**Supplementary Material**

**Effects of co-pyrolysis of rice husk and sewage sludge on the** **bioavailability and environmental risks of** **Pb and Cd**

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**Table S1**

The modified BCR three-step sequential extraction procedure.

|  |  |  |
| --- | --- | --- |
| Fraction | Extraction reagents | Extraction conditions |
| F1 Soluble and exchangeable metals | 20 mL, 0.01 M HAc | Oscillating, 22 ± 5 C, 16 h |
| F2 Carbonates, oxides and reducible metals | 20 mL, 0.50 M NH2OH·HCl | Oscillating, 22 ± 5 C, 16 h |
| F3 Metals bound to organic matter,  oxidisable and sulphidic metals | First, 5 mL, 30%,(v/v) H2O2,  Next, 5 mL, 30% (v/v) , H2O2,  Last, 25 mL, 1.0 M, CH2COONH4 | First, water bath, 85 ± 5 C,1 h,  Next, water bath, 85 ± 5 C,1 h,  Last, Oscillating, 22 ± 5 C, 16 h |
| F4 Residual metals such as silicates | 5 mL, HNO3 | Microwave digestion system |

**Table S2**

The environmental risk and risk classification methods in term of the risk assessment code (RAC)

|  |  |  |
| --- | --- | --- |
| The percentage of F1 fraction | Environmental Risk | Risk classification |
| RAC < 1 % | safe to the environment | no risk (NR) |
| 1 % ≤ RAC < 10 % | relatively safe to the environment | low risk (LR) |
| 10 % ≤ RAC < 30 % | relatively dangerous to the environment | medium risk (MR) |
| 30 % ≤ RAC < 50 % | dangerous to the environment | high risk (HR) |
| RAC≥50 % | very dangerous to the environment | very high risk (VHR) |

**Table S3**

The original metal content of Pb and Cd in the samples (50g) at different mixture ratio before pyrolysis.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Original metal content (g) | | | |
| b0 | b10 | b30 | b50 |
| Pb | 100.00 | 90.00 | 70.01 | 50.01 |
| Cd | 2.25 | 2.03 | 1.58 | 1.13 |

**Table S4**

The recovery rate (%) of Pb and Cd during the co-pyrolysis process.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T |  | Recovery rate of Pb (%) | | | |  | Recovery rate of Cd (%) | | | |
| b0 | b10 | b30 | b50 |  | b0 | b10 | b30 | b50 |
| 300 ℃ |  | 101.2 | 87.0 | 90.1 | 110.8 |  | 103.7 | 91.1 | 100.3 | 106.2 |
| 400 ℃ |  | 93.6 | 83.5 | 83.8 | 97.4 |  | 96.6 | 91.3 | 88.9 | 104.4 |
| 500 ℃ |  | 96.5 | 83.5 | 89.7 | 93.0 |  | 97.5 | 89.9 | 92.6 | 104.4 |
| 600 ℃ |  | 103.8 | 93.9 | 88.7 | 110.2 |  | 97.5 | 86.9 | 88.1 | 114.6 |