Data Article

Data set on volatile compound of coffee flowers at different annual rainfall

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ABSTRACT

This data informs about the profile of volatile compound of coffee flower (Coffee arabica) from different locations with different annual rainfall by using gas chromatography - mass spectrometry (GC-MS). The volatile compounds were captured by solid phase micro extraction (SPME) methods. The extract then subjected to GC-MS for separation and identification of compounds. The profile of volatile compound was provided in, Table 1, Table 2, Table 3 and Table 4.

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1. Data

The data about volatile compound profile of coffee flowers from different locations at different annual rainfall was provided on the Microsoft Excel Worksheet (Table 1—Table 4). The data contain the retention times, names of volatile compound and the peak area of coffee flowers.

2. Experimental design, materials, and methods

The sample of coffee flower was collected from four locations at different annual rainfall (1500–2000, 2000–2500, 2500–3000, 3000–3500 mm/year). At each location, the coffee flowers

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were selected and only fresh anthesis flowers were used for this analysis following [1–3] method. From every location, ten fresh flowers (ca. 1.3 g) were placed respectively in 22 mL solid phase micro extraction (SPME) clear glass vial (Supelco Co., Bellefonte, PA, USA) with PTFE/silicone septa and will be

| Subject area | Agriculture and Biological Science |
|--------------|-----------------------------------|
| More specific subject | Biochemical diversity |

| Type of data | Table |
|--------------|-------|
| How data was acquired | Volatile compound of Coffea arabica flowers from four location were analyzed using gas chromatography (GC: 7890A, Agilent Technologies, Inc.) coupled with mass spectrometry (MS: 5975C, Agilent Technologies, Inc.). |

| Data format | Data (in Excel Worksheet) |
|-------------|---------------------------|
| Experimental factors | Flower samples are taken from four locations at the altitude higher than 1100 m above sea level with different average annual rainfall (1500–2000, 2000–2500, 2500–3000, 3000–3500 mm/year) |

| Data source location | Sukamakmur, Bogor Regency, West Java (S06°40′12.9″ E107°09′40.6″) 1170 above sea level |
|----------------------|------------------------------------------------------------------|
| Data source location | Pangalengan, Bandung Regency, West Java (S07°09′27.1″ E107°33′35.9″) 1266 above sea level |
| Data source location | Tambi, Wonosobo Regency, Central Java (S07°15′25.1″ E109°33′36.1″) 1497 above sea level |
| Data source location | Kamojang, Bandung Regency, West Java (S07°08′47.2″ E107°30′30.6″) 1504 above sea level |

| Data accessibility | Data are available in this article |

**Table 1**
Retention times, names of the identified compounds, and relative peak areas (%) in the GC chromatogram from coffee flower at 1500–2000 mm/year annual rainfall.

| Retention Time (min.) | Compounds | Relative Peak Area (%) |
|--------------------|-----------|------------------------|
| 2.823 | Cyclobutanol | 0.32 0.29 n.d |
| 3.233 | Butanenitrile, 2-methyl- | 3.64 3.85 3.43 |
| 4.303 | 2-Butenoic acid, butyl ester | n.d 3.47 n.d |
| 7.924 | Oxalic acid, pentyl propyl ester | 0.87 n.d n.d |
| 11.266 | β-myrcene | 0.77 0.58 0.63 |
| 12.544 | D-Limonene | 0.32 0.25 0.22 |
| 12.866 | Benzyl alcohol | 0.35 0.39 0.46 |
| 13.222 | Benzoic acid, methyl ester | n.d 0.55 0.56 |
| 13.222 | 1,3,6-Octatriene, 3,7-dimethyl-,(Z) | 0.57 n.d n.d |
| 14.043 | Ethyl 2-(5-methyl-5-vinyltetrahydrofuran-2-yl)propan-2-yl carbonate | 0.07 0.09 0.10 |
| 14.774 | Benzoic acid, methyl ester | 0.93 1.40 n.d |
| 14.953 | Geranyl benzoate | 0.53 n.d n.d |
| 14.958 | Linalool | n.d 1.12 0.79 |
| 15.886 | 2,4,6-Octatriene, 2,6-dimethyl-,(E,Z)- | 0.11 0.04 0.04 |
| Retention Time (min.) | Compounds                                                                 | Relative Peak Area (%) |
|-----------------------|---------------------------------------------------------------------------|------------------------|
| 17.301 17.301         | (3R,6S)-2,2,6-Trimethyl-6-vinyltetrahydro-2H-pyran-3-ol                   | n.d 0.02 0.02          |
| 17.533 17.533         | 3,6-Octadienial, 3,7-dimethyl-                                            | 0.02 0.02 n.d          |
| 17.539 17.539         | Isogeranial                                                              | n.d n.d 0.02           |
| 17.812                | Terpineol                                                                | n.d n.d 0.02           |
| 17.902 17.902         | Methyl salicylate                                                        | 0.07 0.09 0.03         |
| 17.997 17.997         | Dodecane                                                                 | 0.05 0.07 0.06         |
| 18.645 18.657 18.669 | 6-Octen-1-ol, 7-methyl-3-methylene                                       | 0.02 0.02 0.02         |
| 18.966 18.990         | 2,6-Octadien-1-ol, 3,7-dimethyl-,(Z)-                                    | 3.11 3.29 3.56         |
| 19.055 19.073         | 3,6-Octadien-1-ol, 3,7-dimethyl-,(Z)-                                    | 0.14 n.d 0.15          |
| 19.067                | Santolina triene                                                         | n.d 0.13 n.d           |
| 19.269 19.275 19.281 | 2,6-Octadienial, 3,7-dimethyl-,(Z)                                       | 0.22 0.18 0.17         |
| 19.697 19.721 19.745 | 2,6-Octadien-1-ol, 3,7-dimethyl-,(E)-                                   | 1.91 2.21 2.79         |
| 20.108 20.114 20.120 | 2,6-Octadienial, 3,7-dimethyl-,(E)                                      | 0.25 0.20 0.19         |
| 20.470                | 6-Dodecene, (E)-                                                        | 0.01 n.d n.d           |
| 20.471                | 6-Tridecene, (E)-                                                       | n.d 0.02 n.d           |
| 20.536 20.470         | 6-Tridecene, (Z)-                                                       | n.d 0.02 0.01          |
| 20.536 20.536         | 2-Dodecene, 2-methyl-                                                   | n.d n.d 0.01           |
| 20.655 20.655         | 1-Tridecene                                                              | 0.02 n.d n.d           |
| 20.922 20.940 20.952 | Tridecane                                                                | 3.19 3.45 3.91         |
| 21.565 21.570         | trans-Geranic acid methyl ester                                          | n.d 0.05 0.06          |
| 23.128                | 3-Tetradecene, (E)-                                                     | n.d n.d 0.03           |
| 23.342                | 5-Tetradecene, (E)-                                                     | 0.03 n.d 0.04          |
| 23.342                | 3-Tetradecene, (Z-)                                                     | n.d 0.04 n.d           |
| 25.441                | 1-Octodecyne                                                             | 0.02 n.d n.d           |
| 23.592 23.592 23.592 | Tetradecane                                                              | 3.14 3.19 3.24         |
| 25.709                | 9-Eicosene, (E)-                                                        | n.d 5.12 n.d           |
| 25.816 25.828 25.721 | 1-Tridecane                                                              | 0.83 0.96 5.48         |
| 26.547 26.607 26.636 | Pentadecane                                                             | 36.2 36.15 37.52       |
| 28.081                | (2E,6E)-3,7,11-Trimethylimedecano-2,6,10-trien-1-yl decanoate             | n.d n.d 0.01           |
| 28.551 28.563         | 3-Hexadecene, (Z)-                                                      | 0.14 0.17 n.d          |
| 28.652 28.949 28.658 | 7-Hexadecene, (Z)-                                                      | 0.17 0.23 0.38         |
| 29.163 29.175 29.175 | Hexadecane                                                               | 0.96 1.08 0.99         |
| 31.084                | 2,1,6-Tridecadiene                                                       | 0.34 n.d n.d           |
| 31.090                | 6,9-Heptadecadiene                                                      | n.d 0.54 n.d           |
| 31.096                | Linoleic acid                                                             | n.d n.d 0.48           |
| 31.429 31.465 31.416 | 8-Heptadecane                                                            | 8.85 9.53 9.78         |
| 31.869 31.869 31.869 | Heptadecene                                                              | 0.84 1.02 1.08         |
| 32.249 32.249 32.249 | Pentadecanal                                                            | 0.04 0.08 0.10         |
| 32.446 32.452 32.457 | ZZ-10,12-Hexadecadien                                                    | 0.03 0.02 0.03         |
| 33.278                | EE-10,12-Hexadecadien                                                   | n.d n.d 0.02           |
| 33.718 33.718         | 9-Octadecene, (E)-                                                      | n.d n.d 0.01           |
| 33.718                | 3-Octadecene, (E)-                                                      | n.d 0.01 n.d           |
| 34.212 34.217         | cis-9-Hexadecanal                                                        | 0.24 0.35 n.d          |
| 34.212                | 7-Hexadecenal, (Z)-                                                     | n.d 0.21 n.d           |
| 34.408 34.408         | 13-Octadecanal, (Z)-                                                   | n.d 0.03 n.d           |
| 34.408                | cis-11-Hexadecanal                                                      | 0.05 n.d 0.06          |
| 34.699 34.729         | Hexadecanal                                                             | n.d 0.94 1.89          |
| 34.699                | Tetracanalog                                                             | 1.21 n.d n.d           |
| 35.942 35.942 36.031 | 2,5-Nonadecene                                                          | n.d 0.02 0.03          |
| 36.108                | Cyclotetracane                                                          | n.d n.d 0.02           |
| 36.495 36.501 36.501 | Nonadecane                                                               | 0.21 0.32 0.32         |
| 38.564                | Eicosane                                                                | n.d 0.05 n.d           |
| 38.594                | 9-Octadecanal, (Z)-                                                    | 0.06 n.d n.d           |
| 38.594 38.594 38.594 | 13-Octadecanal, (Z)-                                                   | n.d n.d 0.09           |
| 40.491                | Heneicosane                                                             | 0.06 0.09 0.07         |
| 43.606 43.606 43.606 | 9-Tricosene, (Z)-                                                       | 0.02 0.01 0.04         |
| 44.052                | Eicosane, 7-hexyl-                                                      | n.d 0.01 n.d           |
Table 2
Retention times, names of the identified compounds, and relative peak areas (%) in the GC chromatogram from coffee flower at 2000–2500 mm/year annual rainfall.

| Retention Time (min.) | Compounds | Relative Peak Area (%) |
|-----------------------|-----------|------------------------|
| **1**                 | **2**     | **3**                  |
| 2.817                 | Cyclobutanol | n.d 0.27 n.d          |
| 3.245                 | Butanenitrile, 2-methyl- | 8.76 6.74 6.15       |
| 7.663                 | 2-Hexanone, 4-methyl- | 0.11 n.d n.d      |
| 9.294                 | Pentane, 1-propoxy- | 1.68 n.d n.d     |
| 7.930                 | 1,6-Heptadien-4-ol | n.d 1.21 n.d        |
| 11.272                | 11.278 11.284 | 0.10 0.63 0.65   |
| 11.599                | 7H-Dibenz[b,g]carbazole, 7-methyl | 0.65 n.d n.d |
| 12.562                | 12.568 12.574 | 0.36 0.24 0.24 |
| 12.584                | 12.642 12.842 | 0.58 0.51 0.55 |
| 13.222                | 13.228 13.222 | 1.05 0.44 0.54 |
| 14.037                | 2-Furanmethanol, 5-ethenyltetrahydro-s,z,z,5-trimethyl-, cis- | 0.12 n.d n.d |
| 14.037                | 14.043 14.560 | 0.12 0.14 0.21 |
| 14.56                 | trans-Linalool oxide (furanoid) | 0.24 n.d 0.16   |
| 14.822                | 14.834 3-Methyl-2-(2-methyl-2-butenyl)-furan | n.d 0.12 n.d |
| 14.965                | 14.967 14.965 | 2.49 1.20 1.41   |
| 15.875                | 15.886 17.301 | 0.09 0.04 0.04   |
| 17.527                | 17.533 3,6-Octadienial, 3,7-dimethyl- | 0.03 0.03 n.d   |
| 17.527                | 17.572 Isogeraniol | n.d n.d 0.03    |
| 17.813                | 17.813 17.813 | 0.02 0.02 0.01   |
| 17.902                | 17.914 17.908 | 0.03 0.01 0.02   |
| 17.997                | 18.003 17.997 | 0.08 0.08 0.08    |
| 18.651                | 18.651 18.657 | 0.03 0.03 0.03  |
| 18.972                | 18.978 18.972 | 3.9 3.24 3.27   |
| 19.061                | 19.055 3,6-Octadien-1-ol, 3,7-dimethyl- | 0.13 0.14 n.d   |
| 19.269                | 19.270 2,6-Octadienial, 3,7-dimethyl-, (Z)- | 0.25 0.21 0.21    |
| 19.713                | 19.721 2,6-Octadien-1-ol, 3,7-dimethyl-, (E)- | 2.93 2.31 2.25    |
| 20.114                | 20.114 20.108 | 0.27 0.22 0.21  |
| 20.465                | 6-Tridecenial, (Z)- | n.d n.d 0.02 |
| 20.464                | 20.471 6-Tridecenial, (E)- | 0.02 n.d n.d |
| 20.530                | 20.536 6-Tetradecenial, (E)- | 0.02 n.d n.d |
| 20.536                | 20.536 7-Tetradecenial, (E)- | n.d n.d 0.02 |
| 20.928                | 20.940 20.940 | 3.96 3.96 4.42  |
| 23.343                | 5-Tridecenial, (E)- | n.d n.d 0.06    |
| 23.122                | 23.122 3-Tridecenial, (E)- | n.d 0.06 n.d   |
| 23.342                | 23.342 23.123 | 0.06 0.06 0.06  |
| 23.592                | 23.604 23.604 | 3.58 3.43 3.61   |
| 25.691                | n-Tridecan-1-ol | 5.19 n.d n.d |
| 25.715                | 1-Hexadecanol | n.d 5.49 n.d |
| 25.816                | 25.834 25.715 | 0.09 1.47 6.47 |
| 26.482                | 26.553 26.553 | 30.35 30.49 35.15 |
| 28.557                | 28.557 6-Tetradecenial, (Z)- | n.d 0.12 n.d  |
| 28.545                | 28.646 28.646 | 0.22 0.23 0.25 |
| 28.937                | 28.557 3-Hexadecenial, (Z)- | 0.01 n.d 0.12  |
| 28.944                | 28.944 2-Z-8-Hexadecenec | n.d 0.01 n.d |
| 29.151                | 29.164 29.164 | 0.91 0.90 0.93  |
| 31.072                | 31.078 31.084 | 0.32 0.31 0.36 |
| 31.405                | 31.441 31.441 | 8.07 0.37 9.42 |
| 31.863                | 31.875 31.875 | 1.08 1.14 1.26 |
| 29.538                | 32.244 32.244 | 0.03 0.03 0.05  |
| 32.466                | E.E – 10,12-Hexadecadienal | 0.03 n.d n.d |
| 33.272                | 33.272 33.272 | 0.03 0.01 0.02 |
| 34.402                | 34.212 cis-9-Hexadecenal | n.d 0.02 0.16 |
| 34.212                | 34.212 E – 11-Hexadecenal | n.d 0.13 n.d |
| 34.259                | Octadecane | 0.06 n.d n.d |

T.S. Syamsudin et al. / Data in brief 26 (2019) 104418
Table 2 (continued)

| Retention Time (min.) | Compounds                     | Relative Peak Area (%) |
|-----------------------|-------------------------------|------------------------|
| 123                   | 13-Octadecenal, (Z)-          | n.d                    |
| 34.402                | n.d                            | 0.02                   |
| 34.687                | Hexadecanal                   | n.d                    |
| 34.675                | 29.532 34.687                 | 0.23                   |
| 36.031                | 35.936 36.025                 | 0.02                   |
| 36.691                | 29.532 34.675                 | 0.23                   |
| 36.691                | 29.532 34.675                 | 0.23                   |
| 38.558                | 36.031 36.691                 | 0.02                   |
| 40.492                | 38.558 39.092                 | 0.02                   |
| 43.606                | 38.558 39.092                 | 0.02                   |
| 43.606                | 38.558 39.092                 | 0.02                   |

Table 3

Retention times, names of the identified compounds, and relative peak areas (%) in the GC chromatogram from coffee flower at 2500–3000 mm/year annual rainfall.

| Retention Time (min.) | Compounds                     | Relative Peak Area (%) |
|-----------------------|-------------------------------|------------------------|
| 1.800                 | Ethanol                       | n.d                    |
| 3.269                 | Butanenitrile, 2-methyl-       | 11.8                   |
| 4.309                 | 2-Propanone, O-methyloxime    | 8.65                   |
| 6.581                 | 2-Butanone, 2-methyl-          | 11.59                  |
| 6.604                 | O-methyloxime                 | 11.59                  |
| 7.936                 | Pentane, 1-propoxy-           | 1.65                   |
| 7.948                 | Oxalic acid, pentyl propyl ester | n.d                   |
| 9.488                 | 2-Butenoic acid, 2-methyl-     | 0.36                   |
| 10.220                | 2-Phenylindolizine            | n.d                    |
| 10.588                | 1-Heptanol                    | 0.03                   |
| 11.260                | β-myrcene                     | 0.11                   |
| 12.562                | D-Limonene                    | 0.02                   |
| 12.854                | Benzy alcohol                 | 0.19                   |
| 12.854                | E-Z-3-ethylidenecyclohexene   | n.d                    |
| 12.860                | Heptane, 4-methyl-            | 0.03                   |
| 13.222                | 2-Furanmethanol, 5-ethynyltetrahydro-2,3,5-trimethyl-2,6-dimethylene- | n.d                    |
| 14.025                | Oximine                       | 0.11                   |
| 14.031                | trans-Linalool oxide (furanoid)| n.d                    |
| 14.548                | Ethyl 2-(5-methyl-5-vinyltetrahydrofuran-2-yl)propan-2-yl carbonate | 0.48                   |
| 14.828                | Methyl 2-(2-methyl-2-butyl)-furan | 0.21                   |
| 14.952                | Furan, 3-(4-tert-butyl)-pentyl| 0.21                   |
| 15.178                | Butanoic acid, 3-methyl-, 2-methylbutyl ester | n.d                    |
| 15.541                | 5H-Naphtho[2,3-c]carbazole     | n.d                    |
| 15.874                | 2,4,6-Octatriene, 2,6-dimethyl- | 0.06                   |
| 16.344                | 1,3-Cyclopentadiene, 1,2,3,4,5-pentamethyl | 0.02                   |
| 16.350                | 6-Octenal, 7-methyl-3-methylene- | n.d                    |
| 16.974                | Isoserginal                   | n.d                    |
| 17.164                | Benzoic acid, ethyl ester     | n.d                    |
| 17.283                | (3R,6S)-2,2,6-Trimethyl-6-vinyltetrahydro-2H-pyran-3-ol | 0.06                   |
| 17.521                | 1H-Indene, 1-methylene-        | 0.03                   |
| 17.521                | Naphthalene                   | n.d                    |
| 17.795                | Terpineol                     | n.d                    |
| 17.795                | L-α-Terpineol                 | n.d                    |
| 18.354                | Hexanoic acid, 2-methylbutyl ester | n.d                    |
| 18.621                | 6-Octen-1-ol, 7-methyl-3-methylene- | n.d                    |
| 18.746                | Neryl nitrile                 | n.d                    |
| 18.907                | 2,6-Octadien-1-ol, 3,7-dimethyl-(Z)- | 1.11                   |
| 19.031                | Cyclopentanol, 1-(methyleneacyclopoly) | 0.08                   |

(continued on next page)
| Retention Time (min.) | Compounds                                      | Relative Peak Area (%) |
|-----------------------|------------------------------------------------|-------------------------|
|                       |                                                |                         |
| 19.031                | 3,6-Octadien-1-ol, 3,7-dimethyl-, (Z)-         | n.d                     |
| 19.245                | 2,6-Octadienal, 3,7-dimethyl-, (Z)             | 0.12 0.06               |
| 19.656                | 2,6-Octadien-1-ol, 3,7-dimethyl-, (E)-         | 1.01 0.50               |
| 20.090                | 2,6-Octadienal, 3,7-dimethyl-, (E)             | 0.13 0.08               |
| 20.310                | Eicosane, 1-iodo-                             | n.d 0.03                |
| 20.310                | Tetradecane, 5-methyl-                         | n.d n.d 0.03            |
| 20.310                | Octane, 5-ethyl-2-methyl-                      | 0.03 n.d n.d            |
| 20.453                | 5-Tridecene, (E)-                             | n.d n.d 0.01            |
| 20.524                | 6-Tridecene, (E)-                             | 0.03 0.02 n.d           |
| 20.530                | 3-Tridecene, (E)-                             | n.d n.d 0.02            |
| 20.928                | Tridecane                                      | 3.93 4.15 3.97          |
| 21.559                | trans-Graneric acid methyl ester              | n.d 0.09 n.d            |
| 21.832                | Nonadecane                                     | 0.02 n.d n.d            |
| 21.838                | Hexane, 3,3-dimethyl-                          | n.d 0.02 n.d            |
| 22.028                | 1-Hexanol, 5-methyl-2-(1-methylthyl)-          | n.d 0.01 n.d            |
| 22.094                | Octane, 5-ethyl-2-methyl-                      | n.d 0.01 n.d            |
| 22.094                | Nonane, 1-iodo-                                | 0.01 n.d n.d            |
| 23.087                | 7-Tetradecane                                  | 0.04 0.13 n.d           |
| 23.104                | 5-Tetradecane, (Z)-                           | n.d n.d 0.04            |
| 23.122                | 3-Tetradecene, (E)-                           | n.d 0.05 0.11           |
| 23.330                | 3-Tetradecane, (Z)-                           | n.d 0.04 n.d            |
| 23.568                | 7-Tetradecane                                  | 0.03 n.d 0.04           |
| 25.435                | 11,14-Eicosadienic acid, methyl ester         | 0.01 n.d n.d            |
| 25.679                | Cyclopentadecane                               | 4.43 n.d n.d            |
| 25.696                | 1-Hexadecanol                                  | n.d n.d 4.42            |
| 26.482                | 1-Heptadecane                                  | 1.08 1.21 1.04          |
| 26.696                | 1-Pentadecane                                  | 27.46 29.51 27.82       |
| 27.409                | Hexadecane, 1-iodo-                            | n.d n.d 0.01            |
| 27.843                | 4,5-Nonadiene                                  | 0.01 n.d n.d            |
| 28.045                | Supraene                                       | 0.02 n.d n.d            |
| 28.052                | 1,6,10,14-Hexadecatetraen-3-ol, 3,7,11,15-tetramethyl-, (E,E)- | n.d 0.01 n.d |
| 28.295                | Chilosyphone                                    | n.d 0.01 n.d            |
| 28.545                | Acetic acid, 1,3,7-trimethylocta-2,6-dienyl ester | 0.01 n.d n.d |
| 28.928                | 7-Tetradecene, (E)-                           | 0.01 0.04 n.d           |
| 28.928                | 7-Hexadecene, (Z)-                            | n.d 0.22 0.19           |
| 28.926                | 3-Hexadecene, (Z)-                            | 0.18 0.01 n.d           |
| 29.140                | 29.146 29.146 29.146 Hexadecane                | 0.77 0.88 0.87          |
| 29.520                | 29.532 29.526 Pentadecanal-                    | 0.04 0.02 0.03          |
| 31.066                | 31.066 6,9-Heptadecadiene                      | 0.21 0.02 n.d           |
| 31.066                | 9-Tetradecen-1-ol, acetate, (E)-              | n.d n.d 0.21            |
| 31.435                | 31.423 31.447 8-Heptadecene                    | 9.91 8.95 10.08         |
| 31.875                | 31.869 31.881 Heptadecene                      | 1.59 1.37 1.71          |
| 32.089                | Cyclopentane, pentyl-                          | n.d 0.01 n.d            |
| 32.095                | Cyclopentane, nonyl-                           | n.d n.d 0.01            |
| 32.089                | 1-Octadecene                                   | 0.01 n.d n.d            |
| 32.249                | Cyclotridecan                                  | n.d 0.01 n.d            |
| 32.327                | Octadecanal                                    | 0.02 n.d n.d            |
| 33.260                | 33.266 33.266 ZZ-10,12-Hexadecadienal          | 0.02 0.01 0.01          |
| 33.712                | 9-Octadecene, (E)-                            | n.d n.d 0.01            |
| 34.247                | 34.253 34.253 Octadecane                       | 0.10 0.07 0.09          |
| 34.396                | 13-Tetradecenal                                | n.d n.d 0.01            |
| 34.396                | 13-Octadecenal, (Z)-                          | n.d n.d 0.01            |
Table 3 (continued)

| Retention Time (min.) | Compounds                  | Relative Peak Area (%) |
|-----------------------|-----------------------------|------------------------|
| 34.669                | Hexadecanal                 | 0.56                   |
| 34.669                | Tetradecanal                | 0.30                   |
| 35.930                | Z-5-Nonadecene              | 0.02                   |
| 36.019                | 1-Heptadecene               | 0.03                   |
| 36.483                | Nonadecane                  | 0.35                   |
| 38.546                | Eicosane                    | 0.03                   |
| 40.478                | Heneicosane                 | 0.08                   |
| 43.594                | 9-Tricosene, (Z)-           | 0.00                   |

Table 4

Retention times, names of the identified compounds, and relative peak areas (%) in the GC chromatogram from coffee flower at 3000–3500 mm/year annual rainfall.

| Retention Time (min.) | Compounds                                      | Relative Peak Area (%) |
|-----------------------|------------------------------------------------|------------------------|
| 2.703                 | 1-Butanamine, N,3-dimethyl-                    | 0.33                   |
| 2.858                 | Cyclobutanol                                   | n.d 0.27 n.d          |
| 3.245                 | Butanenitrile, 2-methyl-                       | 6.23 6.01 4.88        |
| 4.309                 | 1,3-Dioxolane, 2-ethenyl-4-methyl-             | 6.42 n.d 4.95         |
| 7.930                 | Oxallic acid, pentyl propyl ester              | 1.02 n.d              |
| 7.930                 | Pentane, 1-propoxy-                           | n.d n.d 4.92         |
| 11.123                | 5-Hepten-2-one, 6-methyl-                      | 0.46 0.90 n.d         |
| 11.245                | β-myrcene                                      | 1.35 2.20             |
| 12.538                | D-Limonene                                     | 0.37 0.11 0.40       |
| 12.859                | Benzyl alcohol                                 | 0.49 n.d 1.10        |
| 12.871                | trans-β-Ocimene                               | n.d 0.06 n.d         |
| 13.222                | Ethyl 2-((5-methyl-5-vinyltetrahydrofuran-2-yl)propan-2-yl carbonate n.d 0.03 0.06 |
| 14.037                | trans-Linalool oxide (furanoid)                | 0.06 0.08 n.d        |
| 14.560                | 2-Carene                                       | n.d n.d 0.22        |
| 14.828                | 3-Methyl-2-(2-methyl-2-butetyl)-furan          | 0.15 0.05 n.d        |
| 14.958                | Linalool                                       | 1.26 0.40 1.59      |
| 15.886                | 2,4,6-Octatriene, 2,6-dimethyl-,(E)-           | 0.19 0.05 0.23       |
| 16.284                | 2,4,6-Octatriene, 3,4-dimethyl-,(E)-           | n.d n.d 0.08        |
| 16.998                | cis-Verbenol                                   | n.d n.d 0.02        |
| 17.301                | 3,6-Octadienial, 3,7-dimethyl-                 | 0.02 n.d n.d        |
| 17.527                | Isoneral                                       | 0.02 n.d n.d        |
| 17.807                | L-α-Terpineol                                  | 0.03 n.d n.d        |
| 17.824                | α-Terpineol                                    | n.d n.d 0.06       |
| 18.003                | Dodecane                                       | 0.07 0.07 0.06      |
| 18.651                | 6-Octen-1-ol, 7-methyl-3-methyline             | 0.03 0.07 0.06      |
| 18.984                | 2,6-Octadienial-1-ol, 3,7-dimethyl-,(Z)-       | 3.99 0.79 6.01      |
| 19.269                | 2,6-Octadienial, 3,7-dimethyl-, (Z)             | 0.2 0.06 0.35       |
| 19.727                | 2,6-Octadienial-1-ol, 3,7-dimethyl-,(E)-       | 2.97 0.78 5.08      |
| 20.114                | 2,6-Octadienial, 3,7-dimethyl-, (E)            | 0.22 0.07 0.40      |
| 20.387                | 2,6-Octadienioic acid, 3,7-dimethyl-, methyl ester | n.d n.d 0.09    |
| 20.464                | 4-Nonene, 5-butyl-                            | n.d 0.01 n.d        |
| 28.557                | 7-Tetradecene, (E)-                           | 0.11 0.02 n.d       |
| 20.940                | Tridecane                                      | 4.14 4.85 3.88      |
| 21.564                | trans-Ceramic acid methyl ester               | 0.08 n.d n.d        |
| 23.128                | 7-Tetradecene                                  | n.d n.d 0.03        |
| 23.336                | 3-Tetradecene, (E)-                           | 0.05 0.04 n.d       |
| 23.604                | Tetradecane                                    | 3.84 5.44 3.43      |

(continued on next page)
identified using gas chromatography - mass spectrometry (GCMS) after 24hr waiting period. Three set of samples were taken from each location. Analysis of volatile compounds of coffee flowers was conducted in ICRR flavor laboratory (Indonesian Centre for Rice Research) West Java, Indonesia. The flowers were extracted using the procedure of [2] with some modifications. All samples were extracted at 40°C for 45 minutes. With splitless mode, SPME was injected into a gas chromatograph (Agilent 7890A) at 250°C for 5 minutes. The oven temperature initially was set at 50°C held for 5 minutes and then increased to 150°C at the rate of 5°C/min for 2 minutes and then increased to 250°C at the rate of 5°C/min for 5 minutes. The volatile compounds were identified based on their retention times in gas chromatograph equipped with mass spectrometer. HP-5MS (30 m × 250 μm x 0.25 μm) column was used for the separation. Gas carrier was helium 0.8 ml/min. The relative amounts of volatile compounds from each location were determined by comparing spectra of each compound with library NIST14.

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**Conflict of Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Table 4 (continued)

| Retention Time (min.) | Compounds                                      | Relative Peak Area (%) |
|-----------------------|------------------------------------------------|------------------------|
| 25.703                | 1-Hexadecanol                                   | n.d 5.35 n.d           |
| 25.679                | 1-1-Tridecene                                    | 3.78 1.14 0.71         |
| 26.553                | Pentadecane                                     | 34.27 41.96 32.6       |
| 28.063                | 1,6,10,14-Hexadecatetraen-3-ol, 3,7,11,15-tetramethyl-, (E,E)- | n.d n.d 0.01          |
| 28.652                | 7-Hexadecene, (Z)-                              | n.d 0.2 n.d            |
| 28.640                | 3-Hexadecene, (Z)-                              | 0.18 n.d n.d           |
| 28.634                | Z-9-Hexadecene                                  | n.d n.d 0.30           |
| 29.163                | Hexadecane                                      | 1.09 1.24 1.03         |
| 31.078                | ZZ-10,12-Hexadecadienal                         | 0.36 n.d n.d           |
| 31.417                | 8-Heptadecane                                   | 7.53 7.12 6.68         |
| 31.869                | 4-Hexadecane                                    | 1.13 1.28 0.94         |
| 32.243                | Pentadecanediol                                 | n.d 0.05 0.04          |
| 32.255                | 1,15-Pentadecanediol                            | n.d n.d 0.02           |
| 32.440                | 3,4-Octadiene, 7-methyl-                        | 0.01 n.d n.d           |
| 33.272                | ZZ-10,12-Hexadecadienal                         | 0.02 0.02 0.02         |
| 34.211                | cis-9-Hexadecenal                               | n.d 0.12 n.d           |
| 34.259                | Octadecane                                      | 0.07 n.d 0.06          |
| 34.402                | 13-Octadecenal, (Z)-                            | n.d 0.02 n.d           |
| 34.675                | Hexadecanal                                     | 0.36 n.d n.d           |
| 35.249                | 36.481 36.675 Tetradecanal                      | 0.02 0.65 0.41         |
| 35.936                | Z-5-Nonadecene                                  | 0.02 0.03 n.d          |
| 35.936                | 9-Nonadecene                                    | n.d n.d 0.22           |
| 36.495                | Nonadecane                                      | 0.31 0.32 n.d          |
| 38.552                | 9-Tricosene, (Z)-                              | n.d 0.01 0.01          |
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