

Summary of Revisions in the *IBI Biochar Standards V2.0*

Version 2.0 of the *IBI Biochar Standards* contains four policy revisions—which were approved via a 88% majority vote of IBI members after extensive discussion, multiple webinars seeking stakeholder and public input, and expert consultation. This version also contains several technical program revisions and minor editorial revisions. Below we summarize the policy and technical program revisions.

I. Policy Revisions

A. Testing requirements for weathered biochar

1. Inclusion of a new requirement to re-test biochar that has experienced “significant weathering”—defined as exposure to precipitation events.
2. See Section 5.6.

B. Timing of testing for post-processed biochar

1. Clarification was issued on when sampling and testing of biochar should occur with respect to different post-processing methods. Various known post-processing methods are listed.
2. See Section 5.7.

C. Provisions for high carbon biomass ash

1. A new provision that material derived from the ash fractions of bioenergy generation facilities is permitted for consideration as biochar with strict requirements around permissible feedstocks, sampling and testing for potential toxicants, and documentation of extraction and segregation processes.
2. See Section 5.8.

D. Biochar sampling procedures

1. Inclusion of new biochar sampling procedures that simplify and customize sampling approaches for biochar.
2. See Section 5.1 and Appendix 4.

II. Technical Program Revisions

A. Best Management Practices for Biochar Storage

1. Recommendations on practices to minimize biochar weathering through proper storage of biochar have been incorporated.
2. See Section 3.2.

B. Liming Test Method

1. The liming test method was switched from Rayment & Higginson (1992) to AOAC International 955.01.
2. See Table 1.

C. Particle Size Distribution Test Method

1. The particle size classes to be determined were revised.
2. See Table 1.

D. PAHs Test Method

1. Soxhlet extraction method and 100% toluene solvent must be used within US Environmental Protection Agency (EPA) 8270.

2. US EPA 8275 is no longer accepted as a test method.
 3. See Table 2.
- E. Laboratory Standards
1. Inclusion of a new requirement that laboratories that conduct biochar testing must be accredited by relevant environmental laboratory accreditation programs.
 2. See Section 5.2.
- F. Material Changes in Feedstock Composition
1. Clarification was issued on determining a material change in feedstock composition, which modifies the re-testing requirements.
 2. See Section 5.4 and Appendix 6.
- G. Technical Notes
1. Inclusion of new text indicating that time-sensitive technical program revisions may be issued via technical notes prior to the publication of new sub-versions of the *IBI Biochar Standards*.
 2. See Section 6.2.
- H. Expanded Information on Test Methods for Category B Toxicants
1. Test methods for metals and metalloids in Category B largely cite methods in the US Composting Council Test Methods for Examination of Composting and Compost (TMECC). A new appendix clarifies allowable test methods within the TMECC.
 2. See Appendix 1.
- I. PAH, PCDD/F and PCB Compounds to be Tested
1. Polycyclic aromatic hydrocarbons (PAHs), dioxins/furans (PCDD/Fs), and polychlorinated biphenyls (PCBs) are each suites of related chemical compounds (congeners), sometimes numbering in the hundreds. A new appendix lists the compounds to be tested for each class of organic pollutant based on lists compiled by the US EPA and the World Health Organization (WHO).
 2. See Appendix 2.
- J. Maximum Allowed Thresholds (MATs) for Toxicants under Australian Legislation
1. In 2013, Australia amended its National Environment Protection (Assessment of Site Contamination) Measure 1999 which lists limits for soil contaminants. For biochars tested in Australia, revised MATs are listed for: total PAHs, total PCBs, copper, mercury, nickel, selenium, and zinc.
 2. See Appendix 3 Table A3.1.
- K. MAT for PCDD/Fs
1. The MAT for PCDD/Fs is updated based on legislation from Canada that does not assume application rates of biochar to soils.
 2. See Appendix 3 Table A3.1.
- L. PAH and PCDD/F Toxic Equivalency (TEQ)
1. A new MAT is included for the 8 carcinogenic PAHs (as defined by the US EPA) that utilizes the Benzo(a)Pyrene TEQ approach.
 2. Clarification was issued for PCDD/Fs that reporting is based on WHO Toxic Equivalency Factors (TEFs).
 3. To calculate TEQ, TEFs are listed for PAHs and PCDD/Fs from Australian and WHO citations, respectively.
 4. See Appendix 3 Tables A3.1, A3.2, and A3.3.