30187 |
| *trans*-Linalool oxide | 89805 | ± | 8788 | 99437 | ± | 2620 | 100929 | ± | 12455 | 109681 | ± | 24798 | 114305 | ± | 49 | 117036 | ± | 38817 | 102208 | ± | 15738 |
| Acetic acid | 679569 | ± | 41775 | 831220 | ± | 213070 | 857452 | ± | 193861 | 898543 | ± | 491795 | 1204286 | ± | 249297 | 1640522 | ± | 1189020 | 1028847 | ± | 61812 |
| 2,4-Heptadienal | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Formic acid | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| β-Linalool | 2272809 | ± | 115827 | 2385387 | ± | 79810 | 2535152 | ± | 292733 | 2664161 | ± | 228042 | 2912362 | ± | 345098 | 2515135 | ± | 263043 | 2653388 | ± | 148073 |
| *trans*-2-Pinanol | 643125 | ± | 24662 | 637583 | ± | 51055 | 708405 | ± | 102827 | 748355 | ± | 119411 | 769606 | ± | 47689 | 713536 | ± | 147677 | 710230 | ± | 47401 |
| 2-Norbornanol | 2381412 | ± | 212381 | 2552651 | ± | 202508 | 2658099 | ± | 343387 | 2769975 | ± | 321255 | 3039547 | ± | 520887 | 2645576 | ± | 586597 | 2501479 | ± | 107417 |
| Camphene hydrate | 347947 | ± | 27444 | 286781 | ± | 39616 | 273285 | ± | 48472 | 255451 | ± | 26441 | 238011 | ± | 19060 | 183596 | ± | 29586 | 229897 | ± | 10139 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Caryophyllene | 863454 | ± | 66712 | 989021 | ± | 132136 | 1030017 | ± | 204234 | 1022876 | ± | 151329 | 1061669 | ± | 263957 | 941628 | ± | 157637 | 971466 | ± | 165025 |
| β-Farnesene | 65174 | ± | 17027 | 70817 | ± | 24521 | 62679 | ± | 8409 | 74254 | ± | 10723 | 81277 | ± | 16865 | 87579 | ± | 34329 | 80005 | ± | 3895 |
| Ipsedienol | 449810 | ± | 7369 | 423767 | ± | 13462 | 474985 | ± | 5561 | 506156 | ± | 171309 | 544435 | ± | 56025 | 470298 | ± | 15468 | 514734 | ± | 117169 |
| α-Humulene | 744120 | ± | 54036 | 820816 | ± | 192776 | 797439 | ± | 177936 | 790640 | ± | 133519 | 809625 | ± | 215839 | 746302 | ± | 167594 | 744358 | ± | 143427 |
| α-Terpineol | 1412775 | ± | 53811 | 1496609 | ± | 224831 | 1469090 | ± | 190357 | 1477289 | ± | 17203 | 1616130 | ± | 217275 | 1425517 | ± | 187377 | 1445160 | ± | 5262 |
| Borneol | 1764518 | ± | 68204 | 1839221 | ± | 210396 | 1855251 | ± | 229227 | 1870298 | ± | 107265 | 2062076 | ± | 326572 | 1775105 | ± | 311795 | 1766932 | ± | 35816 |
| Guaiol | 152106 | ± | 15090 | 156072 | ± | 18977 | 164521 | ± | 13666 | 207080 | ± | 32816 | 135367 | ± | 1882 | 205335 | ± | 94544 | 204833 | ± | 5069 |

The results are expressed as mean ± standard deviation. Abbreviations: nd, not detecte

**Table S11.** Identified volatile compounds (as peak area amount) in thermoxidized stripped oil samples containing α-tocopherol (EO) for 0, 0.25, 1, 2, 3, 5 and 7 days.

| Volatile compounds | Day 0 | Day 0.25 | Day 1 | Day 2 | Day 3 | Day 5 | Day 7 |
|---|---|---|---|---|---|---|---|
| Decane | 402578 ± 40084 | 443885 ± 42846 | 512933 ± 11533 | 518501 ± 18516 | 534807 ± 28762 | 600588 ± 85331 | 626827 ± 154075 |
| α-Pinene | nd | nd | nd | nd | nd | nd | nd |
| 2-Butenal | 10720 ± 2681 | 32759 ± 12002 | 78150 ± 31899 | 129250 ± 17043 | 379469 ± 36939 | 305620 ± 179099 | 591705 ± 131818 |
| Hexanal | 139801 ± 21039 | 164878 ± 4045 | 273278 ± 75072 | 246443 ± 12617 | 408634 ± 36869 | 667174 ± 81039 | 1246142 ± 46511 |
| Undecane | 227982 ± 42827 | 231629 ± 7529 | 253688 ± 2798 | 259594 ± 21792 | 282664 ± 39785 | 305831 ± 48710 | 309996 ± 33869 |
| β-Pinene | nd | nd | nd | nd | nd | nd | nd |
| p-Xylene | nd | nd | nd | nd | nd | nd | nd |
| 3-Carene | nd | nd | nd | nd | nd | nd | nd |
| β-Myrcene | nd | nd | nd | nd | nd | nd | nd |
| Limonene | nd | nd | nd | nd | nd | nd | nd |
| o-Cymene | nd | nd | nd | nd | nd | nd | nd |
| 2,4-Nonadiene | 5898 ± 1137 | 7303 ± 744 | 13446 ± 358 | 35080 ± 169 | 100643 ± 8602 | 141727 ± 10399 | 305540 ± 27910 |
| *trans*-3-Caren-2-ol | nd | nd | nd | nd | nd | nd | nd |
| 4-Carene | nd | nd | nd | nd | nd | nd | nd |
| Hexadecane | 66143 ± 22176 | 86700 ± 16005 | 89956 ± 5657 | 76014 ± 12798 | 61611 ± 16016 | 82108 ± 2796 | 82970 ± 208 |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-Diethyl-1-heptanol | 36815 | ± | 9727 | 24617 | ± | 1515 | 29191 | ± | 1049 | 28358 | ± | 4887 | 39752 | ± | 23815 | 34978 | ± | 18311 | 33930 | ± | 3231 |
| 6-Methyl-5-heptene | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| 1-Hexanol | 992735 | ± | 37667 | 1055633 | ± | 40351 | 1171417 | ± | 3143 | 1143731 | ± | 46296 | 1145352 | ± | 118717 | 1337341 | ± | 275874 | 1252044 | ± | 300679 |
| 4-Hydroxy-4-methyl-2-pentanone | 23491 | ± | 1549 | 40156 | ± | 38568 | 27834 | ± | 12948 | 34713 | ± | 7070 | 58370 | ± | 17127 | 40628 | ± | 3262 | 75133 | ± | 3777 |
| Nonanal | 37877 | ± | 357 | 61373 | ± | 11997 | 32883 | ± | 6937 | 16312 | ± | 1667 | 96968 | ± | 1832 | 70329 | ± | 3256 | 34324 | ± | 4183 |
| Fenchone | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Butanoic acid, hexyl ester | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| 1,3-Di-tert-butylbenzene | 246349 | ± | 55858 | 272760 | ± | 1207 | 284039 | ± | 44872 | 298524 | ± | 11536 | 293095 | ± | 62937 | 292352 | ± | 87704 | 315850 | ± | 53575 |
| *trans*-Linalool oxide | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Acetic acid | 75652 | ± | 17287 | 125131 | ± | 6377 | 207757 | ± | 8362 | 401334 | ± | 25150 | 638124 | ± | 89232 | 830888 | ± | 52864 | 1287401 | ± | 272894 |
| 2,4-Heptadienal | 34524 | ± | 7649 | 93110 | ± | 3729 | 264413 | ± | 69766 | 361121 | ± | 7595 | 885534 | ± | 41062 | 1082233 | ± | 1061 | 1728166 | ± | 128432 |
| Formic acid | 1785 | ± | 2048 | 8168 | ± | 943 | 88657 | ± | 37085 | 505838 | ± | 333310 | 1362264 | ± | 94298 | 1794231 | ± | 814796 | 5338211 | ± | 2173005 |
| β-Linalool | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| *trans*-2-Pinanol | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| 2-Norbornanol | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Camphene hydrate | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Caryophyllene | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| β-Farnesene | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Ipsedienol | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| α-Humulene | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| α-Terpineol | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |
| Borneol | 99233 | ± | 50311 | 124663 | ± | 43712 | 166020 | ± | 30724 | 213325 | ± | 34802 | 201079 | ± | 1014 | 241907 | ± | 43897 | 252637 | ± | 13748 |
| Guaiol | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | | | nd | |

The results are expressed as mean ± standard deviation. Abbreviations: nd, not detected.

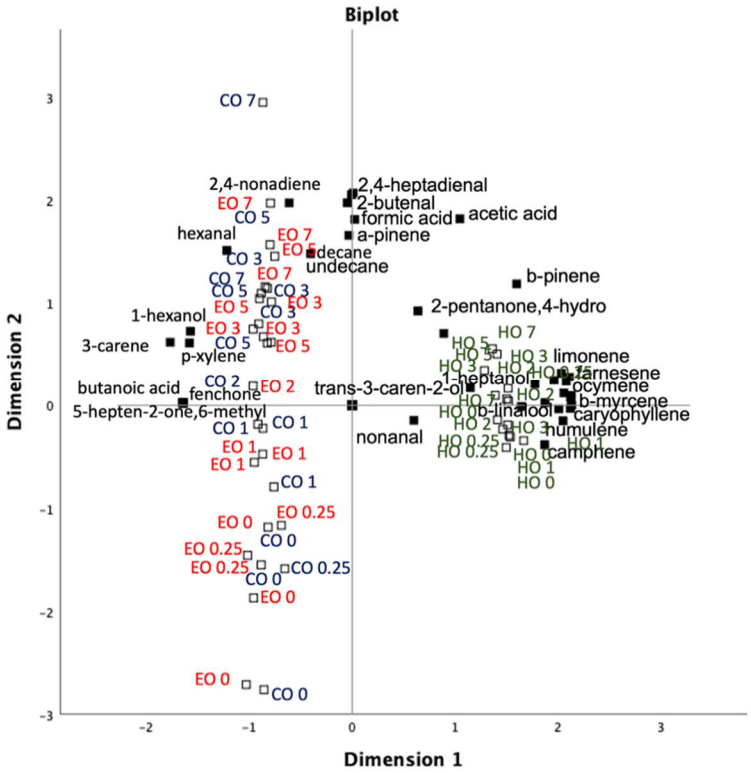


**Figure S1.** Bi-plot of all volatile compounds (black squares) and treatment time (empty squares) in thermo-oxidized bulk oils.