

**Supplementary Table S3** Subgroups of biochar properties with their empirical thresholds

| Biochar properties                 | Classification standard |               | Name of group |             |                                      |
|------------------------------------|-------------------------|---------------|---------------|-------------|--------------------------------------|
| PT/°C                              | < 400                   | 400-600       | > 600         |             |                                      |
|                                    | PT (< 400)              | PT (400-600)  | PT (> 600)    |             |                                      |
| Size/mm                            | < 4                     | > 4           |               |             |                                      |
|                                    | Size (< 2)              | Size (> 4)    |               |             |                                      |
| C/N                                | < 100                   | 100-200       | > 200         |             |                                      |
|                                    | C/N (< 100)             | C/N (100-200) | C/N (> 200)   |             |                                      |
| EC/ms cm <sup>-1</sup>             | < 1.5                   | > 1.5         |               |             |                                      |
|                                    | EC (< 1.5)              | EC (>1.5)     |               |             |                                      |
| SA/m <sup>2</sup> g <sup>-1</sup>  | < 100                   | > 100         |               |             |                                      |
|                                    | SA (< 100)              | SA (> 100)    |               |             |                                      |
| pH                                 | < 9.3                   | > 9.3         |               |             |                                      |
|                                    | pH (< 9.3)              | pH (> 9.3)    |               |             |                                      |
| AR/%                               | < 8                     | 8-12          | > 12          |             |                                      |
|                                    | AR (< 8)                | AR (8-12)     | AR (> 12)     |             |                                      |
| PV/cm <sup>3</sup> g <sup>-1</sup> | < 0.02                  | > 0.02        |               |             |                                      |
|                                    | PV (< 0.02)             | PV (> 0.02)   |               |             |                                      |
| FT                                 | Wood                    | Straw         | Husk          | Bamboo      | Mature/Green Waste/<br>sewage sludge |
|                                    | FT (Wood)               | FT (Straw)    | FT (Husk)     | FT (Bamboo) | FT (M/G/SS)                          |

Note: PT, pyrolysis temperature; C/N, carbon to nitrogen; EC, electricity conductivity; SA, surface area; AR, amendment rate; PV, pore volume; FT, feedstock type.