# NUMERICAL DATA

## Polycyclic aromatic hydrocarbons in tree barks, gaseous and particulate phase samples collected near an industrial complex in Sa~o Paulo (Brazil) (2019)

Concentrations of PAHs in previous and in the present studies

| Site | Reference | PAHs concentrations sum (ng $g^{-1}$ ¼ mg $kg^{-1}$) | Number of PAHs |
|---|---|---|---|
| **Rio de Janeiro (Brazil)** | Pereira Netto et al. (2007) | 242e1640 | 21 |
| **Portugal and Spain** | Ratola et al. (2009) | 22e196 | 16 |
| **Palermo (Italy)** | Orecchio et al. (2008) | 33e1015 | 19 |
| **Mainland of China** | Zhao et al. (2008) | 5.1e1770 | 18 |
| **Jiangsu (China)** | Zhou et al. (2014) | 6.18e1560 | 15 |
| **Middle-Lower Yangtze Plain (China)** | Wu et al. (2019) | 27e1300 | 15 |
| **MASP (Brazil)** | Present study | 21e491 | 14 |

**Source:** https://www.ncbi.nlm.nih.gov/pubmed/31401431

# Solid fuel combustion as a major contributor of polycyclic aromatic hydrocarbons in rural China: Evidence from emission inventory and congener profiles in tree bark (2019)

Summary of descriptive statistics of 16 individual PAHs in tree bark from rural areas across China (ng/g)..

| | median | mean | max | min | percentile | | | | SD [a] | CV [b] | DF [c] (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 5th | 25th | 75th | 95th | | | |
| **Nap** | 11.0 | 15.6 | 173 | 1.28 | 4.12 | 6.80 | 17.95 | 39.2 | 18.4 | 1.19 | **100** |
| **Acy** | 0.870 | 1.65 | 31.2 | BDL [d] | 0.193 | 0.372 | 1.78 | 4.58 | 3.19 | 1.94 | **99.1** |
| **Ace** | 1.27 | 1.99 | 11.2 | BDL | 0.269 | 0.684 | 2.47 | 6.14 | 2.03 | 1.02 | **97.4** |
| **Flo** | 8.09 | 15.0 | 223 | 0.079 | 1.65 | 3.44 | 15.5 | 53.6 | 24.9 | 1.66 | **100** |
| **Phe** | 57.1 | 111 | 10531 | 0.233 | 10.1 | 24.9 | 135 | 346 | 152 | 1.37 | **100** |
| **Ant** | 8.22 | 76.3 | 1223 | 0.282 | 0.970 | 3.41 | 39.0 | 385 | 179 | 2.34 | **100** |
| **Flu** | 48.6 | 90.2 | 695 | 0.240 | 5.53 | 20.7 | 108 | 267 | 120 | 1.33 | **100** |
| **Pyr** | 39.8 | 60.8 | 652 | 0.752 | 5.45 | 16.6 | 69.3 | 170 | 86.1 | 1.42 | **100** |
| **BaA** | 5.63 | 21.2 | 497 | 0.046 | 0.493 | 2.01 | 14.6 | 55.1 | 65.8 | 3.11 | **100** |
| **Chr** | 25.1 | 44.0 | 377 | 0.076 | 2.19 | 8.06 | 46.0 | 148 | 65.9 | 1.50 | **100** |
| **BbF** | 32.0 | 53.7 | 468 | BDL | 2.12 | 11.1 | 60.3 | 150 | 73.7 | 1.37 | **99.1** |
| **BkF** | 22.0 | 36.9 | 318 | BDL | 0.567 | 6.17 | 42.3 | 110 | 50.3 | 1.36 | **96.5** |
| **BaP** | 8.22 | 21.5 | 339 | BDL | BDL | 2.72 | 22.9 | 60.2 | 46.9 | 2.19 | **93.0** |
| **DahA** | 4.43 | 20.6 | 770 | BDL | 0.407 | 1.95 | 12.0 | 84.3 | 77.8 | 3.78 | **96.5** |
| **IcdP** | 10.3 | 21.0 | 343 | BDL | 0.726 | 3.32 | 25.2 | 60.0 | 43.1 | 2.05 | **96.5** |
| **BghiP** | 13.3 | 29.0 | 385 | BDL | 0.954 | 4.43 | 35.0 | 85.9 | 51.9 | 1.79 | **99.1** |
| **2-ring** | 11.0 | 15.6 | 173 | 1.28 | 4.12 | 6.80 | 17.9 | 39.2 | 18.4 | 1.19 | **100** |
| **3-ring** | 80.5 | 206 | 2369 | 0.794 | 14.8 | 40.0 | 233 | 743 | 346 | 1.68 | **100** |
| **4-ring** | 137 | 216 | 1801 | 1.11 | 14.3 | 49.4 | 243 | 858 | 294 | 1.36 | **100** |
| **5-ring** | 70.2 | 133 | 1251 | BDL | 5.45 | 27.9 | 156 | 463 | 196 | 1.48 | **99.1** |
| **6-ring** | 23.5 | 50.0 | 727 | BDL | 1.97 | 8.29 | 61.2 | 158 | 93.3 | 1.87 | **99.1** |
| | | **620** | **3803** | **6.30** | **56.9** | **145** | **700** | **2106** | **752** | **1.21** | **100** |

[a] SD: standard deviation.

[b] CV: coefficient of variance.

[c] DF: detective frequency.

[d] BDL: below detection limit.

[e] PPAHs: total PAHs.

**Source:** https://sci-hub.tw/10.1016/j.envpol.2018.12.068

## Removal of soil polycyclic aromatic hydrocarbons derived from biomass fly ash by plants and organic amendments (2018)

Table 1. Initial polycyclic aromatic hydrocarbon (PAH) contents (µg/kg dry weight) in experimental treatments.

| Treatment | LMW PAHs | MMW PAHs | HMW PAHs | Total PAHs |
|---|---|---|---|---|
| **A** | 745.4 | 371.5 | 484.8 | **1601.7** |
| **CA** | 750.1 | 376.7 | 477.3 | **1604.0** |
| **VA** | 739.2 | 387.4 | 493.8 | **1611.4** |
| **PA** | 730.8 | 417.8 | 526.6 | **1675.2** |
| **PCA** | 732.9 | 369.1 | 480.0 | **1582.0** |
| **PVA** | **725.8** | **401.0** | **483.3** | **1610.1** |

All values represent means (n = 4). There were no significant differences (P < 0.05) in initial PAH contents between the treatments: A – ash-soil; CA – compost-ash-soil; VA – vermicompost-ash-soil; PA – planted ash-soil; PCA – planted compost-ash-soil; PVA – planted vermicompost-ash-soil; LMW PAHs – low molecular weight PAHs; MMW PAHs – medium molecular weight PAHs; HMW PAHs – high molecular weight PAHs; total PAHs – the sum of all 16 individual PAHs.

## Removal of soil polycyclic aromatic hydrocarbons derived from biomass fly ash by plants and organic amendments (2018)

Table 1: Yield of maize roots and shoots, polycyclic aromatic hydrocarbon (PAH) concentration in roots and PAH removal by roots.

| Treatment | Root (g/pot DW) | Shoot (g/pot DW) | Total PAHs in roots (µg PAH/kg roots DW) | Plant PAH removal (%) |
|---|---|---|---|---|
| **PS** | $15.8^{b}$ | $106.9^{a}$ | nd | **nd** |
| **PC** | $22.4^{a}$ | $111.5^{a}$ | nd | **nd** |
| **PV** | $22.1^{a}$ | $105.5^{a}$ | nd | **nd** |
| **PA** | $15.5^{b}$ | $109.5^{a}$ | $83.8^{b}$ | **$0.02^{b}$** |
| **PCA** | $22.7^{a}$ | $105.1^{a}$ | $143.9^{a}$ | **$0.04^{a}$** |
| **PVA** | **$22.8^{b}$** | **$106.0^{a}$** | **$161.2^{a}$** | **$0.04^{a}$** |

nd – not detected (individual PAHs were lower than the detection limit in the range between 1.8–5.6 µg/kg dry weight (DW)). All values represent means (n = 4). Different lower case letters within the same column indicate significant differences (P < 0.05) between the treatments: PS – planted soil (control for plants); PC – planted compost-soil; PV – planted vermicompost-soil; PA – planted ash-soil; PCA – planted compost-ash-soil; PVA – planted vermicompost-ash-soil

**Source:** https://www.agriculturejournals.cz/publicFiles/239233.pdf

## Floristic surveys of hydrocarbon-polluted sites in some Cameroonian cities (Central Africa) (2018)

Table 1: Relative frequency of some taxa in the hydrocarbon-polluted sites. NB: The values for control sites are in brackets.

| | | Relative frequency (%) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Families | Plant species | Douala | | Kribi | | Limbe | | Yaounde | | Means | |
| Poaceae | Eleusine indica | 64 | (33) | 80 | (29) | 85 | (16) | 86 | (14) | 78.75 | (23) |
| | Cynodon dactylon | 47 | (33) | 36 | (0) | 69 | (33) | 64 | (28) | 54 | (32.5) |
| | Acroceras zizanioides | 26 | (11) | 26 | (0) | 0 | (0) | 29 | (14) | 20.25 | (12.75) |
| | Axonopus compressus | 21 | (0) | 30 | (0) | 0 | (0) | 21 | (29) | 18 | (14.75) |
| | Panicum maximum | 10 | (83) | 24 | (57) | 0 | (0) | 86 | (0) | 30 | (35) |
| Amaranthaceae | Alternanthera sessilis | 51 | (50) | 13 | (0) | 46 | (66) | 64 | (0) | 43.5 | (29) |
| | Cyathula prostrata | 33 | (16) | 31 | (71) | 15 | (66) | 21 | (0) | 25 | (38.25) |
| | Amaranthus esculentus | 0 | (0) | 5 | (29) | 0 | (0) | 57 | (57) | 15.5 | (21.5) |
| Asteraceae | Vernonia cinerea | 16 | (0) | 24 | (29) | 54 | (33) | 21 | (0) | 28.75 | (15.5) |
| | Bidens pilosa | 0 | (0) | 0 | (0) | 0 | (0) | 14 | (0) | 3.5 | (0) |
| | Mimosa pudica | 13 | (0) | 0 | (43) | 15 | (33) | 50 | (71) | 19.5 | (36.75) |
| | Eclipta prostrata | 27 | (33) | 15 | (57) | 8 | (33) | 14 | (0) | 16 | (30.75) |
| | Synedrella nodiflora | 0 | (0) | 0 | (29) | 54 | (33) | 7 | (0) | 15.25 | (15.5) |
| Euphorbiaceae | Phyllanthus amarus | 23 | (17) | 26 | (28) | 46 | (66) | 21 | (0) | 29 | (27.75) |
| | Euphorbia hirta | 4 | (0) | 15 | (57) | 69 | (66) | 14 | (0) | 25.5 | (30.75) |
| Cyperaceae | Cyperus esculentus | 11 | (16) | 31 | (45) | 23 | (50) | 29 | (0) | 23.5 | (27.75) |
| | Cyperus alternifolius | 1 | (50) | 28 | (12) | 0 | (0) | 0 | (0) | 7.25 | (15.5) |
| Capparaceae | Cleome ciliata | 31 | (33) | 35 | (43) | 54 | (83) | 29 | (0) | 37.25 | (39.75) |
| Commelinaceae | Commelina benghalensis | 26 | (16) | 26 | (14) | 69 | (50) | 43 | (42) | 41 | (30.5) |
| Acanthaceae | Asystasia gangetica | 22 | (50) | 15 | (0) | 62 | (66) | 29 | (29) | 32 | (36.25) |

**Source:**https://www.researchgate.net/publication/323560742_Floristic_surveys_of_hydrocarbon-polluted_sites_in_some_Cameroonian_cities_Central_Africa

## Dissipation and phytoremediation of polycyclic aromatic hydrocarbons in freshly spiked and long-term field-contaminated soils (2017)

Table 1: Concentrations of PAHs in field-contaminated soils after 10-months plant cultivation.

| PAHs (rings) | Anthrosols | | | Phaeozems | | |
|---|---|---|---|---|---|---|
| | Initial (µgkg$^{-1}$) | Unplanted (µg kg$^{-1}$) | Initial (µg kg$^{-1}$) | Unplanted (µg kg$^{-1}$) | Initial (µg kg$^{-1}$) | Unplanted (µg kg$^{-1}$) |
| **Nap (2)** | N.D. | N.D. | N.D. | 729± 16 a | 665± 50 b | 682 ± 20 b |
| **Ace (3)** | 32 ± 2 a | 11 ± 2 b | 9 ± 9 b | 335± 18 a | 326± 9 ab | 295 ± 20 b |
| **Flu (3)** | 30 ± 4 a | 19 ± 6 ab | 8 ± 9 b | 322± 12 a | 308± 4 a | 245 ± 41 b |
| **Phe (3)** | 487± 32 a | 407± 39 a | 426± 10 a | 3140± 121 a | 2949± 134 ab | 2854 ± 47 b |
| **Ant (3)** | 15 ± 3 a | 16 ± 9 a | 13 ± 8 a | 441± 17 a | 406± 26 ab | 366 ± 40 b |
| **FluA (4)** | 1924 ± 94 a | 1764± 52 b | 1697± 19 b | 3325± 178 a | 3236± 13 a | 3359 ± 132 a |
| **Pyr (4)** | 1511 ± 11 a | 1384± 52 b | 1329± 12 b | 2615± 126 a | 2526± 41 a | 2629 ± 69 a |
| **BaA (4)** | 1038 ± 12 a | 916± 15 b | 865± 7 c | 1990± 23 a | 1978± 48 a | 1931 ± 75 a |
| **Chry (4)** | 902± 4 a | 920± 63 a | 859± 35 a | 2093± 31 ab | 2047± 78 b | 2173 ± 53 a |
| **BbF (5)** | 1161 ± 7 a | 1074± 3 b | 1005± 7 c | 1743± 7 a | 1706± 13 a | 1722 ± 79 a |
| **BkF (5)** | 503± 18 a | 466± 5 b | 439± 7 b | 868± 26 a | 846± 6 a | 887 ± 46 a |
| **BaP (5)** | 936± 24 a | 898± 10 a | 823± 32 b | 1902± 23 ab | 1772± 14 b | 1944 ± 98 a |
| **DBA (5)** | 21 ± 2 a | 16 ± 1 b | 13 ± 1 b | 30± 3 b | 27± 1 b | 35 ± 1 a |
| **BP (6)** | 1073 ± 34 a | 544± 8 b | 546± 60 b | 939± 26 a | 872± 72 a | 934 ± 75 a |
| **IP (6)** | 845± 17 b | 980± 51 a | 838± 54 b | 1233± 20 b | 1335 ± 63 b | 1446 ± 77 a |
| **Total** | 10,478 ± 198 a | 9414± 286 b | 8869± 78 c | 21,705± 459 a | 20,997 ± 456 a | 21,501 ± 425 a |

Mean of three replicates (±standard deviation). N.D. means not detected. Within a row, values followed by different letters are significantly different for each soil according to a Turkey's test ($p < 0.05$)

Table 1: Concentrations of PAHs in plant shoots and roots for field-contaminated soils.

| PAHs (rings) | Anthrosols | | | | Phaeozems | | | |
|---|---|---|---|---|---|---|---|---|
| | Shoot (µg $kg^{-1}$) | | Root (µg $kg^{-1}$) | | Shoot (µg $kg^{-1}$) | Root (µg $kg^{-1}$) | | |
| **Nap (2)** | 47 ± 4 Ab | | 154 | ± 46 Aa | 48 ± 13 Ab | 133 | ± 13 Aa | |
| **Ace (3)** | N.D. | | 4 | ± 4 A | N.D. | 5 | ± 4 | A |
| **Flu (3)** | 23 ± 7 Aa | | 72 | ± 36 Aa | 14 ± 2 Ab | 24 | ± 4 | Ba |
| **Phe (3)** | 349 | ± 74 Aa | 566 | ± 179 Aa | 180 ± 26 Ba | 220 | ± 27 Ba | |
| **Ant (3)** | | 26 ± 4 Ab | 172 | ± 36 Aa | 14 ± 3 Ba | 22 | ± 19 Ba | |
| **FluA (4)** | 225 | ± 7 Aa | 210 | ± 29 Aa | 115 ± 18 Ba | 143 | ± 12 Ba | |
| **Pyr (4)** | 203 | ± 9 Aa | 226 | ± 14 Aa | 127 ± 10 Bb | 159 | ± 7 | Ba |
| **BaA (4)** | 125 | ± 13 Ab | 286 | ± 36 Aa | 67 ± 15 Bb | 126 | ± 2 Ba | |
| **Chry (4)** | | 7 ± 5 Ab | 41 | ± 14 Aa | 1 ± 0 Ab | 61 | ± 12 Aa | |
| **BbF (5)** | | 18 ± 5 Ab | 153 | ± 24 Aa | 5 ± 4 Bb | 80 | ± 7 Ba | |
| **BkF (5)** | | 9 ± 2 Ab | 48 | ± 10 Aa | 6 ± 1 Ab | 36 | ± 6 Aa | |
| **BaP (5)** | | 3 ± 3 Ab | 44 | ± 15 Aa | 2 ± 1 Ab | 63 | ± 14 Aa | |
| **DBA (5)** | N.D. | | 1 | ± 1 A | N.D. | 3 | ± 1 A | |
| **BP (6)** | | N.D. | 85 | ± 8 A | N.D. | 47 | ± 1 | B |
| **IP (6)** | | N.D. | 26 | ± 10 A | N.D. | 92 | ± 70 A | |
| **Total** | | 1035 ± 64 Ab | 2086 | ± 407 Aa | 578 ± 88 Bb | 1212 | ± 112 Ba | |

Mean of three replicates (±standard deviation). N.D. means not detected. Within a row, values followed by different uppercase and lowercase letters are significantly different for same organ of different soils and for different organs of same soil, respectively, according to a Turkey's test ($p < 0.05$)

**Source:** https://link.springer.com/article/10.1007/s11356-017-8459-x