



IBI Biochar Standards and Testing Guidelines – Process and History

Introduction

The International Biochar Initiative (IBI) is a non-profit organization whose mission is to promote the development of biochar systems that follow cradle-to-cradle sustainability guidelines. In pursuit of this IBI supports the generation, review and dissemination of credible information on all aspects of biochar, and the development of sustainability guidelines that can be used to monitor and evaluate biochar projects and systems against these guidelines.

IBI has adopted a strategic plan to support the commercialization of sustainable biochar systems at all scales that will help solve the global food security crisis and the global climate change crisis by enhancing soil fertility, avoiding greenhouse gas emissions and sequestering stable carbon in soils. IBI recognizes that in order for a sustainable biochar industry to succeed, it must be able to provide certainty to consumers and markets about biochar and its safety for use as a soil amendment. The industry must be able to define, analyze and communicate the essential characteristics that define biochar, and what biochar is, as well as what it is not. To do this, standardized guidelines and tests are needed to confirm that a product intended for sale or use as biochar possesses the necessary characteristics for safe use.

Accordingly, since May 2009, IBI has been engaged in a global, transparent, and inclusive process for creating the [*Standardized Product Definition and Product Testing Guidelines for Biochar That Is Used in Soil*](#) (herein after referred to as: *Biochar Standards and Testing Guidelines*.) This paper describes the goals, history and outcomes of this process.

IBI would like to sincerely thank the global biochar community for their participation and support throughout this entire process. We would especially like to thank our funders, our members, our Board of Directors, Leading Carbon, Ltd, Brooks Pierce, LLP and the working group participants and collaborators who dedicated themselves to the process and the development of this document.

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Goals

IBI undertook a comprehensive and open process to develop Biochar Standards with the goal of providing a common framework for analyzing and comparing biochar materials that would be of use to the emerging biochar industry as well as to researchers and other stakeholders. The process and the document were specifically established with the intent to allow the Biochar Standards to evolve over time, as science and further developments in the biochar field warrant updates and revisions.

The process was designed to be collaborative and inclusive. As the document was developed, public input from the international biochar community was continuously sought to ensure multiple perspectives on the use and functionality of this tool. The process design also provided for a final balloting period that would allow all registered, current members of IBI to vote whether or not to adopt the Biochar Standards. This open and transparent process would also allow other entities to easily adopt the Biochar Standards as the basis for their own regulatory or certification schemes.

IBI's ultimate goal is to establish a biochar certification process based on the Biochar Standards to assist in establishing a biochar industry and drive the commercialization of biochar. Certification will allow a biochar seller to have the material certified and labeled to show that it meets established criteria that ensure it is safe for use as a soil amendment, and that it will have certain additional impacts, such as creating a stable carbon sink.

Summary and Overview of the Process

IBI began the Biochar Standards process in May 2009 with a scoping phase that resulted in an initial seed document, the ***Biochar Characterization Discussion Document***. This document was presented at several different public conferences over a one-year period. IBI staff collected comments at these fora, and held email discussions with stakeholders through July 2010. IBI raised funds to hire a consultant, Leading Carbon Ltd, to continue with this open, public process and in September 2010, IBI invited stakeholders to join an International Working Group to begin revisions on ***Working Draft Document 1***. Twenty-four participants from 16 countries met over four months and produced ***Working Draft Documents 2 and 3***. The public was invited to submit comments throughout this time. An in-person meeting in July 2011 resulted in ***Final Draft Document 1***. Comments specific to ***Final Draft Document 1*** were received in October-November 2011. This input was used to inform the next revision, ***Final Draft Document 2***, which was posted for public review and comments in January 2012. Additional public comments received specific to this draft helped to inform the ***Final Biochar Standards and Testing Guidelines***. Following a legal review, IBI posted this final document online in April 2012 for review and approval by IBI Membership. In a two-week open ballot ending May 6, 2012, IBI Members approved the final ***Biochar Standards and Testing Guidelines*** by a 91% majority.

Figure 1, below, is the process flow chart for the entire process, from the initial scoping phase to the final approval by IBI Membership. Figure 2 is a list of all of the draft documents, indicating the dates and participants in document drafting and revision.

IBI Biochar Standards and Testing Guidelines Timeline Flow Chart

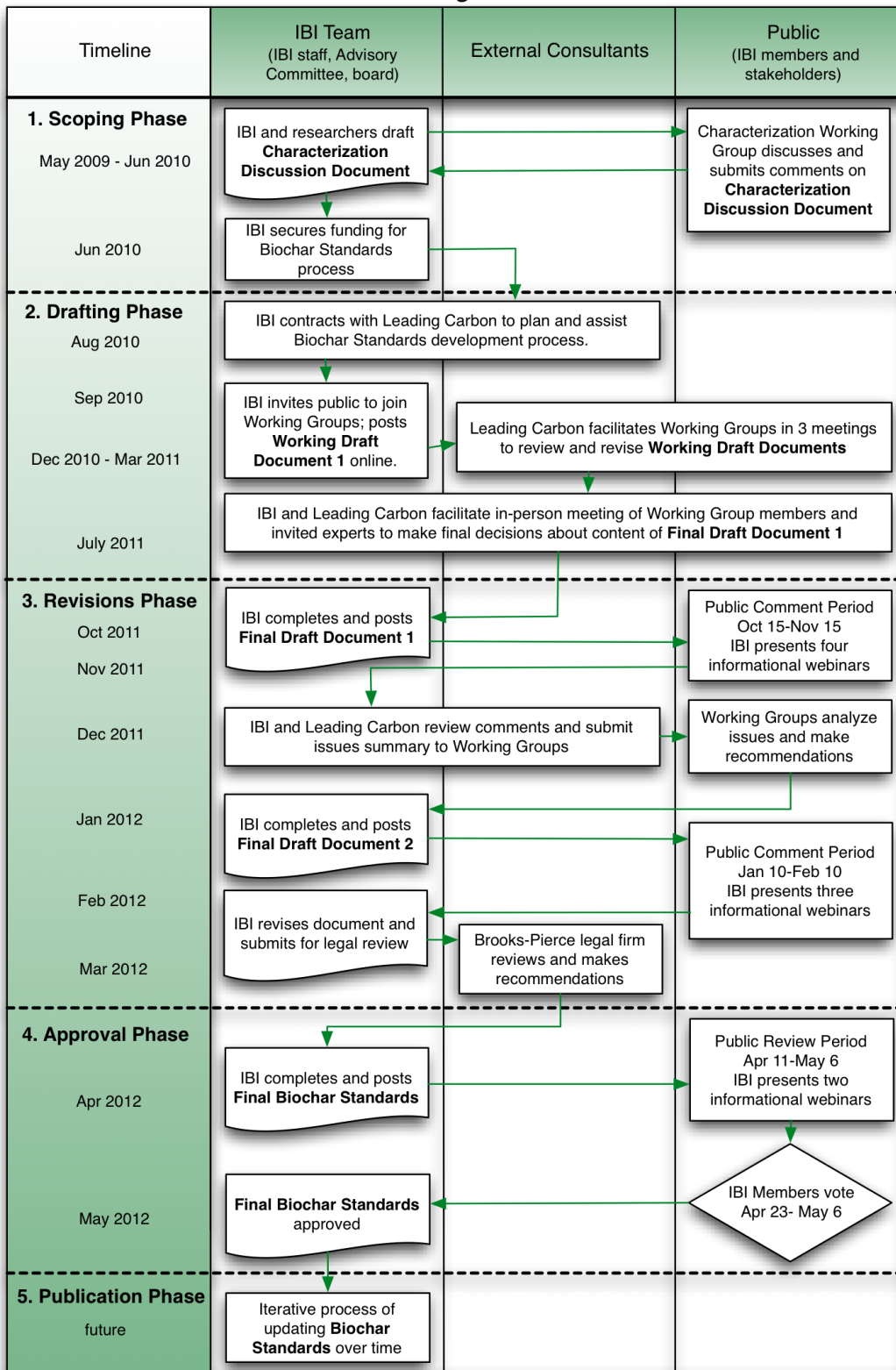


Figure 1. Process flowchart for the IBI Biochar Standards and Testing Guidelines.

Dates	Documents	Participants
May 2009 – August 2010	<i>Biochar Characterization Discussion Document</i>	IBI, Australia and New Zealand Biochar Researchers Network, Biochar Characterization Workgroup, stakeholders
September - December 2010	<i>Working Draft Document 1</i>	Leading Carbon
December 2010 – June 2011	<i>Working Draft Documents 2 and 3</i>	IBI, Leading Carbon, Working Groups, stakeholders
July 2011 – January 2012	<i>Final Draft Documents 1 and 2</i>	IBI, Leading Carbon, Working Groups, stakeholders
February – April 2012	<i>Final Biochar Standards and Testing Guidelines</i>	IBI, Leading Carbon, Working Groups, stakeholders, legal consultants Brooks Pierce

Figure 2. List of document drafts, dates and key participants in drafting and revision.

Phase 1: Scoping

In May 2009, at the Asia Pacific Biochar Conference in Gold Coast, Australia, IBI initiated public discussion of a biochar standard to provide a definition of biochar and a classification scheme across feedstocks, production systems and applications. Members of the Australia and New Zealand Biochar Researchers Network agreed to draft a *Biochar Characterization Discussion Document* to start the process. IBI held an open forum to review and discuss that document at the North American Biochar Initiative conference held in July 2009 in Boulder, Colorado in the USA. IBI announced the online posting of the document in its August 2009 newsletter, inviting public comment on the document and participation in a Biochar Characterization Workgroup to further develop the ideas presented in the *Biochar Characterization Discussion Document*.

In October 2009, IBI convened the first international Biochar Characterization Workgroup, composed of 56 volunteers from nine countries, active in biochar research, production and use, to lay out the scope of the effort and identify the critical components needed to define and characterize biochar. This effort was conducted via email discussions.

In June 2010, IBI presented the *Biochar Characterization Discussion Document* to attendees of the US Biochar Initiative Conference in Ames, Iowa, and announced the beginning of a drafting phase to produce the Biochar Standards.

Phase 2: Drafting

IBI's goal was to produce Biochar Standards that could be easily adopted and used by any regulatory or certification agencies or entities that wished to do so. A transparent and open process, congruent with processes used by international standard setting bodies such as the International Standards Organization (ISO), would be necessary to give regulatory agencies, government entities and others confidence in the usefulness and integrity of the Biochar Standards. IBI researched standard-setting processes and bodies, and in August 2010, contracted with an expert in the field, Leading Carbon Ltd, to help guide the standard setting work in the open, transparent, collaborative and documented process that was required. Leading Carbon began by

analyzing the *Biochar Characterization Discussion Document* and ancillary materials from the Biochar Characterization Workgroup. From this material, they produced *Working Draft Document 1*.

In a formal presentation at the IBI 2010 International Biochar Conference in Rio de Janeiro, Brazil in September 2010, Leading Carbon announced that IBI was seeking nominations to participate in the drafting phase of the *Biochar Standards and Testing Guidelines* International Working Group. The invitation for nominations of Working Group members was thereafter extended to all IBI members and subscribers and other stakeholders through announcements in the IBI Newsletter (sent to approximately 3,000 subscribers) and on the IBI website.

IBI received more than 80 applications to join the Working Group. Based on technical expertise, geographic representation, and potential contributions to the process, 24 Working Group participants were selected, and assigned to one of two geographically based Working Groups to allow for convenient meetings across different time zones. The Working Groups included participants from North America, South America, and Africa; and Asia, Europe, Australia, and New Zealand, respectively. Working group members are listed in Appendix A: List of Participants.

The Working Groups were provided with *Working Draft Document 1*, and each group met three times by phone over a 4-month period, from December 2010 through March 2011. Leading Carbon staff facilitated the meetings and harmonized the information and work products from each of the two groups.

During this process, a constraint identified by the Working Groups was the challenge of finding commonly available standardized testing and assessment methods specific to biochar. As a relatively new material, there exist only a limited number of published tests specifically designed to analyze biochar's properties. In the future, as published and standardized tests specifically designed for biochar become available, it is anticipated that the tests utilized in the Biochar Standards will evolve and improve.

Key issues that were addressed by the Working Groups included: determining which biochar properties to test; appropriate tests to measure chemical and physical properties; world-wide accessibility of tests to biochar producers; biochar material classification schemes; feedstock definitions; and determining acceptable thresholds for potential toxicants. These discussions are all captured in Working Group Meeting Minutes 1-3, posted on [the IBI website](#). Throughout this process all the *Working Draft Documents* (1-3) were posted on line for public input. IBI announced the posting of each draft in its monthly newsletter and invited the public to send comments to Leading Carbon. These comments were summarized by Leading Carbon and forwarded to the Working Groups for consideration.

To conclude the Drafting Phase, IBI invited a small subset of the Working Groups, along with some additional experts, to an in-person workshop in Frankfurt, Germany on July 26-27, 2011, in order to create a final draft document and to grapple with some unresolved issues. Leading Carbon facilitated the workshop with help from IBI staff. The discussions are recorded as Working Group Meeting Minutes 4, posted on the IBI website.

Phase 3: Revisions

IBI and Leading Carbon consolidated the decisions from the workshop into *Final Draft Document 1* for public review. This document was posted online on October 10th, 2011. A thirty-day comment period specific to this draft document was widely publicized through the IBI newsletter and website, and notifications were sent to the biochar networks on Facebook, Twitter, LinkedIn and the Yahoo Group biochar discussion lists, as well as related networks focused on biomass utilization. A dedicated email address was provided for submission of public comments. During the October 15th through November 15th comment period, IBI conducted four informational webinars that were free and open to the public to explain the Biochar Standards and answer questions. Approximately 100 participants from around the world attended the webinars.

IBI received comments during the comment period from individuals as well as from academic groups composed of dozens of researchers. The comments, posted on the IBI website, brought up many critical issues and ideas. Due to the extensive nature of some of the comments and resulting changes to the Biochar Standards, IBI added an additional review and comment period to the process schedule.

The Working Groups were reconvened in December 2011 to review the comments received on *Final Draft Document 1* and resolve issues. These discussions were conducted solely through email. All of the Working Group members, attendees from the Frankfurt Workshop, and several other experts (see Appendix A: List of Participants) were invited to participate in four topical areas of discussion: carbon and ash content; toxicant assessment; optional enhancement properties; and determining feedstock changes. These discussions are recorded as Working Group Meeting Minutes 5, posted on the IBI website.

IBI and Leading Carbon incorporated the recommendations into *Final Draft Document 2*. The most significant changes as a result of the October 15th – November 15th, 2011 comment period were: changing the maximum ash requirement to a minimum carbon requirement; addition of a grading system based on carbon content; a change in the classification scheme from levels to categories in order to eliminate confusion; additional toxicant reporting requirements; and a new system of threshold ranges for toxicants to allow producers to follow their own country's standards. New appendices were also added to provide guidance on appropriate laboratory methods for working with biochar, and on methods of determining feedstock changes. Technical issues around toxicant thresholds and the method of assessing carbon stability were also addressed in appendices.

Final Draft Document 2 was posted online on January 10th, 2012, and another thirty-day public comment period was initiated from January 10th – February 10th, 2012. Three additional informational webinars were offered to the public during this period, with approximately 150 attendees. Comments and questions from the webinars, along with all other comments submitted during this period, are available on the IBI website.

Following the comment period, experts were again consulted to address specific issues. IBI sought the help of additional experts not originally part of the International Working Groups, primarily for

the purpose of examining toxicant issues in more depth. These experts are acknowledged in Appendix A: List of Participants.

IBI and Leading Carbon reviewed the comments and expert recommendations and incorporated them into a final *Biochar Standards and Testing Guidelines* document. Changes made to the draft included: changes to some test methods; a new threshold level for dioxins; higher carbon content thresholds; additional restrictions on the definition of “unprocessed” feedstocks; and changes to testing frequency requirements.

Before submitting the final *Biochar Standards and Testing Guidelines* to a ballot, the revised document was reviewed by a legal firm (Brooks Pierce). Their recommendations on the document title, copyright and ownership, disclaimer language, and the testing categories associated with different feedstocks were incorporated into the final document, now titled: *Standardized Product Definition and Product Testing Guidelines for Biochar That Is Used in Soil*. This final document was posted online on April 11th, 2012, in preparation for balloting.

Phase 4: Approval

The process of creating and adopting the *Biochar Standards and Testing Guidelines* was designed to be open and collaborative, including a democratic approach to the final decision. All currently registered, dues-paying members of IBI were eligible to cast a vote to approve or reject the *Biochar Standards and Testing Guidelines* in a two-week long online ballot. A simple majority, based on the total votes cast, was the established criteria that would decide the outcome.

In preparation for balloting, IBI posted the final document online on April 11th, 2012, and hosted two public informational webinars to assist stakeholders in understanding the content of the final *Biochar Standards and Testing Guidelines*, the most recent changes to the document, and to answer any questions. The balloting period ran from April 23rd, 2012 through May 6th, 2012.

On May 9th, 2012, IBI announced the results of the *Biochar Standards and Testing Guidelines* balloting process. The IBI Membership approved the *Standardized Product Definition and Product Testing Guidelines for Biochar* by a 91% majority. Of eligible membership, 24% voted.

Phase 5: Publication

Publication of the *Final Biochar Standards and Testing Guidelines* is not the conclusion of the Biochar Standards process, but rather the beginning of a new phase where the *Biochar Standards and Testing Guidelines* will be tested in practical applications. IBI expects that the document will evolve in an iterative fashion as science and further developments in the biochar field warrant updates and revisions.

Appendix A: List of Participants

Phase 1: Scoping – Biochar Characterization Discussion Document

Australia and New Zealand Biochar Researchers Network

- Paul Blackwell
- Marta Camps
- Annette Cowie
- Adriana Downie
- Mark Glover
- Stephen Joseph
- Steve Kimber
- Evelyn Krull
- Paul Munroe
- Balwant Singh
- Bhupinderpal Singh
- Lukas Van Zwieten

Phase 2: Drafting – Working Draft Documents 2 and 3

Working Group #1: North America/South America/Africa

- Jim Amonette, United States
- Jason Aramburu, United States
- Louis de Lange, South Africa
- Mariam Ekebafé, Nigeria
- Jesus Garcia, Colombia
- Johannes Lehmann, United States
- Kim Magrini, United States
- Hugh McLaughlin, Canada
- Rene Pigeon, Canada
- Joseph Pignatello, United States
- Rogerio Traballi, Brazil
- Sunguo Wang, Canada

Working Group #2: Asia/Europe/Australia/New Zealand

- Marta Camps, New Zealand
- Thomas Harttung, Denmark
- Michael Hayes, Ireland
- Stephen Joseph, Australia
- Rupam Katak, India
- Guitong Li, China
- Franco Miglietta, Italy
- Amran Salleh, Malaysia
- Yoshiyuki Shinogi, Japan
- Balwant Singh, Australia

- Saran Sohi, United Kingdom
- Lukas Van Zwieten, Australia

Participants, in-person workshop in Frankfurt, Germany on July 26-27, 2011

- Marta Camps, New Zealand
- Stephen Joseph, Australia
- Johannes Lehmann, United States
- Cordner Peacocke, [C.A.R.E. Ltd.](#)
- Mike Sesko, [Encendia Biochar](#)
- Saran Sohi, United Kingdom
- Edward Someus, [3R Agrocarbon](#)

Phase 3: Revisions – Final Draft Document 2 and Final Biochar Standards and Testing Guidelines

Additional experts consulted on toxicant issues

- Gerard Cornelissen, Norway
- Manuel Garcia-Perez, United States
- Sarah Hale, Norway
- Claudia Kammann, Germany
- Isabel Lima, United States