Breaking Silos, Building Bridges; A Collaborative Scan of Definitions for Compost and Compostable Packaging

> We invite you to consider the following with a spirit of reflection, openness, and reconciliation. The Improving the Circularity of Compostables and Composting (IC3) event in 2024 was powerful, not because people had strong opinions, but because people found humility. Stakeholders looked inward for a time and brought personal responsibility and insight to a collective vision of trust and optimism. As with any volunteer-based effort, the fervor of the moment fades over time. But it is within our grasp anytime we wish to revive it.

Introduction

We are a multi-stakeholder group working at the intersection of commercial composting and compostable product manufacturing. This group originated from the 2024 *Improving the Circularity of Compostables and Composting* (IC3) Strategic Planning Event in Denver, Colorado, which brought together a diverse coalition of stakeholders[1], from product designers to compost manufacturers. The following is offered as an initial report of our work to date. This is Part 1 of a two-part report that examines the assumptions and underpinnings of the compostable products and compost manufacturing nexus.

How IC3 Sparked This Collaboration

"The definition of insanity is doing the same thing over and over again and expecting a different result." - **Anonymous**

While significant efforts have been made to bridge the gaps between all sectors of the compostable product and composting space, there was a general feeling that these efforts had not gone far enough to ignite true cross-sector efforts. The vision was to create a space

[1] Defined stakeholders groups for IC3: Brands & Retailers; Certifiers & Labs; Compost Manufacturers; Compost Technology & Infrastructure; Distributors; End Users; Generators; Hauling & Education; Innovation & Funding; Material & Product Designers; Material Manufacturers & Suppliers; Municipalities & Local Government; Packaging Distributors & Broadliners; Packaging Manufacturers; Policymakers & Influencers; Professional Associations & Industry Trade Groups; Regulatory Agencies (State & Federal); Research Institutions.

in which the members of the industry as a whole decided where to focus, rather than follow the agenda of one or two organizations.

"I talked to people I didn't know I needed to talk to, until I was there." - Josh Russo, LifeMade

In September 2024, 120 individuals representing nearly as many entities devoted three days to working together to map where we have been, where we are, and where we want to go to improve the circularity of composting and compostable packaging. Out of this, the group decided on ten initiatives to take forward. This group represents one of those initiatives.

Purpose of this Action Group

At IC3, stakeholders identified a key barrier to advancing compostable materials: **inconsistent standards and definitions for compostability**. While compostable packaging has the potential to increase organics diversion and support climate goals, unclear and misaligned definitions limit acceptance, create confusion, and thwart effective implementation across the system.

The founding objective of the group was to:

> *Create one national consensus-based public, scientific, transparent set of performance criteria to determine compostability based on an agreed-upon set of definitions that is responsive to innovation with a goal of international harmonization.*

The group worked to develop a shared problem statement[2] which led to a two-pronged action plan:

1. Establish single, consensus-based definitions of "compostable" and "composting"
2. Document and compare packaging and composting evaluation criteria and standards that address lab certification and real-world composting conditions

At the end of 2025, both projects yielded interesting outcomes. This paper provides the approach and results from the definitions exercise. A later paper will share the results for cross-comparing standards and certifications.

Scope and Limitations

This document maps the current compostability standards landscape and is anchored in existing ASTM and ISO standards. It identifies a functional gap—best described as a misalignment between laboratory testing and real-world composting outcomes—while legitimizing a broad range of stakeholder perspectives and preserving space for future harmonization.

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[2] Problem Statement: The lack of clear, consistent, and widely accepted standards for compostable packaging creates significant challenges in its adoption across composting facilities. The disconnect between certification requirements and real-world composting conditions, along with other sources of contamination, leads to distrust, confusion, and inconsistent acceptance, undermining efforts to divert organic waste from landfills.

This document does not redefine the term *"compostable."* It does not rank or endorse specific standards, test methods, or certification schemes, nor does it propose regulatory changes. Finally, it does not resolve existing disagreements or provide a direct path from test results to guarantees of real-world compostability across all composting systems.

Project 1: Seeking (and not finding!) Definitions-Consensus

> *"The limits of my language means the limits of my world."* – ***Ludwig Wittgenstein***

Why Definitions Matter

Compostable products are intended to support the circular economy by capturing and diverting organics, particularly food scraps, from disposal to compost systems. However, today:

- Standards for compostability vary by jurisdiction and certifying body
- Technical laboratory specifications do not always reflect actual product disintegration at organics processing facilities
- Stakeholders often use the term "compostable" with different assumptions and expectations
- Jurisdictions adopting clashing definitions and criteria for acceptance make it difficult for packaging manufacturers to work across regions

This disconnect hinders product design, policy development, certification, collection programs, and compost manufacturing operations. *Shared understanding is a prerequisite for collaboration, and this starts with shared language.*

Project Approach

The purpose of the definitions-consensus project was to to work toward unified, practical definitions that reflect real-world composting conditions and needs. The approach taken was to evaluate existing definitions for key terms, collaboratively develop a single, harmonized set of definitions, and get buy-in to adopt the harmonized set of definitions. Project stages were:

1. Select terms for definition
2. Identify groups from whom to seek input
3. Collect and compare definitions from recognized authorities
4. Consolidate into single definitions per term, while tracking key insights from the discussions about definitions
5. Seek consent / consensus for the use of these definitions across all engaged groups
6. Report on outcomes

Terms Selected

The group originally worked towards consensus on the definitions of 'composting' and 'compostable' but quickly realized the root term 'compost' was a required definition to

include. We reviewed existing definitions and surveyed stakeholders across sectors to understand how each of these terms were being used in-situ.

While researching these terms, additional terms used for reference-only included 'compostable product', 'compostability (for products)', 'biodegradable', 'anaerobic digestion', and 'home composting'.

Stakeholder Engagement

Twenty-two original members representing as many distinct organizations across seven sectors[3] kicked off the project. An additional 35 organizations were identified as relevant parties. Of these, we reached out to 18 individuals across seven sectors[4], and received feedback from eight individuals across four sectors.

Definitions Reviewed

Although definitions across a dozen organizations were reviewed, the three evaluated with the greatest scrutiny were from ASTM International, the Environmental Protection Agency (EPA), the Canadian Council of Ministers of the Environment (CCME) and the shared definitions of the US Composting Council (USCC) and Association of American Plant Food Control Officials (AAPFCO).

Definitions of Compost

Organization	'Compost' Definitions
USCC / AAPFCO	Compost - is the product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds, and stabilizes the carbon, such that it is beneficial to plant growth. Compost is typically used as a soil amendment, but may also contribute plant nutrients. *Source:* Association of American Plant Food Control Officials. (2018). AAPFCO *official publication no. 77.* Association of American Plant Food Control Officials. https://www.aafco.org/resources/publications/ *Accessed December 15, 2025.*
ASTM International	The product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. *Source*: ASTM D8618
EPA	A biologically stable soil amendment produced by the aerobic decomposition of organic materials. *Source*: EPA.gov

[3] Sectors represented within the Unified Standards group: Certifiers, composters, product manufacturers, material manufacturers, research institutions, and trade associations.
[4] Responding sector groups: Trade associations (2), certifiers (1), composters (2), Regulators - state & federal (2), IC# Group - Federal Legislation (1)..

CCME	T-4- 120 – Regulation of compost under the Fertilizers Act and Regulations: Solid mature product resulting from composting (a managed bio-oxidation process that includes a thermophilic phase) of a solid heterogeneous organic substrate. *Source*: inspection.canada.ca

Definitions of Composting

Organization	'Composting' Definitions
USCC / AAPFCO	The process involves material undergoing mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds (in accordance with EPA 40 CFR 503 standards) and stabilizes the carbon such that it is beneficial to plant growth. ***Source***: Remix from AAFPCO definition for compost https://www.aapfco.org/ and USCC
ASTM International	A managed process that controls the biological decomposition and transformation of biodegradable materials into a humus-like substance called compost: the aerobic mesophilic and thermophilic degradation of organic matter to make compost; the transformation of biologically decomposable material through a controlled process of biooxidation that proceed through mesophilic and thermophilic phases and results in the production of carbon dioxide, water, minerals, and stabilized organic matter (compost or humus). *Source*: ASTM D6400
EPA	Composting is the managed, aerobic (oxygen-required) biological decomposition of organic materials by microorganisms. Organic (carbon-based) materials include grass clippings, leaves, yard and tree trimmings, and food scraps. The end product is compost, a biologically stable soil amendment that can be used to build soil health and provide nutrients to plants. Microorganisms feed on the materials added to the compost pile during the composting process. They use carbon and nitrogen to grow and reproduce, water to digest materials, and oxygen to breathe. *Source*: EPA.gov
CCME	Managed process of bio-oxidation of a solid heterogeneous organic substrate including a thermophilic phase. *Source*: Guidelines for compost quality : En108-4/25-2005E-PDF - Government of Canada Publications - Canada.ca

Definitions of Compostable

Organization	'Compostable' Definitions
USCC / AAPFCO	Compostable (adj): capable of undergoing aerobic biological decomposition in a compost system, such that the material becomes visually indistinguishable and breaks down into carbon dioxide, water, inorganic compounds, and biomass. *Source: (2018) AAPFCO 2024 Official Publication No. 77*
ASTM International	Compostability, adj: the capacity of an organic material to be transformed into compost through the composting process. *Source*: ASTM D8618
EPA	Compostable plastic refers to biodegradation into soil conditioning material (i.e., compost) under a certain set of conditions. In order for a plastic to be labeled as commercially "compostable" it must able to be broken down by biological treatment at a commercial or industrial composting facility. Composting utilizes microorganisms, heat and humidity to yield carbon dioxide, water, inorganic compounds, and biomass that is similar in characteristic to the rest of the finished compost product. Decomposition of the plastic must occur at a rate similar to the other elements of the material being composted (within 6 months) and leave no toxic residue that would adversely impact the ability of the finished compost to support plant growth. *Source*: EPA.gov
CCME	The term "compostable" means that the material is capable of undergoing biological decomposition, within a specific time period, that results in the material being visually indistinguishable from finished compost, and being broken down into carbon dioxide, water, inorganic compounds and biomass. *Source:* CCME.ca

Definitions Developed by this Action Group

The group arrived at the following definitions which were sent to interest-holders who were asked whether they would be prepared to adopt these definitions.

Compost, *n* **-** the product of the aerobic decomposition of biodegradable materials by microorganisms under controlled conditions.

- *Commercial compost* - the stable and mature product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds, and stabilizes the carbon, such that it is beneficial to plant growth.
- *Home compost* - the managed composting conditions may not reach thermophilic temperatures, yet the product is mature and stable.

Composting, *v* - a controlled and managed process to facilitate the aerobic decomposition of biodegradable materials by microorganisms to produce compost.

Compostable, *adj* - capable of undergoing composting, such that the material becomes visually indistinguishable and breaks down into carbon dioxide, water, inorganic compounds, and biomass that poses no environmental health impact or accumulation risk at a rate that facilitates use as a soil amendment.

What We Learned

From reviewing existing definitions

- Definitions are interdependent. Defining 'composting', 'compostable' is not possible without a definition of 'compost' or 'biodegradable materials'.
- Definitions of 'compost' and 'composting' are more consistent across authoritative sources[5] than the term 'compostable'.
- Commonalities emerged within stakeholder groups, but cross-group alignment remains limited.
    - For practical purposes the definition depends on the needs of the audience, with public audiences requiring more simplicity and industry insiders requiring a more precise and technical definition. It may be challenging to meet the needs of all organizations and individuals with a single definition.
- Organizations who had spent time reaching internal consensus or cross-organizational consensus on definitions, did not want to shift their wording.
- The concept of "compostability" becomes complicated in practice due to diverse composting systems, processing conditions, and operational realities that impact disintegration results.

See the table summarizing definitions reviewed, and the synthesis developed by the group which was then shared back with contributing organizations to see if they would be willing to adopt the synthesized definition.

Why Does it Matter?

Understanding the language we use is vital to dissecting differences, identifying areas of agreement, and ultimately creating collaborative solutions. From this foundation, we will next explore the implications of our findings and define a vision for a pathway to creating greater alignment of standards and communication within the industry.

Acknowledgements

This work would not have been possible without the efforts of all those who participated in and contributed to the group's efforts throughout the year, including:

[5] "Composting is the biological decomposition of organic matter by mixing and piling in such a way to promote aerobic and/or anaerobic decay. The process inhibits pathogens, viable weed seeds and odors." [AAPFCO Rules and Regulations–Bulk Compost 1(e)]

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REFERENCE: Definitions

Definitions Scan Summary Table