

Supplementary Material

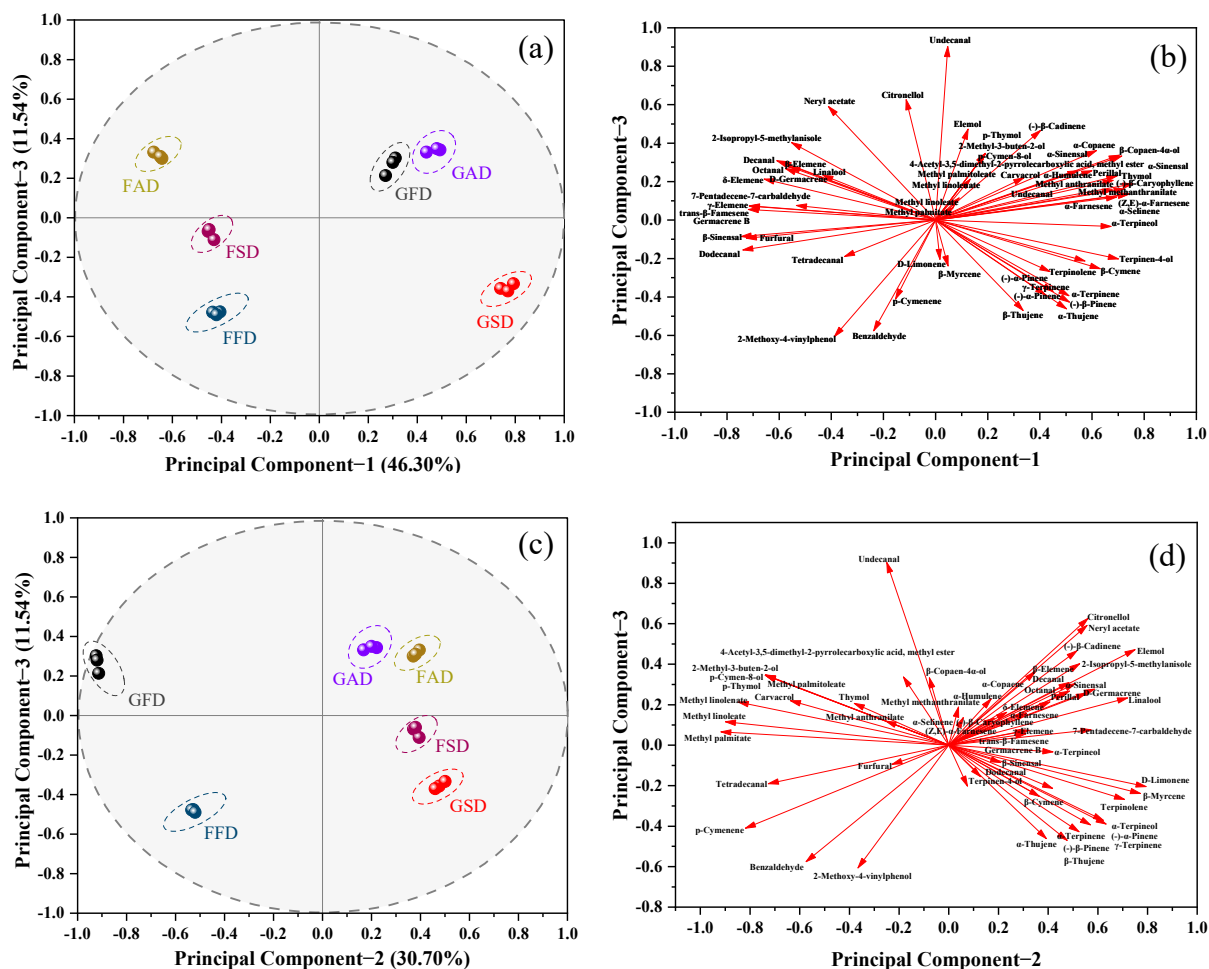


Figure S1. Plots of principal component scores (a, principal component-1 vs. principal component-3; c, principal component-2 vs. principal component-3) and loadings (b, principal component-1 vs. principal component-3; d, principal component-2 vs. principal component-3) in PCA analysis for GC-MS data of dried Chachi and Ponkan peels prepared from three drying methods.

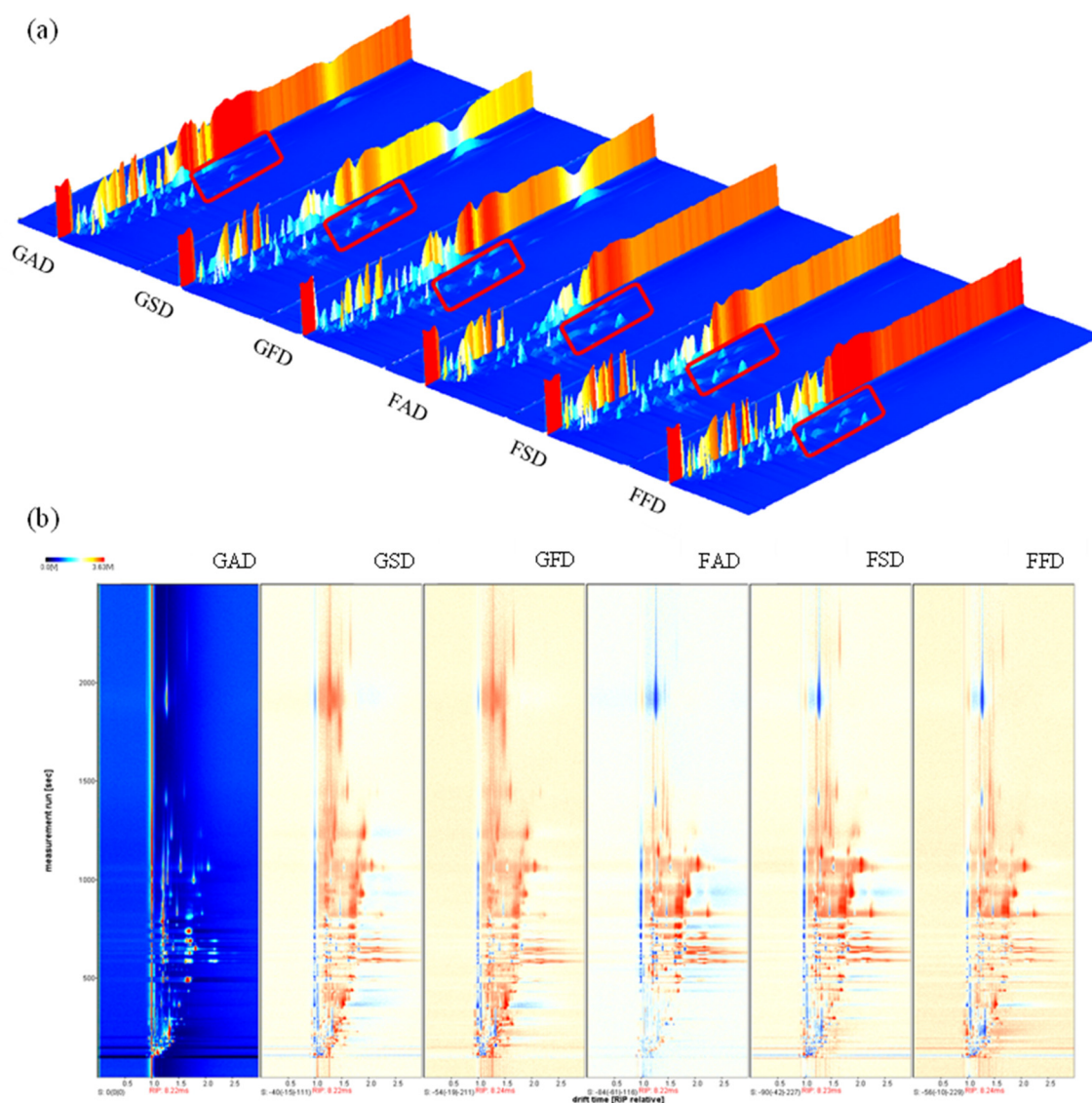


Figure S2. 3D-topographic view (a) and vertical view (b) of volatile compounds in dried Chachi and Ponkan peels prepared from three drying methods. ((a), X-, Y-, and Z-axes represent the ion migration time, retention time of GC, and ion peak strength, respectively). (b), GAD was used as a reference. The colors indicate the signal strengths of the individual compounds. Red means high intensity, and blue means low intensity.) of volatile compounds in dried Chachi and Ponkan peels prepared from three drying methods.)

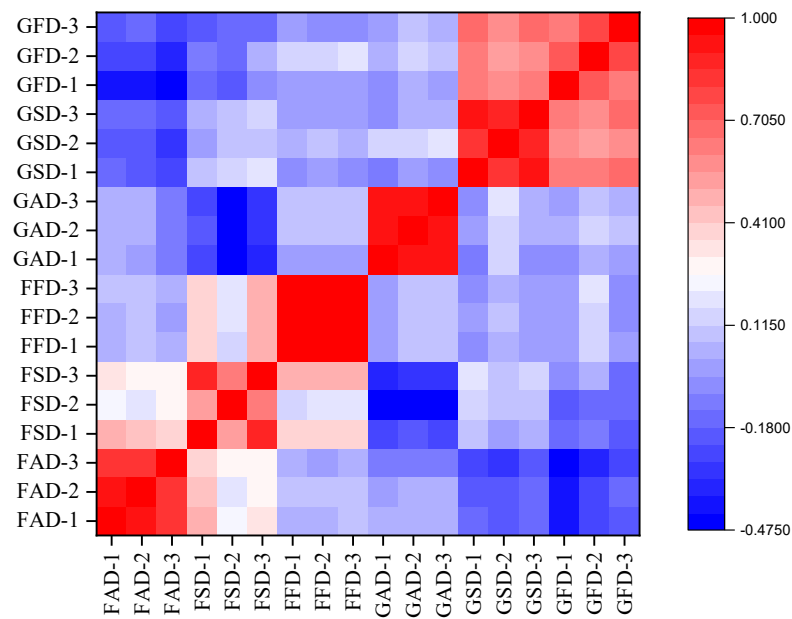


Figure S3. Correlation between dried citrus peel samples of different groups (FAD, FSD, FFD, GAD, GSD, GFD) as characterized by GC-IMS analysis.

Table S1. The relative percentage content of each compound in GC–MS total ion chromatogram of different dried citrus peel samples through peak area normalization.

| Compound | CAS | Formula | FAD | FSD | FDD | GAD | GSD | GFD |
|--|-------------|---|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Alcohols | | | | | | | | |
| 2-Methyl-3-buten-2-ol | 115-18-4 | C ₅ H ₁₀ O | nd | nd | nd | nd | nd | 0.30±0.01 |
| Linalool | 78-70-6 | C ₁₀ H ₁₈ O | 3.84±0.04 ^a | 2.95±0.05 ^b | 1.53±0.03 ^c | 0.93±0.00 ^d | 0.61±0.00 ^e | 0.27±0.00 ^f |
| Terpinen-4-ol | 562-74-3 | C ₁₀ H ₁₈ O | 0.43±0.00 ^d | 0.38±0.00 ^d | 1.17±0.07 ^a | 0.45±0.01 ^d | 0.67±0.04 ^c | 0.93±0.01 ^b |
| p-Cymen-8-ol | 1197-01-9 | C ₁₀ H ₁₄ O | nd | nd | nd | nd | nd | 0.29±0.00 |
| α-Terpineol | 98-55-5 | C ₁₀ H ₁₈ O | 2.54±0.04 ^b | 1.96±0.04 ^c | 4.44±0.18 ^a | 1.95±0.01 ^c | 1.96±0.03 ^c | 2.66±0.03 ^b |
| Citronellol | 106-22-9 | C ₁₀ H ₂₀ O | 0.59±0.02 ^a | 0.26±0.02 ^b | nd | 0.17±0.03 ^c | 0.13±0.00 ^c | 0.25±0.04 ^b |
| Elemol | 639-99-6 | C ₁₅ H ₂₆ O | 0.53±0.01 ^a | 0.21±0.02 ^c | nd | 0.37±0.02 ^b | 0.15±0.00 ^d | nd |
| β-Copaen-4α-ol | 124753-76-0 | C ₁₅ H ₂₄ O | nd | nd | nd | 0.54±0.00 ^b | 0.28±0.03 ^c | 0.63±0.01 ^a |
| | | Sum | 7.93±0.11^a | 5.77±0.06^c | 7.14±0.29^b | 4.52±0.01^e | 3.89±0.10^f | 5.33±0.06^d |
| Aromatic hydrocarbons and ethers | | | | | | | | |
| β-Cymene | 535-77-3 | C ₁₀ H ₁₄ | 0.31±0.00 ^c | 0.28±0.00 ^c | 0.55±0.10 ^b | 0.41±0.01 ^c | 0.88±0.01 ^a | 0.56±0.08 ^b |
| p-Cymenene | 1195-32-0 | C ₁₀ H ₁₂ | nd | nd | 2.19±0.21 ^a | nd | nd | 0.51±0.02 ^b |
| 2-Isopropyl-5-methylanisole | 1076-56-8 | C ₁₁ H ₁₆ O | 0.93±0.03 ^a | 0.52±0.01 ^b | nd | 0.18±0.01 ^c | nd | nd |
| | | Sum | 1.24±0.03^b | 0.81±0.00^{cd} | 2.75±0.31^a | 0.59±0.01^d | 0.88±0.01^{cd} | 1.07±0.09^{bc} |
| Phenols | | | | | | | | |
| p-Thymol | 3228-02-2 | C ₁₀ H ₁₄ O | nd | nd | nd | nd | nd | 0.44±0.01 |
| Thymol | 89-83-8 | C ₁₀ H ₁₄ O | 0.63±0.01 ^{cd} | 0.47±0.05 ^d | 1.83±0.17 ^a | 0.84±0.00 ^b | 0.68±0.01 ^{bc} | 1.86±0.02 ^a |
| Carvacrol | 499-75-2 | C ₁₀ H ₁₄ O | nd | nd | nd | nd | 0.14±0.02 ^b | 1.10±0.00 ^a |
| 2-Methoxy-4-vinylphenol | 7786-61-0 | C ₉ H ₁₀ O ₂ | 0.84±0.02 ^b | 0.46±0.02 ^c | 8.20±0.34 ^a | 0.15±0.00 ^c | 0.13±0.03 ^c | 0.30±0.02 ^c |
| | | Sum | 1.47±0.01^c | 0.92±0.07^d | 10.03±0.51^a | 1.00±0.00^{cd} | 0.95±0.01^{cd} | 3.70±0.00^b |
| N-containing compounds | | | | | | | | |
| Methyl anthranilate | 134-20-3 | C ₈ H ₉ NO ₂ | nd | nd | nd | 0.15±0.01 ^c | 0.20±0.00 ^b | 0.48±0.03 ^a |
| Methyl methanthranilate | 85-91-6 | C ₉ H ₁₁ NO ₂ | 5.47±0.63 ^e | 1.92±0.13 ^f | 10.87±0.78 ^d | 42.31±0.37 ^b | 30.71±0.39 ^c | 47.52±0.09 ^a |
| 4-Acetyl-3,5-dimethyl-2-pyrrole carboxylic acid, methyl ester | 89909-47-7 | C ₁₀ H ₁₃ NO ₃ | nd | nd | nd | 0.16±0.04 ^b | 0.09±0.00 ^c | 0.24±0.01 ^a |
| | | Sum | 5.47±0.63^e | 1.92±0.13^f | 10.87±0.78^d | 42.61±0.32^b | 31.00±0.39^c | 48.23±0.07^a |
| Aldehydes | | | | | | | | |
| Furfural | 98-01-1 | C ₅ H ₄ O ₂ | 1.57±0.22 ^b | 0.91±0.00 ^c | 4.01±0.17 ^a | 0.35±0.03 ^d | 0.12±0.00 ^d | 0.80±0.05 ^c |
| Benzaldehyde | 100-52-7 | C ₇ H ₆ O | nd | nd | 1.29±0.01 ^a | nd | nd | 0.18±0.05 ^b |
| Octanal | 124-13-0 | C ₈ H ₁₆ O | 0.28±0.00 ^a | 0.19±0.00 ^b | nd | nd | nd | nd |

| | | | | | | | | |
|------------------------------|------------|-----------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|
| Decanal | 112-31-2 | C ₁₀ H ₂₀ O | 1.77±0.00 ^b | 1.12±0.02 ^c | 1.92±0.07 ^a | 0.48±0.01 ^e | 0.28±0.00 ^f | 0.62±0.06 ^d |
| Perillal | 2111-75-3 | C ₁₀ H ₁₄ O | 0.68±0.01 ^b | 0.53±0.01 ^d | nd | 0.76±0.01 ^a | 0.62±0.01 ^c | 0.60±0.00 ^c |
| Undecanal | 112-44-7 | C ₁₁ H ₂₂ O | 0.24±0.01 | nd | nd | 0.13±0.00 ^b | nd | 0.23±0.01 ^a |
| Dodecanal | 112-54-9 | C ₁₂ H ₂₄ O | 1.81±0.01 ^b | 0.83±0.04 ^c | 3.46±0.14 ^a | nd | nd | nd |
| Tetradecanal | 124-25-4 | C ₁₄ H ₂₈ O | 0.26±0.03 ^b | nd | 1.21±0.10 ^a | nd | nd | 0.31±0.00 ^b |
| β-Sinensal | 60066-88-8 | C ₁₅ H ₂₂ O | 3.08±0.20 ^b | 1.60±0.00 ^c | 4.87±0.19 ^a | nd | nd | nd |
| α-Sinensal | 17909-77-2 | C ₁₅ H ₂₂ O | 4.01±0.32 ^b | 2.37±0.01 ^c | 3.56±0.36 ^b | 7.62±0.33 ^a | 3.90±0.25 ^b | 2.40±0.17 ^c |
| 7-Pentadecene-7-carbaldehyde | — — | C ₁₆ H ₃₀ O | 1.45±0.09 ^a | 1.29±0.02 ^b | 0.59±0.03 ^c | 0.14±0.04 ^d | 0.15±0.01 ^d | nd |
| | | Sum | 15.16±0.84^b | 8.83±0.05^c | 20.91±0.44^a | 9.48±0.32^c | 5.07±0.27^d | 5.14±0.02^d |
| Monoterpenes | | | | | | | | |
| α-Thujene | 2867-05-2 | C ₁₀ H ₁₆ | nd | nd | nd | nd | 0.27±0.00 | nd |
| (-)-α-Pinene | 7785-26-4 | C ₁₀ H ₁₆ | 0.29±0.00 ^c | 0.62±0.01 ^b | nd | 0.23±0.00 ^d | 0.86±0.03 ^a | nd |
| β-Thujene | 28634-89-1 | C ₁₀ H ₁₆ | nd | 0.16±0.01 ^a | nd | nd | 0.10±0.00 ^b | nd |
| (-)-β-Pinene | 18172-67-3 | C ₁₀ H ₁₆ | nd | 0.30±0.01 ^b | nd | 0.17±0.01 ^c | 0.65±0.02 ^a | nd |
| β-Myrcene | 123-35-3 | C ₁₀ H ₁₆ | 0.91±0.00 ^b | 1.62±0.02 ^a | nd | 0.27±0.01 ^d | 0.79±0.02 ^c | nd |
| α-Terpinene | 99-86-5 | C ₁₀ H ₁₆ | nd | 0.27±0.01 ^b | nd | 0.17±0.00 ^c | 0.43±0.00 ^a | nd |
| D-limonene | 5989-27-5 | C ₁₀ H ₁₆ | 39.87±0.32 ^b | 60.73±0.01 ^a | 6.89±0.83 ^e | 12.17±0.28 ^d | 28.76±0.58 ^c | 2.02±0.67 ^f |
| γ-Terpinene | 99-85-4 | C ₁₀ H ₁₆ | 3.97±0.02 ^c | 6.45±0.00 ^b | 1.09±0.10 ^e | 3.25±0.09 ^d | 10.09±0.14 ^a | 0.55±0.14 ^f |
| Terpinolene | 586-62-9 | C ₁₀ H ₁₆ | 0.53±0.00 ^c | 0.57±0.01 ^b | nd | 0.41±0.00 ^d | 0.85±0.02 ^a | nd |
| | | Sum | 45.57±0.35^b | 70.72±0.02^a | 7.98±0.93^e | 16.66±0.40^d | 42.80±0.77^c | 2.56±0.81^f |
| Sesquiterpenes | | | | | | | | |
| δ-Elemene | 20307-84-0 | C ₁₅ H ₂₄ | 3.66±0.01 ^a | 1.76±0.03 ^b | 1.89±0.18 ^b | 0.11±0.02 ^c | nd | nd |
| α-Copaene | 3856-25-5 | C ₁₅ H ₂₄ | 0.50±0.00 ^b | 0.21±0.00 ^d | 0.51±0.04 ^b | 0.78±0.02 ^a | 0.43±0.01 ^c | 0.50±0.00 ^b |
| β-Elemene | 515-13-9 | C ₁₅ H ₂₄ | 2.12±0.02 ^a | 1.03±0.03 ^c | 1.52±0.03 ^b | 0.37±0.00 ^d | 0.18±0.00 ^f | 0.27±0.00 ^e |
| (-)-β-Caryophyllene | 87-44-5 | C ₁₅ H ₂₄ | 0.50±0.07 ^c | 0.20±0.02 ^d | 0.52±0.03 ^c | 2.81±0.04 ^a | 1.95±0.08 ^b | 1.92±0.02 ^b |
| γ-Elemene | 29873-99-2 | C ₁₅ H ₂₄ | 1.77±0.00 ^a | 0.89±0.01 ^b | 1.71±0.15 ^a | nd | nd | nd |
| trans-β-Farnesene | 18794-84-8 | C ₁₅ H ₂₄ | 2.34±0.01 ^a | 1.09±0.03 ^b | 2.33±0.11 ^a | nd | nd | nd |
| α-Humulene | 6753-98-6 | C ₁₅ H ₂₄ | nd | nd | nd | 0.49±0.02 ^a | 0.26±0.01 ^b | 0.28±0.01 ^b |
| D-Germacrene | 23986-74-5 | C ₁₅ H ₂₄ | 3.24±0.04 ^a | 1.50±0.01 ^c | 2.08±0.18 ^b | 0.62±0.02 ^d | 0.25±0.01 ^e | nd |
| (Z,E)-α-Farnesene | 26560-14-5 | C ₁₅ H ₂₄ | nd | nd | nd | 0.46±0.00 ^a | 0.32±0.01 ^b | 0.33±0.00 ^b |
| α-Selinene | 473-13-2 | C ₁₅ H ₂₄ | nd | nd | 0.88±0.05 ^d | 1.75±0.04 ^a | 1.13±0.03 ^c | 1.51±0.02 ^b |
| α-Farnesene | 502-61-4 | C ₁₅ H ₂₄ | 3.23±0.05 ^d | 1.50±0.02 ^e | 3.17±0.23 ^d | 16.10±0.26 ^a | 10.02±0.37 ^b | 7.19±0.18 ^c |
| (-)-β-Cadinene | 523-47-7 | C ₁₅ H ₂₄ | 2.01±0.04 ^b | 1.00±0.00 ^e | 2.72±0.05 ^a | 1.49±0.01 ^c | 0.86±0.03 ^f | 1.27±0.02 ^d |
| Germacrene B | 15423-57-1 | C ₁₅ H ₂₄ | 3.33±0.03 ^a | 1.66±0.00 ^b | 3.44±0.62 ^a | nd | nd | nd |

| | | | Sum | 22.71±0.01^b | 10.84±0.12^f | 20.77±1.58^c | 25.00±0.40^a | 15.41±0.56^d | 13.28±0.25^e |
|---------------------|-----------|--|------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Esters | | | | | | | | | |
| Neryl acetate | 141-12-8 | C ₁₂ H ₂₀ O ₂ | 0.46±0.01 ^a | 0.20±0.01 ^b | nd | 0.14±0.00 ^c | nd | nd | nd |
| Methyl palmitoleate | 1120-25-8 | C ₁₇ H ₃₂ O ₂ | nd | nd | nd | nd | nd | nd | 0.46±0.02 |
| Methyl palmitate | 112-39-0 | C ₁₇ H ₃₄ O ₂ | nd | nd | 12.15±0.16 ^a | nd | nd | nd | 10.72±0.31 ^b |
| Methyl linoleate | 112-63-0 | C ₁₉ H ₃₄ O ₂ | nd | nd | 5.21±0.43 ^a | nd | nd | nd | 5.59±0.03 ^a |
| Methyl linolenate | 301-00-8 | C ₁₉ H ₃₂ O ₂ | nd | nd | 2.19±0.22 ^b | nd | nd | nd | 3.92±0.15 ^a |
| Sum | | | 0.46±0.01^c | 0.20±0.01^c | 19.55±0.80^b | 0.14±0.00^c | nd | nd | 20.69±0.52^a |
| Total | | | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |

The term “nd” means the compound was not detected in sample. Different lower-case letters in the same row indicated the significant differences ($P < 0.05$).