**Supporting Information: Notes S1, Tables S1–S2**

**Notes S1** A list of 38 papers from which the data were extracted for this meta-analysis.

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10. Wang, X., Tam, N.F.Y., Fu, S., Ametkhan, A., Ouyang Y., and Ye, Z.H. (2014). Selenium addition alters mercury uptake, bioavailability in the rhizosphere and root anatomy of rice (*Oryza sativa*). *Ann. Bot*. 114, 271-278. doi: 10.1093/aob/mcu117
11. Zhou, X.B., Yu, S.H., Wang, W.H., Chang, H., Zhou, Y.X. (2014). Effects of application of selenium in soil on the formation of root surface iron plaque and mercury uptake by rice plants (In Chinese). *J. Southwest. Univ. (Natural Science Edition)*. 39, 50-56. doi: 10.13718/j.cnki.xdzk.2014.01.015
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**Table S1** General information for the overall date used in the meta-analysis.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| No. | Type | Species | *k* | Se | c(Seadd)(μmol/kg) | c(Segrowth media)(μmol /kg) | Hg | c(Hgplant)(μmol /kg) | c(Hggrowth media)(μmol /kg) | Se/Hg | References |
| 1 | P | Rice | 12 | Ⅵ | 12.66-63.32 | 15.45-66.11 | THg | 0.03-2.24 | 0.16-5.14 | 3.00-421.78 | He et al., 2017 |
| 2 | P | Pak Choi | 24 | Ⅵ | 6.33-31.66 | 8.95-34.28 | THg | 0.37-177.26 | 0.25-15.21 | 0.59-137.54 | Tran et al., 2018a |
| 3 | P | Pak Choi | 24 | Ⅳ | 6.33-31.66 | 8.95-34.28 | THg | 0.28-173.55 | 0.25-15.21 | 0.59-137.54 | Tran et al., 2018b |
| 4 | S | *Allium fistulosum* | 2 | Ⅳ | 379.94 | 379.94 | THg | 0.52-125.85 | 74.78 | 5.08 | Afton & Caruso, 2009 |
| 5 | P, S | Tomato | 120 | Ⅳ, Ⅵ | 6.33-75.99 | 6.33-75.99 | THg | 0.01-2.40 | 9.97-24.93 | 0.25-7.62 | Shanker et al., 1996a |
| 6 | P, S | Radish | 80 | Ⅳ, Ⅵ | 6.33-75.99 | 6.33-75.99 | THg | 0.08-14.35 | 9.97-24.93 | 0.25-7.62 | Shanker et al., 1996b |
| 7 | H | Gallic | 90 | Ⅳ, Ⅵ | 0.13-1266.46 | 0.13-1266.46 | THg | 0.00-5.32 | 0.05-498.53 | 0.00-25404.00 | Zhao et al., 2013 |
| 8 | P, H | Rice | 53 | Ⅳ | 1.27-126.65 | 1.27-126.65 | THg, MeHg | 0.16-480.40 | 0.00-49.85 | 0.03-2540.40 | Zhao et al., 2014 |
| 9 | F | Rice | 5 | Ⅳ | 0.13-63.32 | 8.87-72.06 | THg | 0.19-0.47 | 1176.53 | 0.00-0.06 | Li et al., 2015 |
| 10 | P, H | Rice | 16 | Ⅳ | 1.00-126.65 | 1.00-72.19 | THg, MeHg | 0.03-10265.72 | 0.23-5.00 | 0.20-314.79 | Wang et al., 2014 |
| 11 | P | Rice | 8 | Ⅳ | 12.66-101.32 | 15.64-104.29 | THg | 0.93-10.68 | 10.23 | 1.53-10.19 | Zhou et al., 2014 |
| 12 | H | Water hyacinth | 3 | Ⅳ | 1.27 | 1.27 | THg | 162.02-3978.26 | 0.25 | 5.08 | Pacheco et al., 2014 |
| 13 | F | Rice | 40 | Ⅳ | 0.13-63.32 | 8.87-72.06 | THg, MeHg | 0.12-84.13 | 1179.67 | 0.01-0.06 | Li et al., 2019 |
| 14 | P | Rice | 8 | Ⅳ, Ⅵ | 37.99 | 45.39 | MeHg | 0.08-1.42 | 10.97 | 4.50 | Wang et al., 2016a |
| 15 | P, Fo | Rice | 54 | Ⅳ, Ⅵ | 6.33-75.99 | 17.86-158.94 | MeHg | 0.02-2.33 | 11.72-0.01 | 0.68-207.14 | Wang et al., 2016b |
| 16 | F | Rice | 48 | Ⅳ | 253.29-6332.32 | 256.71-6335.74 | THg, MeHg | 0.03-8.02 | 16.98 | 15.12-373.05 | Xu et al., 2019 |
| 17 | P, Fo | Rice | 36 | Ⅳ, Ⅵ | 6.33-75.99 | - | IHg | 0.18-13.10 | 11.96 | - | Tang et al, 2017 |
| 18 | P | Rice | 4 | Ⅳ | 126.65-633.23 | - | MeHg, IHg | 0.01-0.16 | - | - | Lv et al, 2021 |
| 19 | P | Rice | 6 | Ⅳ, Ⅵ | 37.99-75.99 | - | MeHg | 0.20-1.88 | - | - | Wang et al., 2018 |
| 20 | F | Rice | 6 | Ⅳ | 253.29-6332.32 | - | THg | 0.19-0.61 | - | - | Yan et al., 2015 |
| 21 | H | Rice | 8 | Ⅳ | 184.90-1266.46 | 0.18-1.27 | THg | 0.84-984.86 | 0.50 | 0.37-2.54 | Zhou et al., 2012 |
| 22 | H | Rice | 2 | Ⅳ | 2.50 | 2.50 | THg | 16.62-1533.94 | 2.50 | 1.00 | Li et al., 2014 |
| 23 | H | Rice | 2 | Ⅵ | 2.50 | 2.50 | THg | 17.79-1499.20 | 2.50 | 1.00 | Zhou & Li, 2019 |
| 24 | P | Rice | 18 | Ⅳ, Ⅵ | 37.99-75.99 | 42.43-77.25 | THg, MeHg | 0.02-0.48 | 12.46 | 3.40-6.20 | Liu et al., 2022 |
| 25 | P | Wheat, Sorghum | 162 | Ⅳ | 12.66-37.99 | 27.28-65.27 | THg | 0.01-1.17 | 0.73-15.69 | 1.74-89.07 | Chen, 2009 |
| 26 | H | Rice | 50 | Ⅳ, Ⅵ | 0.15-0.98 | 0.15-0.98 | MeHg | 0.00-0.07 | 0.10 | 1.50-9.80 | Wang, 2015 |
| 27 | S | *Polygonatum sibiricum* | 26 | Ⅳ | 31.66-1053.08 | 31.66-1053.08 | THg | 4.27-23.53 | 74.78 | 0.42-21.17 | Teng, 2018 |
| 28 | P | Rice, Pak Choi | 56 | Ⅳ | 1.27-126.65 | - | Hg | 0.25-227.53 | - | - | Guo, 2019 |
| 29 | H | Alfalfa | 2 | Ⅳ | 63.32 | 63.32 | THg | 0.39-0.44 | 0.00-7.48 | 8.47 | Chen, 2016 |
| 30 | H | Maize | 2 | Ⅳ | 379.94 | 379.94 | THg | 63.74-84.04 | 249.27 | 1.52 | Du & Yu, 1987 |
| 31 | H | Rice | 2 | Ⅳ | 6.33 | 6.33 | THg | 12.45-1752.89 | 1.50 | 4.23 | Gao et al., 2017 |
| 32 | H | Gallic | 3 | Ⅳ | 126.65 | 126.65 | THg | 25.92-3399.32 | 49.85 | 2.54 | Yang et al., 2009 |
| 33 | P, H | Rice | 87 | Ⅳ, Ⅵ | 2.00-101.32 | 2.00-104.29 | THg | 0.95-513.33 | 0.00-10.23 | 0.20-10.19 | Zhang, 2016 |
| 34 | S | *Gynostemma pentahyllum*, *Ampelopsis grossedentata* | 19 | Ⅳ | 6.33-1266.46 | 6.33-1266.46 | THg | 0.26-13.31 | 24.93 | 0.25-50.81 | Dun, 2016 |
| 35 | S | *Trillium tschonoskii* | 7 | Ⅳ | 63.32-506.59 | 63.32-506.59 | THg | 58.95-178.80 | 49.85 | 1.27-10.16 | Jiang et al., 2016 |
| 36 | P | *Reineckea carnea* | 4 | Ⅳ | 50.66-151.98 | - | THg | 0.96-1.32 | 0.73 | - | Cong et al., 2012 |
| 37 | H | Gallic | 90 | Ⅳ, Ⅵ | 0.13-633.23 | 0.13-633.23 | THg | 0.00-9.56 | 0.05-249.26 | 0.00-12702.00 | Zhao et al., 2020 |
| 38 | Fo | Rice | 12 | Ⅳ | 2.53-63.32 | 5.51-66.30 | THg | 1.84-8.54 | 10.23 | 0.54-6.48 | Zhang et al., 2017 |

# P - Pot culture experiment; H - Hydroponic culture experiment; S - Sand culture experiment; F - Field culture experiment; Fo - Foliar fertilization experiment.

**Table S2** General information for the categorical data used in the meta-analysis.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | *k* | Articles | Plantspecies | Range(Seadd)(μmol/kg) | Average Concentration(Seadd)(μmol/kg) | Range(Hggrowth media)(μmol/kg) | Average Concentration(Hggrowth media)(μmol/kg) |
| Complete dataset | 1193 | 38 | 16 | 0.13-6332.32 | 181.87 | 0.00-1179.67 | 69.55 |
| Cultivation method | Pot | 576 | 18 | 7 | 1.27-633.23 | 36.71 | 0.16-207.14 | 17.91 |
|  | Hydroponic | 318 | 13 | 5 | 0.13-1266.46 | 132.15 | 0.00-598.53 | 75.61 |
|  | Sand | 156 | 7 | 8 | 6.33-1583.08 | 196.50 | 0.00-74.78 | 29.93 |
|  | Field | 99 | 4 | 1 | 0.13-6332.32 | 1181.97 | 16.98-1179.67 | 414.95 |
|  | Foliar | 44 | 3 | 1 | 2.53-63.32 | 26.17 | 10.23 | 10.23 |
| Exogenous Se speciation | Se(Ⅳ) | 786 | 32 | 16 | 0.13-6332.32 | 103.63 | 0.00-1179.67 | 81.52 |
|  | Se(Ⅵ) | 401 | 14 | 5 | 0.13-6332.32 | 340.31 | 0.05-498.53 | 47.55 |
| Plant Hg speciation | THg | 959 | 32 | 16 | 0.13-6332.32 | 160.16 | 0.00-1179.67 | 76.94 |
|  | MeHg | 196 | 10 | 1 | 0.13-6332.32 | 310.35 | 0.10-207.14 | 34.24 |
|  | IHg | 38 | 2 | 1 | 6.33-633.23 | 77.14 | 11.96 | 11.96 |
| Se/Hg molar ratio | Se/Hg ≤1 | 187 | 18 | 7 | 0.13-126.65 | 15.95 | 0.50-1179.67 | 282.01 |
|  | 1< Se/Hg ≤3 | 216 | 20 | 11 | 0.13-1266.46 | 75.90 | 0.05-498.53 | 34.83 |
|  | Se/Hg >3 | 509 | 25 | 14 | 0.50-6332.32 | 331.74 | 0.05-74.78 | 11.09 |
| Plant Hg BAF | Root | 329 | 24 | 10 | 0.13-6332.32 | 133.16 | 0.05-1179.67 | 57.59 |
|  | Stem | 70 | 6 | 3 | 0.13-6332.32 | 356.70 | 0.05-498.53 | 110.73 |
|  | Leaf | 89 | 7 | 5 | 0.13-6332.32 | 373.24 | 0.05-498.53 | 92.41 |
|  | Grain | 82 | 10 | 3 | 0.13-6332.32 | 186.33 | 0.05-1179.67 | 181.09 |
| Growth stage | Seedling | 195 | 12 | 5 | 0.15-379.94 | 22.73 | 0.00-249.26 | 8.88 |
|  | Mature | 411 | 17 | 4 | 0.13-6332.32 | 339.55 | 0.23-1179.67 | 132.97 |
| Rice only | 517 | 22 | 1 | 0.13-6332.32 | 269.20 | 0.00-1179.67 | 92.98 |
| Cultivation method | Pot | 244 | 12 | 1 | 1.27-633.23 | 47.60 | 0.16-207.14 | 30.03 |
|  | Hydroponic | 130 | 8 | 1 | 0.15-126.65 | 12.47 | 0.00-48.85 | 5.06 |
|  | Field | 99 | 4 | 1 | 0.13-6332.32 | 1181.97 | 16.98-1179.67 | 414.95 |
|  | Foliar | 44 | 3 | 1 | 2.53-63.32 | 26.17 | 10.23 | 10.23 |
| Exogenous Se speciation | Se(Ⅳ) | 324 | 17 | 1 | 0.13-6332.32 | 73.57 | 0.00-1179.67 | 149.33 |
|  | Se(Ⅵ) | 187 | 9 | 1 | 0.15-6332.32 | 629.02 | 0.10-207.14 | 20.49 |
| Plant Hg speciation | THg | 283 | 16 | 1 | 0.13-6332.32 | 257.97 | 0.00-1179.67 | 133.03 |
|  | MeHg | 196 | 10 | 1 | 0.13-6332.32 | 310.35 | 0.10-207.14 | 34.24 |
|  | IHg | 38 | 2 | 1 | 6.33-633.23 | 77.14 | 11.96 | 11.96 |
| Se/Hg molar ratio | Se/Hg ≤1 | 71 | 10 | 1 | 0.13-63.32 | 10.76 | 0.50-1179.67 | 473.53 |
|  | 1< Se/Hg ≤3 | 82 | 8 | 1 | 0.15-126.65 | 14.88 | 0.10-49.85 | 8.68 |
|  | Se/Hg >3 | 206 | 12 | 1 | 0.50-126.65 | 535.64 | 0.05-16.98 | 8.67 |
| Plant Hg BAF | Root | 118 | 13 | 1 | 0.13-6332.32 | 131.11 | 0.05-1179.67 | 77.00 |
|  | Stem | 8 | 2 | 1 | 12.66-6332.32 | 1628.99 | 10.23-16.98 | 15.30 |
|  | Leaf | 8 | 2 | 1 | 12.66-6332.32 | 1628.99 | 10.23-16.98 | 15.30 |
|  | Grain | 64 | 9 | 1 | 0.13-6332.32 | 232.20 | 0.23-1179.67 | 229.42 |
| Growth stage | Seedling | 142 | 9 | 1 | 0.15-126.65 | 14.63 | 0.00-49.85 | 4.86 |
|  | Elongation | 19 | 2 | 1 | 2.53-101.32 | 44.13 | 10.23 | 10.23 |
|  | Booting | 27 | 2 | 1 | 2.53-101.32 | 45.12 | 10.23 | 10.23 |
|  | Mature | 329 | 16 | 1 | 0.13-6332.32 | 425.69 | 0.23-1179.67 | 173.38 |
| Plant part | Root | 161 | 18 | 1 | 0.13-6332.32 | 192.88 | 0.00-1179.67 | 61.53 |
|  | Stem | 33 | 5 | 1 | 1.27-6332.32 | 916.96 | 10.23-16.98 | 14.95 |
|  | Leaf | 22 | 3 | 1 | 1.27-6332.32 | 1192.89 | 10.23-16.98 | 16.02 |
|  | Grain | 134 | 16 | 1 | 0.13-6332.32 | 370.84 | 0.23-1179.67 | 172.25 |
| Rice excluded | 676 | 17 | 15 | 0.13-1583.08 | 119.21 | 0.00-498.53 | 53.19 |
| Cultivation method | Pot | 332 | 7 | 6 | 1.27-151.98 | 28.70 | 0.25-15.69 | 8.03 |
|  | Hydroponic | 188 | 5 | 4 | 0.13-1266.46 | 214.91 | 0.05-498.53 | 124.39 |
|  | Sand | 156 | 7 | 8 | 6.33-1583.08 | 196.50 | 0.00-74.78 | 29.93 |
| Exogenous Se speciation | Se(Ⅳ) | 462 | 16 | 14 | 0.13-1583.08 | 123.66 | 0.00-498.53 | 43.85 |
|  | Se(Ⅵ) | 214 | 5 | 4 | 0.13-1266.46 | 109.60 | 0.05-498.53 | 75.77 |
| Se/Hg molar ratio | Se/Hg ≤ 1 | 116 | 8 | 6 | 0.13-126.65 | 19.12 | 4.99-498.53 | 164.79 |
|  | 1 < Se/Hg ≤ 3 | 134 | 12 | 10 | 0.13-1266.46 | 113.24 | 0.05-498.53 | 50.83 |
|  | Se/Hg > 3 | 339 | 13 | 13 | 1.27-1583.08 | 193.13 | 0.05-74.78 | 12.73 |
| Plant Hg BAF | Root | 211 | 11 | 9 | 0.13-1583.08 | 121.60 | 0.05-498.53 | 46.63 |
|  | Stem | 62 | 4 | 2 | 0.13-1266.46 | 192.53 | 0.05-498.53 | 123.04 |
|  | Leaf | 81 | 5 | 4 | 0.13-1266.46 | 249.22 | 0.05-498.53 | 100.23 |
|  | Grain | 18 | 1 | 2 | 0.13-37.99 | 23.23 | 0.05-15.69 | 9.24 |
| Growth stage | Seedling | 53 | 3 | 4 | 12.66-379.94 | 44.45 | 0.73-249.26 | 19.66 |
|  | Mature | 82  | 2 | 3 | 1.27-126.65 | 27.55 | 0.73-15.69 | 8.66 |