**Supplementary Informations**

**Table S1**: Bioactive compounds of eluted from 6 types of herbs by solvent extraction

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Herbal material | No | Retention time (minute) | Bioactive compound | Abundance of extracted compounded (%) | | |
| **95% ethanol** | **Hexane** | **Water** |
| Kaffir lime | 1 | 6.11 | -Pinene | 2.62 | - | - |
| 2 | 6.44 | Cis-sabinene | 2.02 | - | - |
| 3 | 8.635 | D-Limonene | 4.06 | - | - |
| 4 | 18.36 | Citronellal | 4.9 | - | - |
| 5 | 18.716 | α-Copaene | 2.38 | - | - |
| 6 | 19.745 | Linalool | 2.02 | - | - |
| 7 | 20.542 | Caryophyllene | 3.13 | - | - |
| 8 | 20.626 | Terpinen-4-ol | 1.43 | - | - |
| 9 | 21.684 | Humulene | 1.7 | - | - |
| 10 | 22.064 | Terpineol | 6.92 | - | - |
| Lemongrass | 1 | 11.261 | D-Limonene | - | 4.52 | - |
| 2 | 23.032 | Isoledene | 0.84 | - | - |
| 3 | 24.285 | Geraniol | 0.68 | - | - |
| 4 | 26.718 | Caryophyllene oxide | 1.83 | - | - |
| 5 | 27.822 | Epicubenol | 0.8 | - | - |
| 6 | 27.922 | Junenol | 4.67 | - | - |
| 7 | 29.275 | (-)-Globulol | 1.24 | - | - |
| 8 | 29.868 | α -Cadinol | 7.04 | - | - |
| Plai | 1 | 6.573 | γ -Terpinene | 1 |  |  |
| 2 | 11.267 | D-Limonene | - | 3.08 | - |
| 3 | 15.554 | α-Terpinyl acetate | 0.35 | - | - |
| 4 | 15.885 | Sesquithujene | 0.39 | - | - |
| 5 | 15.984 | β-Bisabolene | 0.21 | - | - |
| 6 | 20.383 | Tetradecane | - | 15.35 | - |
| 7 | 23.556 | Decanal | - | 1.21 | - |
| 8 | 23.715 | Pentadecane | - | 19.72 | - |
| 9 | 27.643 | Octanoic acid | - | - | 0.11 |
| 10 | 29.871 | 2-Methoxy-4-vinylphenol | 2.28 | - | 0.92 |
| Soap pod | 1 | 11.941 | Furfural | 1.81 | - | - |
| 2 | 26.372 | Coumaran | 3.08 | - | - |
| 3 | 28.113 | 5-Hydroxymethylfurfural | 5.57 | - | 13.29 |
| Tamarind | 1 | 4.448 | α-Pinene | - | 3.54 | - |
| 2 | 7.654 | β -Pinene | 7.23 | 35.41 | - |
| 3 | 8.163 | Sabinene | 5.61 | 23.63 | - |
| 4 | 9.881 | -Myrcene | - | 0.83 | - |
| 5 | 11.181 | D-Limonene | 6.19 | 19.15 | - |
| 6 | 22.977 | Citronellal | - | 2 | - |
| 7 | 29.854 | 2-Methoxy-4-vinylphenol | - | - | 1.48 |
| Turmeric | 1 | 6.117 | β -Pinene | - | 0.84 | - |
| 2 | 8.654 | D-Limonene | - | 1.48 | - |
| 3 | 20.563 | Caryophyllene | - | 1.32 | - |
| 4 | 20.619 | Heneicosane | - | 0.32 | - |
| 5 | 22.422 | Sesquithujene | 16.31 | 26.23 | - |
| 6 | 22.522 | β-Bisabolene | - | 5.17 | - |
| 7 | 22.997 | Citronellal | - | 0.73 | - |
| 8 | 25.5 | Terpinen-4-ol | 8.55 | - | - |

**Table S2**: Bioactive compounds eluted from 6 types of herbs by Soxhlet extraction

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Herbal material | No | Retention time (minute) | Bioactive compound | Abundance of extracted compounded (%) | | |
| **95% ethanol** | **Hexane** | **Water** |
| Kaffir lime | 1 | 11.28 | D-Limonene | - | 4.26 | - |
| 2 | 23.565 | Decanal | - | 1.47 | - |
| 3 | 23.725 | Heptadecane | - | 13.33 | - |
| 4 | 25.506 | Terpinen-4-ol | 1.57 | - | - |
| 5 | 26.987 | α-Terpineol | 5.97 | - | - |
| 6 | 27.07 | Borneol | 1.4 | - | - |
| 7 | 27.977 | Citronellol | 13.01 | - | - |
| 8 | 28.496 | Heneicosane | - | 11 | - |
| 9 | 29.21 | Geraniol | 1.81 | - | - |
| Lemongrass | 1 | 11.279 | D-Limonene | - | 3.97 | - |
| 2 | 20.3999 | Tetradecane | - | 22.41 | - |
| 3 | 23.564 | Decanal | - | 1.71 | - |
| 4 | 23.723 | Heptadecane | - | 11.53 | - |
| 5 | 24.285 | Geraniol | 0.68 | - | - |
| 6 | 26.718 | Caryophyllene oxide | 1.83 | - | - |
| 7 | 27.006 | Heneicosane | - | 9.05 | - |
| 8 | 27.922 | Junenol | 4.67 | - | - |
| 9 | 29.275 | (-)-Globulol | 1.24 | - | - |
| 10 | 29.38 | Guaiacol | - | - | 0.24 |
| Plai | 1 | 11.253 | D-Limonene | - | 3.83 | - |
| 2 | 23.714 | Tetradecane | - | 8.56 | - |
| 3 | 25.485 | Heneicosane | - | 15.35 | - |
| 4 | 25.507 | Terpinen-4-ol | 56.93 | - | - |
| 5 | 26.968 | α-terpinyl acetate | 2.95 | - | - |
| 6 | 28.087 | Sesquisabinene | 10.73 | - | - |
| 7 | 29.494 | Guaiacol | 4.25 | - | 1.32 |
| Soap pod | 1 | 6.104 | β-Pinene | 2.18 | - | - |
| 2 | 6.436 | cis-sabinene | 1.72 | - | - |
| 3 | 11.65 | Dodecane | - | 4.01 | - |
| 4 | 20.409 | Tetradecane | - | 28.85 | - |
| 5 | 23.567 | Decanal | - | 1.46 | - |
| 6 | 23.727 | Heptadecane | - | 13.41 | - |
| 7 | 25.47 | Neophytadiene | 1.37 | - | - |
| 8 | 27.008 | Heneicosane | - | 16.43 | - |
| 9 | 27.976 | γ-Muurolene | - | 1.8 | - |
| 10 | 29.854 | Guaiacol | 2.48 | - | - |
| Tamarind | 1 | 11.268 | D-Limonene | - | 3.18 | - |
| 2 | 13.941 | M-Cymene | - | - | 1.02 |
| 3 | 20.388 | Tetradecane | - | 23.58 | - |
| 4 | 23.559 | Decanal | - | 1.69 | - |
| 5 | 23.717 | Heptadecane | - | 13.2 | - |
| 6 | 25.45 | Terpinen-4-ol | 21.68 | - | - |
| 7 | 26.307 | Furfuryl alcohol | - | - | 4.62 |
| 8 | 27.00 | Heneicosane | - | 10.69 | - |
| 9 | 27.743 | 2(5H)-Furanone | - | - | 2.16 |
| 10 | 28.08 | β-Sesquiphellanderene | - | 3.13 | - |
| Turmeric | 1 | 9.794 | α-Phellandrene | 0.16 | - | - |
| 2 | 11.24 | Limonene | - | 3.79 | - |
| 3 | 11.68 | Eucalyptol | 1.92 | - | - |
| 4 | 14.792 | Terpinolene | 1.14 | - | - |
| 5 | 24.905 | σ-Elemene | 0.2 | - | - |
| 6 | 25.325 | Caryophyllene | 6.81 | - | - |
| 7 | 25.48 | Heptadecane | - | 6.64 | - |
| 8 | 27.367 | β-Bisabolene | 5.89 | - | - |
| 9 | 27.567 | β-Curcumene | 2.08 | - | - |
| 10 | 27.834 | γ-Bisabolene | 3.29 | - | - |

**Table S3**: Bioactive compounds eluted by different steaming processes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Herbal material | No | Bioactive compound | Abundance of extracted compound (%) | | |
| **Steaming with water** | **Steaming with 5% ethanol** | **Steaming with 5% coconut oil** |
| Kaffir lime | 1 | β-Pinene | 1.72 | - | - |
| 2 | β -Myrcene | - | - | 2.44 |
| 3 | (+)-4-Carene | - | - | 19.5 |
| 4 | D-Limonene | 1.81 | 1.96 | 2.37 |
| 5 | Citronellal | 4.05 | - | - |
| 6 | α-Copaene | 1.96 | - | - |
| 7 | Linalool | 2.91 | - | - |
| 8 | Caryophyllene | - | 3.06 | - |
| 9 | Humulene | - | 1.92 | - |
| 10 | γ-Terpinene | - | - | 13 |
| Lemongrass | 1 | β-Pinene | 0.97 | - | 5.18 |
| 2 | cis-sabinene | 0.59 | - | 5.12 |
| 3 | D-Limonene | 1.26 | - | 6.77 |
| 4 | Copaene | - | 0.53 | - |
| 5 | trans- α -Bergamotene | 1.42 | 1.46 | - |
| 6 | Caryophyllene | 1.53 | 1.8 | - |
| 7 | Germacrene D | 1.19 | 1.15 | - |
| 8 | Heneicosane | 1.91 | - | 8.07 |
| 9 | Terpinen-4-ol | - | - | 1.61 |
| 10 | α -Terpineol | - | 0.57 | - |
| Plai | 1 | β-Pinene | - | - | 2.41 |
| 2 | cis-sabinene | 1.13 | - | 2.93 |
| 3 | Citronellal | 3.04 | - | - |
| 4 | Caryophyllene | 0.43 | - | - |
| 5 | γ-Terpinene | - | - | 1.98 |
| 6 | Terpinen-4-ol | 37.16 | - | 2.1 |
| 7 | α -Terpinyl acetate | 6 | 3.48 | - |
| 8 | β-Sesquiphellanderene | 27.82 | 51.15 | - |
| 9 | Heneicosane | - | - | 10.5 |
|  |  |  |  |  |
| Soap pod | 1 | Terpinen-4-ol | 36.69 | 34.9 | 44 |
| Tamarind | 1 | Limonene | 5.07 | 21.1 | - |
| 2 | (+)-4-Carene | - | 5.79 | - |
| Turmeric | 1 | β -Pinene | 1.44 | - | 0.53 |
| 2 | cis-sabinene | 5.33 | - | 0.4 |
| 3 | D-Limonene | 5.94 | 0.23 | 1.05 |
| 4 | Caryophyllene | 0.78 | 2.88 | 1.69 |
| 5 | Terpinen-4-ol | 1.35 | 1.07 | - |
| 6 | Humulene | - | 0.58 | 1.24 |
| 7 | β -Bisabolene | 3.92 | 5.37 | - |
| 8 | β -Curcumene | - | 0.59 | - |
| 9 | β-Sesquiphellanderene | - | 40.7 | - |
| 10 | Heptadecane | 0.63 | - | - |

**Table S4:** Bioactive compounds eluted in storage studies

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Herbal material | No | Retention time (minute) | Bioactive compound | Abundance of extracted compounded (%) | | | |
| 95 % Ethanol | | Hexane | |
| 1 Day | 7 Days | 1 Day | 7 Days |
| Kaffir lime | 1 | 7.517 | β-Pinene | - | - | 3.14 | - |
| 2 | 7.696 | cis-sabinene | - | - | 6.48 | - |
| 3 | 10.026 | (+)-4-Carene | - | - | 12.5 | - |
| 4 | 10.95 | D-Limonene | 0.9 | - | 9.4 | - |
| 5 | 12.953 | 3-Carene | 3.31 | - | - | - |
| 6 | 13.001 | γ-Terpinene | - | - | 8.83 | - |
| 7 | 21.687 | trans-Linalool oxide (furanoid) | 17.3 | 8.92 | - | 22.4 |
| 8 | 22.834 | Citronellal | 2.24 | 0.77 | 6.79 | - |
| 9 | 24.224 | Germacrene D | - | - | 4.6 | - |
| 10 | 24.443 | Linalool | 1.12 | 0.83 | - | - |
| Lemongrass | 1 | 7.511 | β -Pinene | - | - | 2.61 | - |
| 2 | 8.014 | cis-sabinene | - | - | 2.17 | - |
| 3 | 10.855 | D-Limonene | - | - | 6.81 | 1.04 |
| 4 | 21.701 | trans-Linalool oxide (furanoid) | 1.18 | 1.64 | - | - |
| 5 | 25.063 | Trans- α -Bergamotene | - | - | 3.74 | 2.81 |
| 6 | 25.223 | Caryophyllene | - | - | 3.23 | 5.2 |
| 7 | 26.401 | Humulene | - | - | - | 1.24 |
| 8 | 26.674 | Carveol | 0.93 | 1.07 | - | - |
| 9 | 27.029 | Germacrene D | - | - | - | 1.65 |
| 10 | 29.019 | Geraniol | 2.33 | 2.91 | 8.62 | 7.77 |
| Plai | 1 | 5.201 | α-Phellandrene | - | - | - | 0.96 |
| 2 | 7.924 | Cis-sabinene | - | - | 2.63 | 2.43 |
| 3 | 10.219 | (+)-4-Carene | - | - | 3.06 | 1.95 |
| 4 | 11.055 | D-Limonene | - | - | - | 0.61 |
| 5 | 13.031 | γ-Terpinene | - | - | 2.45 | 1.03 |
| 6 | 22.885 | Citronellal | 4.61 | - | - | - |
| 7 | 23.608 | Pentadecane | - | - | - | 2.81 |
| 8 | 25.4 | Hexadecane | - | - | - | 4.77 |
| 9 | 26.914 | Heneicosane | - | - | - | 2.63 |
| 10 | 29.216 | Guaiacol | - | - | 1.58 | - |
| Soap pod | 1 | 10.852 | Limonene | - | - | 9.72 | - |
| 2 | 21.965 | Furfural | 0.38 | - | - | - |
| 3 | 25.302 | Terpinen-4-ol | - | - | - | 8.04 |
| 4 | 26.083 | Furfuryl alcohol | - | - | - | - |
| 5 | 27.485 | 2(5H)-Furanone | 2.35 | 2.95 | - | 36.8 |
| 6 | 29.382 | Benzyl alcohol | - | - | - | - |
| Tamarind | 1 | 10.917 | D-Limonene | - | - | - | 34.2 |
| 2 | 14.49 | (+)-4-Carene | - | - | - | 6.17 |
| 3 | 21.961 | Furfural | - | - | - | - |
| 4 | 26.07 | Furfuryl alcohol | - | - | - | - |
| 5 | 29.11 | Guaiacol | - | - | - | - |
| 6 | 29.363 | Benzyl alcohol | - | - | - | - |
| Turmeric | 1 | 8.061 | cis-sabinene | - | - | 0.3 | - |
| 2 | 11.062 | D-Limonene | - | - | 0.38 | - |
| 3 | 25.269 | Caryophyllene | 3.89 | - | 1.53 | 2.96 |
| 4 | 25.388 | Terpinen-4-ol | 1.05 | - | - | - |
| 5 | 25.402 | Heptadecane | - | - | 0.37 | - |
| 6 | 26.436 | Humulene | - | - | - | 3.22 |
| 7 | 26.918 | Heneicosane | - | - | 0.53 | 5.52 |
| 8 | 27.309 | β -Bisabolene | 5.46 | 5.39 | 6.16 | 5.93 |
| 9 | 27.974 | β-Sesquiphellandrene | 40.3 | 46.3 | 49.3 | 42.8 |
| 10 | 29.253 | Guaiacol | 6.96 | 15.9 | - | - |