Consumers, Plastic, and What It Means To Be "Biodegradable"

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ABSTRACT

Biodegradability is a loosely used term, but it carries a complicated meaning. As more and more companies stamp "biodegradability" labels on their products, a challenge arises as to what the term actually means. Everything is biodegradable at some point, so how does the government determine which claims are deceptive and which ones are true? It is a challenging feat to accurately convey that achievement to consumers. This Note explores the difficulty of labeling biodegradability claims. It delves into the Federal Trade Commission's ("FTC") attempt to create a labeling standard under the Green Guides and analyzes the requirements of biodegradability labeling for plastic additives after ECM BioFilms v. FTC. *This Note provides an analysis of how companies can comply with FTC biodegradability labeling requirements and encourages companies to invest in sound consumer surveys to prevent implied deceptive claims. But more importantly, it suggests a different way to label biodegradability claims. Specifically, it proposes to base the definition of biodegradability on factors other than just time and to require all biodegradability claims to be labeled pursuant to a uniform scientific method determined by the agency. With those changes, companies can properly advertise their scientific achievement and consumers will have a better understanding of a product's biodegradable capability.*

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INTRODUCTION

A philosopher once reflected that "nature does not hurry, yet everything is accomplished."[1] Although that may have once been true, now, nature is struggling to keep pace. As masses of trash accumulate in response to a fast-growing population, eco-conscious manufacturers and consumers often opt for products that might mitigate the adverse effects and speed up biodegradation. Biodegradability is the capability of an organic or non-organic item to break down into natural products by the action of living organisms.[2] Companies invest in researching and developing these products—particularly for stubborn synthetic materials like plastic. One such company, ECM BioFilms, claimed their plastic additive would allow any plastic product to break down at a faster rate than normal plastic and advertised that plastic containing their additive was "biodegradable." These claims caught the attention of the Federal Trade Commission ("FTC") and sparked a lawsuit that questioned the meaning of biodegradability.

This Note explores the difficulty in labeling products as "biodegradable." Specifically, it analyzes the tension between the need to prevent deceptive advertising and the benefits of awarding scientific achievement in creating eco-friendly products. First, this Note discusses the meaning of biodegradability and how the FTC's current guidance under the Green Guides and the landmark *ECM BioFilms* case have shaped claims that companies are permitted to make concerning their products. Next, it encourages companies advertising "biodegradable" products to invest in sophisticated consumer surveys to prevent deceptive advertising. Finally, this Note proposes a new way to define biodegradability beyond its current definition that focuses only on the factor of time. It argues that all

1. *"Nature does not hurry, yet everything is accomplished." -Lao Tzu*, NAT. EPICUREAN (Dec. 14, 2015), http://naturalepicurean.com/nature-does-not-hurry-yet-everything-is-accomplished-lao-tzu/?doing_wp_cron=1550793334.0794160366058349609375.

2. MERRIAM-WEBSTER DICTIONARY, https://www.merriam-webster.com/dictionary/biodegradable (last visited Jan. 20, 2019); *Environment: Biodegradability and Organic Compounds*, AM. CHEMISTRY COUNCIL, https://solvents.americanchemistry.com/Biodegradability/ (last visited Jan. 20, 2019). Biodegradability means the breakdown of chemical substances by living organisms.

biodegradability claims should be labeled pursuant to a scientific method performed under uniform conditions set by government agencies. With a uniform method of labeling biodegradability claims, companies can properly advertise, and consumers can make informed decisions about purchasing, eco-friendly products.

I. BACKGROUND

This Part provides a background for understanding biodegradability and FTC regulation. First, it delves into the definition and the factors that render biodegradability particularly difficult to measure. It then examines the current FTC guidelines for advertising degradability claims. Finally, this Part introduces and reviews *ECM BioFilms*, the first case to address biodegradability advertising.

A. BIODEGRADABILITY IS PARTICULARLY DIFFICULT TO MEASURE

Biodegradability depends on many external factors making it exceptionally difficult to define and measure. A biodegradable product is distinguishable from a merely degradable product. A degradable product is one that physically breaks down into smaller pieces, like shattered glass.[3] A biodegradable product, however, is commonly defined as one that breaks down into its fundamental components from the action of naturally occurring microorganisms like bacteria, fungi, and algae—essentially becoming "obsolete."[4] Every item, even plastic, is technically biodegradable, as microorganisms evolve to decompose them.[5] Scientists generally agree that time and the product's disposal location are important factors that affect the biodegradation rate.[6]

Landfills are where most biodegradation occurs. More than 50% of solid waste goes to one of 3,000 landfills across the country.[7] Other methods of disposal include incineration and recycling.[8] These landfills especially hinder the biodegradation process because they create an anaerobic environment, or an

3. *Degradable Versus Biodegradable Versus Compostable. What It All Means*, CERES ORGANICS, https://ceres.co.nz/blog/degradable-versus-biodegradable-versus-compostable-what-it-all-means/ (last visited Jan. 20, 2019).

4. *Id.*; *see also* ECM BioFilms, Inc., No. 9358, slip op. at 83 (F.T.C. Jan. 28, 2015), https://www.ftc.gov/system/files/documents/cases/150206ecmdecision-1.pdf. The American Society for Testing and Materials ("ASTM") developed an agreed upon definition for biodegradable plastics, which includes neither complete breakdown nor a timeframe. *Id.*

5. *Degradable Versus Biodegradable Versus Compostable. What It All Means*, *supra* note 3.

6. Hussein I. Abdel-Shafy & Mona S.M. Mansour, *Solid Waste Issue: Sources, Composition, Disposal, Recycling, and Valorization*, 27 EGYPTIAN J. OF PETROLEUM 1276 (2018).

7. *National Overview: Facts and Figures on Materials, Wastes and Recycling*, ENVTL. PROT. AGENCY (last updated Oct. 26, 2018), https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/national-overview-facts-and-figures-materials.

8. Kadir van Lohuizen, *Drowning in Garbage*, WASH. POST (Nov. 21, 2017), https://www.washingtonpost.com/graphics/2017/world/global-waste/?utm_term=.cbf0d227ba19.

environment without oxygen.[9] When the environment is aerobic, when it contains oxygen, the biodegradation process occurs faster because microorganisms flourish in oxygen-rich environments.[10] Temperature variations also impact biodegradability rates[11]—a landfill in Florida will have a higher temperature than a similar landfill in Alaska and a different moisture level from a landfill in Arizona.[12] Even within a single landfill, there may be different rates of biodegradation.[13]

Because biodegradation is environment dependent, scientists focus on "intrinsic biodegradability."[14] They evaluate the rate of biodegradation in different environments and compare it to other materials rather than just the amount of time the process takes.[15] One of the most common ways to measure intrinsic biodegradability is through gas evolution testing, specifically the D5511 protocol. D5511 provides the best approximation for plastic biodegradation in anaerobic environments like landfills.[16] It is widely used to detect evidence of biodegradation in plastic substances.[17] This test measures the percent conversion of carbon in the sample to gaseous carbon and methane at specific temperatures and external conditions.[18] However, as the conditions of this protocol cannot precisely mirror the conditions in landfills, researchers caution against using its results for unqualified biodegradability claims.[19] Additionally, closed-system testing, like D5511, is

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9. Abdel-Shafy & Mansour, *supra* note 6.

10. Boyd A. McKew et al., *Differences Between Aerobic and Anaerobic Degradation of Microphytobenthic Biofilm-Derived Organic Matter Within Intertidal Sediments*, 84 FEMS MICROBIOLOGY ECOLOGY 495, 500–01 (2013).

11. *See generally* R. Chandra & Renu Rustgi, *Biodegradable Polymers*, 23 PROGRESS IN POLYMER SCI. 1273 (1998).

12. *ECM BioFilms, Inc.*, No. 9358, slip op. at 75–77.

13. *Id.*

14. Intrinsic biodegradability describes a property of the material that does not change no matter where you put it. *Id.* at 96. External factors such as moisture and temperature affect the rate of biodegradability, but not whether the material will biodegrade. *Id.*

15. Some scientists argue that the definition of biodegradability has a one-year time factor, but substances commonly recognized as biodegradable, like banana peels, orange peels, and paper, do not completely break down into elements after one year of customary disposal. *Id.* at 229; *see also* Andrew Gilchrist, *Hiker: Eat Bananas – But Take Your Skins Home*, THE GUARDIAN (Sept. 23, 2009), https://www.theguardian.com/environment/2009/sep/24/bananas-litter-hikers-mountains-scotland.

16. *ATSM D5511 – Anaerobic Biodegradation*, SITU BIOSCIS. LLC, http://www.situbiosciences.com/biodegradation/astm-d5511-anaerobic-bidoegradation/ (last visited Jan. 20, 2019).

17. *ECM BioFilms, Inc.*, No. 9358, slip op. at 242.

18. The ASTM D5511 test method states to incubate the material at 52° C for thermophilic conditions, or 37°C for mesophilic conditions for a period of fifteen to thirty days. The digester breaks down the material for at least four months, with no specific cut-off time or duration for the test. But for the D5511 test to be considered valid, the positive control must reach 70% biodegradation within thirty days. Furthermore, the incubation time will run until no net gas production is noted for at least five days from both the positive control and test substance reactors. *Id.* at 97–98; *ATSM D5511*, *supra* note 16.

19. *Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions*, ASTM INT'L, https://www.astm.org/Standards/D5511.htm (last visited Dec. 27, 2018).

limited in terms of the information it can provide.[20] In a closed system, the microorganisms cannot release or expel waste products created by its bacterial metabolism out of the testing enclosure, giving the experiment a finite life span that does not fully assess biodegradable capability.[21]

The definition and external factors affecting biodegradation are important to understanding the FTC's guidance on the issue, known as the Green Guides.

B. THE FTC'S "GREEN GUIDES" INSTRUCT COMPANIES HOW TO APPROPRIATELY LABEL BIODEGRADABILITY CLAIMS

The FTC provides guidance to help companies properly advertise biodegradability claims. Under the 2012 "Green Guides," it is considered deceptive to misrepresent, "directly or by implication," that a product is degradable or biodegradable.[22] The Green Guides describe different scenarios for marketing with a biodegradability claim. First, if the marketer makes an "unqualified degradable claim," the Green Guides suggest that the marketer should have "competent and reliable scientific evidence" that the "entire item will break down and decompose" into "elements found in nature" within a "reasonably short period of time after customary disposal."[23] Furthermore, the Green Guides state that it is deceptive to make an unqualified degradable claim for items "entering the solid waste stream if the items do not completely decompose within one year after customary disposal."[24] Thus, the Green Guides define the "reasonably short period of time" to mean within one year. Items labeled with unqualified degradable claims that are customarily disposed of in landfills are deceptive because landfills "do not present conditions in which complete decomposition occurs in one year."[25] This includes items like plastic trash bags, which normally enter into incineration facilities and landfills.[26] Such items need to contain a qualified biodegradability label. The degradability claims should be qualified "clearly and prominently" to the extent necessary to avoid deception about the product's ability to degrade in the environment where it is customarily disposed, and it should include the rate and extent of degradation.[27]

The Green Guides also provide some examples to clarify how companies can comply with the guidelines. For example, if a marketer advertises its trash bags using an unqualified "biodegradable" claim and relies on soil burial tests to show the product will decompose in the presence of water and oxygen, the claim is

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20. *ECM BioFilms, Inc.*, No. 9358, slip op. at 98.
21. *Id.*
22. FTC Green Guides, 16 C.F.R. § 260.8(a) (2012).
23. *Id.* § 260.8(b).
24. *Id.* § 260.8(c).
25. *Id.*
26. Shannon Bond, *Where Do Plastic Bags Go?*, EPA BLOG (Mar. 6, 2014), https://blog.epa.gov/2014/03/06/where-do-plastic-bags-go/.
27. 16 C.F.R. § 260.8(d).

deceptive.[28] The claim is considered deceptive because consumers of the trash bags place the bags into the solid waste stream,[29] which normally terminates in incineration facilities or landfills. As explained, specific conditions for biodegradability do not exist in such locations and the bags will not degrade within one year.[30] If a marketer advertises a shampoo as "biodegradable" without qualification but the advertisement makes clear that only the shampoo, and not the bottle, is biodegradable, then the claim is not deceptive so long as the marketer has competent and reliable scientific evidence demonstrating that the shampoo, which is customarily disposed of in sewage systems, will break down and decompose into elements found in nature in a reasonably short period of time.[31] Another example considers when a fiber pot containing a plant is labeled "biodegradable" unqualified. Because the pot is customarily buried in the soil with the plant, and fully decomposes during the growing season allowing the plant's roots to grow into the surrounding soil, the claim is not deceptive.[32]

Thus, company claims must rely on the scientific tests conducted in an environment that simulates where the trash is likely to end up.[33] From the guidelines, the marketer must have established evidence that the product will break down into elements found in nature in the area where it would customarily be disposed of for the product to have an unqualified biodegradability claim.[33] Qualified claims that include a statement explaining the extent of breakdown are likely more common, as most trash is sent to landfills.[35]

The FTC then had the opportunity to examine the application of the Green Guides in *ECM BioFilms*. In *ECM BioFilms*, there was competing evidence that showed that the patented additive did increase the rate of biodegradation in plastic for ECM to make biodegradability claims; however, the FTC Commissioners and the Sixth Circuit held that those claims both expressly and impliedly misled consumers.

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28. *Id*.

29. Solid Waste Stream, also known as Municipal Solid Waste, is defined as waste consisting of everyday items such as product packaging, clothing, food scraps, newspapers, appliances, batteries, etc. Items that do not enter the Solid Waste Stream include municipal wastewater treatment sludge, industrial process waste, etc. . . *Quantity of Municipal Solid Waste Generated and Managed*, ENVTL. PROT. AGENCY (last updated June 26, 2018), https://cfpub.epa.gov/roe/indicator.cfm?i=53.

30. Bond, *supra* note 26.

31. 16 C.F.R. § 260.8(d).

32. *Id*.

33. Even for the plastics that are considered truly biodegradable—like polylactic acid ("PLA"), polycaprolactone ("PCL"), and polybutyrate adipate terephthalate—biodegradability depends on the environmental conditions at the disposal location. Stephan Kubowicz & Andy M. Booth, *Biodegradability of Plastics: Challenges and Misconceptions*, 51 ENVTL SCI. & TECH. 12058 (2017).

34. 16 C.F.R. § 260.8(b).

35. Derek Thompson, *2.6 Trillion Pounds of Garbage: Where Does the World's Trash Go?*, THE ATLANTIC (June 7, 2012), https://www.theatlantic.com/business/archive/2012/06/26-trillion-pounds-of-garbage-where-does-the-worlds-trash-go/258234/.

C. *ECM BIOFILMS* ADDRESSES BIODEGRADABILITY ADVERTISING

ECM BioFilms, Inc. v. Federal Trade Commission[36] is the only case so far to examine the biodegradability labeling requirements created by the FTC. The case was first brought to an administrative law judge, then to the FTC Commissioners, and, finally, to the Sixth Circuit. The case addresses both qualified and unqualified biodegradability claims and examines how ECM BioFilms' advertising was misleading and deceptive to consumers. This case creates unanswered questions about the claims companies can now make and what "competent and reliable" scientific evidence entails.

ECM BioFilms is a company that invests in creating and selling additives that claim to accelerate the rate of biodegradation of plastic.[37] Ordinary plastic is created with petroleum, which takes hundreds of years to biodegrade.[38] By contrast, biodegradable plastic is created from natural plant materials and, with proper disposal, can biodegrade in three to six months.[39] Plastic additives, however, are different from bioplastics. Additives change the material's property and characteristics to allow microorganisms to decompose the plastic at a faster rate.[40] Specifically, ECM claims its additive enables the microorganisms to metabolize the molecular structure of plastic products into humus, or soil, that is beneficial to the environment.[41] The plastic products made with ECM technology rely on microbes in the soil to react to the additives and form communities known as biofilms.[42] These microbes secrete enzymes and acids that break down the long chain hydrocarbon molecules in plastic, physically breaking it down.[43] The microbes can then metabolize the simple hydrocarbons into carbon dioxide, water, and methane.[44] This process continues until all the plastic product is fully biodegraded.[45]

ECM BioFilms advertised on their website that plastics properly manufactured with their additive, "renders the resulting plastic products biodegradable" without negatively affecting product performance.[46] Each page of the ECM website

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36. ECM BioFilms, Inc. v. FTC, 851 F.3d 599 (6th Cir. 2017).

37. *Cutting-Edge Additives for Manufacturing Biodegradable* Plastics*, ECM BIOFILMS, https://www.ecmbiofilms.com/ (last visited Jan. 1, 2019); *ECM BioFilms, Inc.*, No. 9358, slip op. at 5–6.

38. Jack Serle, *How Long Do Biodegradable Bags Take to Decompose?*, SCI. FOCUS, https://www.sciencefocus.com/science/how-long-do-biodegradable-bags-take-to-decompose/ (last visited Mar. 14, 2019).

39. *Id.*

40. Nathan Chandler, *Biodegredation Additives for Plastics*, HOWSTUFFWORKS, https://science.howstuffworks.com/environmental/green-science/biodegradation-additives4.htm.

41. Complaint Exhibits 1–4, at 10, ECM BioFilms, Inc., No. 9358, (F.T.C. Oct. 29, 2013), https://www.ftc.gov/sites/default/files/documents/cases/131028ecmbiofilmexhibits.pdf.

42. *Id.*

43. *Id.*

44. *Id.*

45. *Id.*

46. *ECM BioFilms, Inc.*, No. 9358, slip op. at 31.

contained the statement, "Additives for Manufacturing Biodegradable Plastic Packaging and Products."[47] ECM also created a logo that depicted a green tree with the name "ECM" in the tree and the word "biodegradable" right below it.[48] After the 2012 Green Guides were issued, ECM included an asterisk next to the word "biodegradable" with the fine print statement: "Plastic products manufactured with ECM BioFilms' Additive will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year."[49] Prior to the 2012 revision, ECM also stated that plastics treated with their additive will "fully biodegrade" in a landfill, in a period of "9 months to 5 years."[50] Even though they discontinued these claims on their website in 2013, ECM would still send out old brochures with those representations.[51] Furthermore, after the Green Guides, ECM's website described plastics containing their additive to behave like "sticks, branches or trunks of trees."[52] ECM explicitly disclaimed any guarantee of a particular biodegradation time frame, explaining that biodegradation is a natural process that is dependent on external factors such as "ambient biota and other environmental conditions."[53]

In 2013, the FTC filed an administrative complaint alleging that ECM's biodegradability claims were false and misleading under Section 5 of the FTC Act.[54] There were two contentious claims. The first was that the express claims that plastic containing ECM additive would completely biodegrade within "9 months to 5 years" were unsupported by scientific evidence.[55] The second was that the unqualified biodegradability claims, those without an asterisk, caused consumers to interpret the claims to mean that the entire product would completely decompose into elements found in nature within a reasonably short period of time after customary disposal, and because ECM plastics do not decompose within that time, the claims were deceptive.[56] The FTC contended that the first was a deceptive express claim and the second, a deceptive implied claim.[57]

Chief administrative law judge, Michael Chappell ("ALJ"), agreed with the FTC that the express claim that ECM plastics would biodegrade in "9 months to

47. *Id*.
48. *Id*. at 32.
49. *Id*. at 36.
50. *Id*. at 33–36.
51. *Id*. at 36.
52. *Id*. at 35.
53. *Id*.
54. FTC Unfair Methods of Competition, 15 U.S.C. § 45 (2012). Section 5 of the FTC Act declares unfair methods of competition in or affecting commerce, and unfair or deceptive acts or practices in or affecting commerce as unlawful.
55. ECM BioFilms, Inc. v. FTC, 851 F.3d 599, 607 (6th Cir. 2017).
56. *Id*. Unqualified claims include titles on the website, such as "Additives for Manufacturing Biodegradable Plastic Packaging and Products," and descriptions such as "renders . . . plastic products biodegradable." *ECM BioFilms, Inc*., No. 9358, slip op. at 31.
57. *ECM BioFilms, Inc*., 851 F.3d at 607.

5 years," was deceptive and scientifically unsupported.[58] However, the ALJ held that the FTC failed to prove that ECM's claim of "biodegradability" conveyed an implied claim to consumers when there was no implied claim that the plastic would completely biodegrade in a landfill within one year (which was the Green Guides' interpretation of a "reasonably short period of time").[59] Furthermore, the ALJ held that the tests that ECM furnished were competent and reliable evidence demonstrating that ECM plastics were biodegradable, including in a landfill, and that the FTC failed to prove that these claims were false or unsubstantiated.[60] The ALJ discussed how biodegradability was defined by experts to mean that an item degrades by biotic or biological agents and does not require completion or an imposed time restraint.[61] The FTC did not provide sufficient evidence, through their expert survey and other means, to show that ECM's biodegradability claims were false.[62]

The case was appealed by both parties to the Commission, which affirmed the ALJ's decision in regard to the express claim, but reversed on the implied claim that ECM plastics would fully biodegrade within a reasonably short period of time.[63] The Commission found it was a deceptive implied claim.[64] It looked to the consumer surveys and held, contrary to the ALJ's determination, that the surveys were enough to support the contention that reasonable consumers would be misled by the implied claims.[65]

The Commission decides whether an advertisement is deceptive by engaging in a three-step inquiry. It first looks to the claims that are covered in the advertisement, then examines whether those claims are false, misleading, or unsubstantiated; and finally, whether the representations were material to prospective consumers.[66] The Commission deems an advertisement to convey a claim if consumers acting "reasonably under the circumstances would interpret the advertisement to contain that message."[67] It looks to the overall impression of the ad and bases its determination on whether the interpretation is reasonable, even if it is

58. *ECM BioFilms, Inc*., No. 9358, slip op. at 6.

59. *Id*.

60. Fed. Trade Comm'n, *Administrative Law Judge Issues Initial Decision in the ECM BioFilms, Inc. Case* (Feb. 6, 2015), https://www.ftc.gov/news-events/press-releases/2015/02/administrative-law-judge-issues-initial-decision-ecm-biofilms-inc.

61. *ECM BioFilms, Inc*., No. 9358, slip op. at 7.

62. *Id*.

63. Fed. Trade Comm'n, Opinion on In the Matter of ECM BioFilms, Inc., No. 9358 (Oct. 19, 2015), at 2 [hereinafter FTC Opinion].

64. *Id*.

65. *Id*. at 15–18.

66. POM Wonderful, LLC v. Fed. Trade Comm'n, 777 F.3d 478, 490 (D.C. Cir. 2015).

67. *Id*.; Fed. Trade Comm'n, *Policy Statement on Deception* (1983), *appended to* In re Cliffdale Assoc., 103 F.T.C. 110, 177 (1984) [hereinafter FTC Statement on Deception].

not shared by a majority of consumers.[68] However, a claim's interpretation is not necessarily reasonable simply because it is held by a "significant minority" of consumers.[69] Here, the Commission relied on an FTC survey which found that, at a minimum, adding a "biodegradable" label increased the percentage of respondents who believed the bottle would fully decompose within five years from 13% to between 44% and 49%.[70] The surveys supported the Commission's finding that ECM's unqualified biodegradability claims conveyed an implied claim to consumers.

Aside from the factual review of the case, the Commission also addressed how companies can correctly make biodegradability claims. The Commission elaborated that ECM is only allowed to make biodegradability claims that are "true" and supported by "competent, reliable, scientific evidence that substantiates the representation" of complete decomposition within five years after customary disposal.[71] Or, if the item takes longer than five years to decompose, the qualification must include either the time to complete decomposition or the rate and extent of decomposition into elements found in nature.[72] The qualification must also include the disposal facility and the availability of such a disposal facility where the product is marketed or sold.[73] The most notable departure from the Green Guides is the five-year mark for making unqualified claims.

Furthermore, the Commissioners set standards for unqualified claims and qualified claims. To make an unqualified claim, "any scientific technical protocol (or combination of protocols) substantiating such claims must assure complete decomposition and simulate the physical conditions found in landfills, where more trash is disposed."[74] Results from the D5511 protocol cannot be used to support unqualified claims but can be used to substantiate qualified claims.[75] The Commissioner's Order specifically states that the results from the American Society for Testing and Materials ("ASTM") D5511-12 are "not competent and

68. *See* Heinz W. Kirchner, 63 F.T.C. 1282 (1963) (holding that an interpretation may be reasonable even though it is not shared by a majority of consumers in the relevant class, or by particularly sophisticated consumers).

69. *Id.* An act or practice can be considered deceptive if it misleads "a significant minority of consumers." Fed. Trade Comm'n, *The FTC's Endorsement Guides: What People Are Asking*, https://www.ftc.gov/tips-advice/business-center/guidance/ftcs-endorsement-guides-what-people-are-asking (last visited Mar. 22, 2019). The FTC has found that 30 to 45 percent of consumers to be more than a significant minority. Fed. Trade Comm'n, Opinion on In the Matter of Novartis Corp. et al., No. 99-1315 (1999), at 10.

70. ECM BioFilms, Inc. v. FTC, 851 F.3d 599, 606–07 (6th Cir. 2017). The study also showed that an additional 28% of consumers believe a plastic Tupperware container would fully decompose within five years, and that an additional 20% believe a plastic bag would fully decompose within five years. *Id.*

71. Fed. Trade Comm'n, Final Order In the Matter of ECM BioFilms, Inc., No. 9358, https://www.ftc.gov/system/files/documents/cases/151019ecmorder.pdf (Oct. 19, 2015) [hereinafter FTC Final Order No. 9358].

72. *Id.*

73. *Id.*

74. *ECM BioFilms, Inc.*, 851 F.3d at 608.

75. *Id.*

reliable scientific evidence supporting unqualified claims, or claims of outcomes beyond the parameters and results of the actual test performed."[76] To make a qualified biodegradability claim, any scientific, technical protocol substantiating such claims must assure that the entire product will completely decompose into elements found in nature in the stated timeframe or at the rate stated in the representation.[77] The test must also simulate the physical conditions where the trash is normally disposed, and if the representation is not qualified by a disposal facility, the test must reflect conditions found in a landfill.[78]

Commissioner Maureen Ohlhausen partially dissented, claiming that the evidence submitted by the FTC was unreliable and insufficient to prove that ECM's implied claims deceived consumers.[79] She argued that the majority misapplied the "significant minority" test by allowing it to "swallow" the average listener and typical buyer.[80] She held that the majority had never solely relied on a significant minority to find an ad interpretation reasonable.[81] She called for revising the Green Guides and departing from the "arbitrary" and "unjustifiable" five-year threshold.[82]

ECM BioFilms appealed the case to the Sixth Circuit for review. It contended that the Commission's findings on the product's unqualified biodegradability claim were not supported by substantial evidence and that its departure from the ALJ's decision was arbitrary and capricious under the Administrative Procedure Act.[83] ECM BioFilms claimed that this labeling requirement infringed on the First Amendment's right to freedom of speech because "nothing biodegrades within five years in a landfill" and ECM could never make an unqualified biodegradability claim.[84]

But, the court agreed with the Commissioners that the manufacturer's representation was deceptive and violated Section 5 of the FTC Act.[85] When reviewing the case, the court gave the Commission's determination great weight and found substantial evidence to support its decision.[86] The court held that the surveys supported the finding that ECM's unqualified biodegradability claims conveyed an implied claim to consumers.[87] The court was equally unconvinced of ECM's First Amendment argument.[88] It held that the FTC was not completely prohibiting

76. FTC Final Order No. 9358, *supra* note 71.
77. *Id*.
78. *Id*.
79. Fed. Trade Comm'n, Partial Dissent of Commissioner Maureen K. Ohlhausen on In the Matter of ECM BioFilms, Inc., No. 9358 (Oct. 19, 2015), at 2 [hereinafter FTC Commission's Dissent].
80. *Id*. at 9.
81. *Id*.
82. *Id*. at 11.
83. ECM BioFilms, Inc. v. FTC, 851 F.3d 599, 604 (6th Cir. 2017).
84. *Id*. at 615–16.
85. *See id*. at 619.
86. FTC v. Colgate-Palmolive, Co., 380 U.S. 374, 385 (1965).
87. *ECM BioFilms, Inc*., 851 F.3d at 611.
88. *Id*. at 615–17.

the use of the term "biodegradable," but rather was only disallowing the unqualified use of the term.[89] Disclaimers, the court explained, always restrict speech.[90] Companies are free to use biodegradability claims so long as they explain the testing, describe the disposal conditions simulated by the test, and specify whether the tests had been run to complete decomposition.[91]

II. DISCUSSION

After *ECM BioFilms*, companies must proceed with caution when making "biodegradability" claims. Specifically, *ECM BioFilms* modified the Green Guides by interpreting a "reasonably short period of time after customary disposal" for items entering the solid waste stream as decomposable within five years instead of within one year. Because the FTC evaluates deceptive practices on consumer perception, one solution would be for eco-friendly companies to invest in sophisticated consumer surveys to ensure no implied deceptive claims are passed on to the consumer. However, a long-term proposal would be to establish a standardized scientific method with uniform conditions that all companies would perform to substantiate the claims. All companies would be required to label their biodegradability claims pursuant to the scientific results. Under this method, companies would be able to make biodegradability claims advertising their achievement while also ensuring consumers are not misled or deceived. The FTC's consumer perception standard would still apply, but now it would examine the veracity of the scientific labeling.

A. *ECM BIOFILMS* ELABORATES ON LABELING REQUIREMENTS PROVIDED BY THE GREEN GUIDES

ECM BioFilms modified and defined the terms in the Green Guides. First, it provided that any plastic product that is degradable can claim biodegradability if the entire item will completely decompose within five years after customary disposal.[92] The decision also provided an explanation of what "competent and reliable scientific evidence" entails, explicitly rejecting the D5511-12 standard.[93]

Based on the Commissioners' opinion of the Green Guides, products disposed in landfills cannot advertise as "biodegradable" without qualification. Such a claim, without a qualification signaled by an asterisk, would lead at least a minority of consumers to believe the product will biodegrade within five years (the new standard the Commissioners adopted for a reasonable amount of time).[94] And

89. *Id*. at 616.
90. *Id*.
91. *See id*. at 615.
92. FTC Final Order No. 9358, *supra* note 71.
93. *See id*.
94. FTC Opinion, *supra* note 63, at 23–24.

because the ECM additive did not cause the plastic to degrade within five years, the claim was deceptive.[95]

Another question that arose was whether an image of just a green tree or leaf alone would be enough to create an implied claim. Before the 2012 Green Guides, ECM placed the words "ECM Biodegradable" against a tree design without qualification.[96] This design was then reprinted on other manufactured products.[97] This representation was also considered deceptive.[98] However, the ruling suggests that merely placing a tree without the words "biodegradable" would not be enough for a reasonable consumer to infer a biodegradable claim, thus avoiding a deceptive claim. The Green Guides provide a similar example: A plastic six-pack ring carrier that has a small diamond mark that indicates certain degradability standards under state law is not by itself sufficient to constitute a degradability claim.[99] Thus, without the express term "biodegradability," images of tree designs, or other eco-friendly symbols, are not enough to create an implied claim to consumers.

When defining "competent and reliable scientific evidence" the Commissioners look to any scientific, technical protocol substantiating such claims and assure complete decomposition that simulates the physical conditions found in landfills.[100] Companies need to be able to prove that their products will biodegrade in five years to make an unqualified claim. Because it is extremely unlikely that plastic will biodegrade in a landfill in five years, plastic additive manufactures cannot make an unqualified biodegradability claim.

The Commission explicitly rejected the D5511-12 standard as "competent and reliable scientific evidence."[101] It found that D5511 is an "accelerated" test designed to measure intrinsic biodegradability under certain laboratory conditions unrealistically found in nature.[102] This specific method is a reactor test performed in a high-solids environment, which is more representative of the matrix in landfills than other methods.[103] However, water is added and the pH is altered throughout the experiment, distinguishing it from typical landfill conditions.[104] The test is also incubated at a temperature of 52˚C, whereas the average landfill temperature is 37˚C.[105] The increase of temperature, moisture, and adjusted pH

95. *Id*. at 44.
96. *ECM BioFilms, Inc*., No. 9358, slip op. at 33.
97. *Id*. at 40–41.
98. *See generally* ECM BioFilms, Inc. v. FTC, 851 F.3d 599, 605 (6th Cir. 2017).
99. 16 C.F.R. § 260.8(d).
100. *See* FTC Final Order No. 9358, *supra* note 71.
101. *See id*.
102. FTC Opinion, *supra* note 63, at 3–4.
103. *Id*. at 41.
104. *Id*.
105. *Id*.

accelerate the experiment and the natural biodegradation process.[106] For these reasons, ASTM explicitly forbids the test to be used for marketing purposes.[107]

The Commission briefly considered another testing model—the biochemical methane potential ("BMP") test.[108] BMP is another gas evolution test, but it lacks a uniform standard so it can be modified by individual labs.[109] The Commission's opinion explains that BMP can be used for "screening" purposes to determine whether biodegradation of the material is possible in general.[110] However, the BMP test can neither establish reliable rate data nor the actual amount of methane gas generated in a landfill.[111]

Thus, the Commission emphasized the ability of the scientific evidence to mirror actual conditions in order to be considered competent and reliable. However, landfill conditions are not consistent at all. Companies who invest in testing can have different outcomes for the same additive depending on the conditions of the lab experiment. This explains why the Commissioners concluded that the test results of the ECM additive were not an adequate substantiation of its claims.[112] The FTC provided test results that showed little to no methane production, indicating minimal plastic biodegradation with the ECM additive, while ECM's own results showed actual biodegradation.[113] The Commission found that none of the ECM tests demonstrated complete biodegradation in landfills within five years and that the tests were not "well-designed, well-conducted, well-controlled," and appropriately analyzed to satisfy the relevant scientific community.[114] It took issue with specific methodologies employed by the individual labs.[115] This subjective standard is difficult for companies to comply with because landfill conditions are difficult to mimic.[116] A better solution to prevent deceptive claims would be to establish a uniform method with set standards—replicable in any laboratory.

B. METHODOLOGICALLY SOUND CONSUMER SURVEYS CAN PREVENT DECEPTIVE IMPLIED CLAIMS

After *ECM BioFilms*, companies are left questioning what claims they can make and how to substantiate their biodegradability claims. The main concern

106. *Id.*
107. *Id.* at 3–4
108. *Id.* at 41 n.59.
109. *Id.*
110. *Id.*
111. *Id.*
112. *Id.* at 47. Eight tests were conducted by Eden labs, ten tests were conducted by Northeast Laboratories, and a BMP test was conducted by North Carolina State University. *Id.*
113. *Id.* at 49–50.
114. *Id.* at 47.
115. *Id.* The Commission focused on Northeastern Labs' method of transferring the test material to canisters with fresh inoculum which exposes it to oxygen, contrary to an anaerobic environment.
116. *See* SITU BIOSCIS. LLC, https://www.situbiosciences.com/2015/02/18/biodegradation-testing-overview/ (last visited Dec. 27, 2018).

around *ECM BioFilms* involves the treatment of implied biodegradability claims. Specifically, the Commission and Sixth Circuit relied upon questionable survey methodology to determine that "reasonable consumers" believed an unqualified biodegradability label to mean complete degradation within five years. The reasonableness standard should consider what consumers believe before and after the "biodegradability" labeling.

More random survey methods that directly ask about prior biodegradability knowledge and the demographics of the consumers can provide better data about whether a company's claims are actually deceptive. Everything is eventually biodegradable, and a consumer's knowledge would be material in determining whether the labeling caused them to believe differently. For example, if a consumer believed that plastic was already biodegradable within five years, then the addition of the additive would likely cause the consumer to believe that it would biodegrade in an even shorter timeframe. If the consumer's perception is that the item biodegrades within five years, there is no deception under the Green Guides and the Commissioners' opinion. Thus, their perception of the chemical's ability to cause biodegradation does not reflect its actual ability. However, the Sixth Circuit rejected scientific validity of a consumer's belief as the standard for reasonableness.[117] Rather, it found that when determining false and deceptive advertising, the "public's impression is the only true measure of deceptiveness."[118] Although that is true for FTC Section 5 deception cases, biodegradability presents a unique circumstance where a company might not be falsely advertising, but because of the consumer's lack of knowledge on the subject, it would still cause deception. If consumers already believe that plastic biodegrades within five years without ECM additive, then adding the additive would not offer much evidence about the effect of ECM's claims on consumer beliefs. Pre-existing consumer misunderstandings about the biodegradability of plastic is material to understanding whether the additive in fact changed their perception about what biodegradability means.[119]

As the ALJ held, the FTC had not provided sufficient evidence to support the allegation that the unqualified use of the word "biodegradable" conveyed an implied claim that such product would biodegrade in a year. Commissioner Ohlhausen also agreed with that determination in her dissent.[120] She argued that the FTC lacked evidence that specifically showed that ECM's unqualified claim caused reasonable consumers to believe that the plastic treated with ECM additive would biodegrade either in a year or between one and five years.[121]

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117. ECM BioFilms, Inc. v. FTC, 851 F.3d 599, 611 (6th Cir. 2017).

118. *Id*. (quoting FTC v. Brown & Williamson Tobacco Corp., 778 F.2d 35, 39–40 (D.C. Cir. 1985)).

119. For example, ECM's expert chose to exclude from his survey people who indicated that they did not have a general understanding of the term "biodegradable." These individuals would simply be guessing and not giving meaningful responses to the survey questions. *ECM BioFilms, Inc*., No. 9358, slip op. at 70.

120. *ECM BioFilms, Inc*., No. 9358, slip op. at 54; FTC Commission's Dissent, *supra* note 79, at 5.

121. FTC Commission's Dissent, *supra* note 79, at 5.

Particularly, both the ALJ and Commissioner Ohlhausen took issue with the FTC survey as evidence of consumer perception. The FTC collected its consumer data through an online tool available through Google Consumer Surveys.[122] The tool asked consumers one of sixty different questions collecting nearly 29,000 results.[123] The study found that adding the "biodegradable" label to a plastic bottle increased the percentage of respondents who believed the bottle would fully decompose within five years from 13% to between 44% and 49%.[124] The FTC's expert witness, Dr. Shane Frederick, found that 20% to 52% of consumers "infer" that plastic products labeled "biodegradable" will biodegrade within a year.[125] This data was enough for the Commission to conclude that the label leads a "significant minority of reasonable consumers" to believe that the plastic product will biodegrade in five years—which would be a deceptive claim for the ECM additive because the additive would not cause biodegradation within that time.[126]

On the other hand, ECM's expert, Dr. David Stewart, conducted a survey of 400 respondents, who were age eighteen or older, by landline telephone asking five questions.[127] One of the questions open-endedly asked, "If something is biodegradable, how long do you think it would take for it to decompose or decay?"[128] Of the respondents who provided an answer to the survey with a number and unit of time, 64% said that it would decompose within five years.[129] These respondents represented 23% of the survey's total respondents.[130] Not one respondent interpreted biodegradation to mean the breakdown of a substance within one year after customary disposal.[131] Based on ECM's expert results, none of the consumers thought that "biodegradability" meant that the product would decompose in less than one year—thus the question is whether the claim was deceptive to consumers at all. Under the Green Guides, ECM could not have made an unqualified claim, but even though it did make the claim, consumer's perception of what biodegradability means does not include less than one year anyways.[132] Rather, consumers believed biodegradability to mean the process by

122. *ECM BioFilms, Inc*., No. 9358, slip op. at 59.

123. *Id*. at 54.

124. *ECM BioFilms, Inc*., 851 F.3d at 606-607.

125. *ECM BioFilms, Inc*., No. 9358, slip op. at 59. For example, Dr. Frederick showed an image of a plastic bag photoshopped to display a large ECM "biodegradable" logo and asked: "What is your best estimate of the amount of time it would take for this plastic bag to biodegrade?" The results indicated that 20% of consumers believed it would biodegrade in less than one year. *Id*. at 61.

126. *ECM Biofilms, Inc*., 851 F.3d at 607.

127. *ECM BioFilms, Inc*., 851 F.3d at 607. A sample size of 400 is considered by researchers to be the point of "diminishing returns" where there is no greater statistical precision possible. *ECM BioFilms, Inc*., No. 9358, slip op. at 68, 68–72.

128. *ECM BioFilms, Inc*., 851 F.3d at 607.

129. *Id*.

130. This was a conservative figure. The Commission actually calculated 30% of the 400 surveys *Id*. at 607 n.4.

131. *ECM BioFilms, Inc*., No. 9358, slip op. at 73.

132. *See* 16 C.F.R. § 260.8(d).

which a product breaks down or decays. Consumers recognized that the process varies depending on the materials involved and that it is not always rapid.[133] As this Note will later discuss, this is yet another reason why a definition of biodegradability that includes only time is not a particularly accurate measure of deception.

The ALJ focused on the methodological flaws in Dr. Frederick's surveys.[134] First, Dr. Frederick's Google Consumer Surveys contained no legal precedent to establish facts in litigation.[135] It was also not accepted as a reliable research tool by market research professionals.[136] There was no way of justifying that the survey provided a representative sample of consumers when it failed to produce demographic data for about 30% of the participants.[137]

Demographic data is critical to a methodologically sound survey because it provides background information about the consumers, which helps analysts understand the responses and the data better.[138] For example, it would have been material to know whether the consumers were younger or older because younger people tend to be more environmentally conscientious. Consumer's background would likely affect their subjective interpretation of what a biodegradability label means—someone who lives in an eco-conscious city might have a different understanding than someone who resides in the countryside. Normally, Google Consumer Surveys infer demographic features, including gender, age, geographic region, and whether the respondent resides in an urban, suburban, or rural area through the respondent's browsing history, IP address, and "cookies."[139] But if Frederick's survey appeared on a home computer that was shared by multiple users, there is no way to know who answered the question.[140] Lack of demographic information also weakens the reliability of the surveys because the age of the participant is material in determining the FTC "reasonable" person standard.[141] Children and elderly have a more lenient "reasonableness" standard because they are considered a more vulnerable group when it comes to deception.[142] Thus, the evidence the Commission relied upon for its determination that ECM's implied biodegradability was deceptive came from surveys

133. *ECM BioFilms, Inc*., No. 9358, slip op. at 74.

134. *Id*. at 51–75. By contrast, the ALJ held that Dr. Stewart's survey was consistent with accepted standards and best practices in the design of survey research. *Id*. at 73.

135. *Id*. at 51.

136. *See id*.

137. *Id*. at 57.

138. Sean Si, *The Importance of Demographic Questions*, QERYZ, https://qeryz.com/blog/importance-demographic-questions/ (last visited Feb. 27, 2019).

139. *ECM BioFilms, Inc*., No. 9358, slip op. at 56.

140. *Id*. at 57.

141. Bates v. Arizona, 433 U.S. 350, 383 n.37 (1977) (holding that the determination of whether an advertisement is misleading requires consideration of the "legal sophistication of its audience"); *See* FTC Statement on Deception, *supra* note 67.

142. *See* FTC Statement on Deception, *supra* note 67.

that were methodologically flawed and may not have represented "reasonable consumers."[143]

Furthermore, this particular Google survey would block users from access to the desired website until they answered the question or paid to proceed.[144] This presents a problematic situation for the consumer, who must answer the question before he or she is allowed to access the desired website.[145] This forced participation may skew the results of a survey when consumers are likely to press any option to avoid the survey and continue on to their intended website.[146] Furthermore, the agency ignored 28% of responses that included answers such as, "It depends" or "I don't know," which are technically accurate answers.[147] Ignoring some of the responses also skews the data because it limits the range of acceptable responses to fit a pre-determined format.[148]

The flaws in the consumer survey are not only material for this case but also reflect the difficulty of measuring deception in this field. Biodegradability is a complex scientific process whose definition scientists cannot even agree on. Allowing consumers to steer the labeling requirements makes it challenging to make any biodegradability claim in fear that a minority of consumers might be deceived. This would make any unqualified biodegradability statement susceptible to a Section 5 deception claim and would likely hinder eco-friendly biodegradable product development. If companies cannot clearly advertise their achievements then they will spend less time developing new products.

C. LABELING ALL PRODUCTS PURSUANT TO AN ESTABLISHED UNIFORM SCIENTIFIC METHOD AND CONDITIONS PROVIDES A STRUCTURED APPROACH TO PREVENTING DECEPTIVE CLAIMS

Although investing in consumer surveys can protect companies from making implied deceptive claims, a long-term proposal to create consistency in biodegradable labeling would be to establish a uniform scientific method. The results should be included on all products claiming biodegradability. First, the Green Guides should include a precise definition of biodegradability marketing irrespective of time. Instead, the definition should be based on rate, percentage of

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143. Other ancillary issues the ALJ found concerning were the costs of the different surveys and the wording of the questions. Dr. Fredrick's Google Survey cost about $7,400, while Dr. Stewart's the telephone survey cost $37,500. The Google Survey had a character limit and Dr. Frederick had to change his questions to comply with it. These factors also influenced the ALJ's view of the legitimacy of the survey results. *ECM BioFilms, Inc*., No. 9358, slip op. at 59.

144. *Id*. at 49.

145. *Id*. at 191. Because Google would decide where the pop-up surveys would be, there was no way of knowing whether the consumer just blindly picked an answer to move onto the desired site or whether they actually read the survey question and answered truthfully. It is a forced survey in a sense that it stands between the computer users access to their intended site. This method can seriously skew the data results.

146. *Id*. at 192.

147. *ECM BioFilms, Inc*., No. 9358, slip op. at 54; FTC Commission's Dissent, *supra* note 79, at 5.

148. *ECM BioFilms, Inc*., No. 9358, slip op. at 194–96.

methane production, or hydrocarbon break down. Second, instead of dividing the criteria into qualified and unqualified claims, the FTC should require all companies producing additives that enhance plastic biodegradability to invest in the scientific method and label their products according to that uniformly accepted protocol.

1. Definition of Biodegradability Based on Scientific Results, Not Just Time

First, it would be helpful to have a clear agency definition for biodegradability. Currently, the Green Guides describe degradable as the "entire item will completely break down and return to nature within a reasonably short period of time after customary disposal."[149] A definition clarifies and creates a consistent understanding of what the term means and how companies can comply with it. Scientific evidence points to biodegradation as a much more complex process that cannot be reasonably measured solely through timeframes.[150] This issue is most apparent by the Commission's rejection in *ECM BioFilms* of the "one year" Green Guides standard for unqualified claims in favor of a five year standard.[151] The definition should instead be based on a rate, percentage of methane production, hydrocarbon breakdown, or another perimeter that all companies can provide.

Arguably, solely providing a timeframe makes the claim deceptive because biodegradation time is very much dependent on external factors such as temperature, moisture, access to oxygen, light, and heat.[152] A newspaper placed in one area of a landfill can decompose at a different rate than one placed in another area of that same landfill.[153] Furthermore, the structure of the product, whether it is a solid or a liquid, also affects the rate of biodegradability.[154] It is unduly burdensome to require companies to validate their claims by providing evidence that their products will biodegrade within certain timeframes and in different environments because it would require multiple tests under different conditions. Having a definition based on factors other than just time allows for a clearer definition of biodegradability and makes it simpler for companies to comply.

2. Uniform Scientific Method Determined by Agency

A uniform scientific method would provide a clearer way to lawfully market biodegradable products. In *ECM BioFilms*, the company provided evidence that

149. 16 C.F.R. § 260.8(b).

150. *ECM BioFilms, Inc*., No. 9358, slip op. at 234.

151. *See generally* ECM BioFilms, Inc., v. FTC, 851 F.3d 599, 605 (6th Cir. 2017).

152. *Id*.

153. *ECM BioFilms, Inc*., No. 9358, slip op. at 77.

154. Selene Chinaglia, Maurizio Tosin, & Francesco Degli-Innocenti, *Biodegredation Rate of Biodegradable Plastics at Molecular Level*, 147 POLYMER DEGRADATION & STABILITY 237, 237–44 (2018). Liquids that are soluble in water increase the biodegradability rate as the moisture attracts microorganisms.

nineteen D5511 protocol tests showed that additive plastic biodegrades at a faster rate than traditional plastic, while thirteen tests indicated no change in biodegradation rate.[155] The Sixth Circuit dismissed the evidence as insufficient competent and reliable scientific evidence to support an unqualified claim that the entire product would break down within a reasonably short period of time.[156] But if all companies invested in having their products tested under a standard protocol, there would be consistency in the claims, and it would be easier for consumers to understand the degradability of the material.[157]

Before publishing the 2012 Green Guides, the FTC sought comments from the public to establish these marketing standards. Some companies suggested this uniform system and even mentioned the D5511 protocol.[158] The Society of the Plastics Industry, an organization that represents plastic manufacturers, and Northeast Laboratories, who perform scientific testing for companies, both suggested a uniform method, acknowledging that the standards might not strictly "mimic the conditions found in a landfill," but rather, "foster consistency."[159] The Commission rejected this proposal because the scientific method did not replicate actual, highly variable landfill conditions, such as the size of the disposed item, its compression, and levels of moisture and temperature.[160] However, landfills are not exactly replicable, and if there is a standard test with uniform conditions, then consumers can compare the biodegradability of some products with others. For example, a plastic that is 60% biodegradable in 900 days at 20˚C, 1 atm, pH 7 (neutral) anaerobic environment under a specific scientific protocol, would break down more quickly than a plastic 40% biodegradable in 900 days under those same conditions.[161] Furthermore, the consumer can infer that the first plastic would biodegrade even faster in warmer, more humid conditions than the second plastic.[162] For plastic additives, a reference to standard plastic biodegradability would be even more helpful because it would provide a reference to compare the efficiency of different products, which enhances competition between plastic additive manufacturers.

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155. In one test, ECM plastic biodegraded 49.28% over 900 days, whereas traditional plastic biodegraded just 0.1152% over the same time. *ECM BioFilms, Inc.*, 851 F.3d at 606.

156. *Id.* at 616–17.

157. This idea was also mentioned by the Society of the Plastics Industry ("SPI") and Northwest Laboratories in a public comment for the Green Guides. FED. TRADE COMM'N, THE GREEN GUIDES: STATEMENT OF BASIS AND PURPOSE (2012), https://www.ftc.gov/sites/default/files/attachments/press-releases/ftc-issues-revised-green-guides/greenguidesstatement.pdf [hereinafter Green Guides Statement].

158. *Id.* at 119.

159. *Id.*; William W. Ullman & Garrett W. Johnson, Northeast Laboratories, Inc., *Request for Public Comment: Guide For the Use of Environmental Marketing Claims; Project No. P954501* (Dec. 10, 2010), https://www.ftc.gov/sites/default/files/documents/public_comments/guides-use-environmental-marketing-claims-project-no.p954501-00230%C2%A0/00230-56817.pdf [hereinafter Public Comment Letter].

160. Green Guides Statement, *supra* note 157, at 123.

161. *See* Part I.A. As the temperature, pressure, acidity, and oxygen level is held constant, it is easier to examine biodegradation and then attribute those results to the manufacturer's additive.

162. *Id.*

For those reasons, as discussed in Part II.C.1., revising the definition of biodegradability to include more than just timeframes would be a step towards ensuring that more accurate information about the actual biodegradability of a product is published. The FTC should also base its guidance on the numerical rate results received from uniform scientific lab tests. Besides the ASTM D5511 protocol, which is the standard testing method for determining anaerobic biodegradation of plastic materials under high-solids conditions, there are other scientific experiments labs run to determine the rate of biodegradation.[163] The ASTM D5526 is the standard test for determining anaerobic biodegradation of plastic materials under accelerated landfill conditions.[164] This costly test represents "all landfill environments" conducted over a three to six month period and is often used in tandem with the D5511 protocol.[165] There is also an international standard for solids, ISO 16929,[166] created by the International Organization for Standardization.[167] It creates the test procedure for determining the degree of disintegration of plastic materials in a pilot-scale aerobic composting test under defined conditions.[168] This test provides the most accurate measurement of biodegradability in aerobic conditions, which would not be recommended for landfill conditions.[169] However, these different tests underscore that scientists have developed specific methods of testing biodegradability. Following these methods will allow for coherence and assist the consumer in familiarizing his or her self with a uniform biodegradability scale.

Another possibility would be to create a methodology with the Environmental Protection Agency ("EPA") that accounts for standards that are most like those found in a landfill. The EPA has set out specific criteria for managing landfill conditions.[170] Agency collaboration also allows for more uniformity in measuring

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163. *Biodegradability Testing*, SITU BIOSCIS. LLC (last visited Jan. 25, 2019), http://www.situbiosciences.com/biodegradation/.

164. *Biodegradable Testing Methods and Standards*, BIOSPHERE (last accessed Jna. 2, 2018), http://www.biosphereplastic.com/biodegradableplastic/uncategorized/biodegradable-testing-methods-and-standards/.

165. *Id.*; Public Comment Letter, *supra* note 159.

166. OECD 301 is the specific protocol for Liquids Biodegradability Testing. *Biodegradability Testing*, *supra* note 163.

167. ISO sets the international standard. *Plastics — Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test*, ORGANISATION INTERNATIONALE DE NORMALISATION, https://www.iso.org/obp/ui/#iso:std:iso:16929:ed-2:v1:en (last visited Mar. 14, 2019). There are also international standards set by the OECD. *OECD 302B – Inherent Biodegradation*, SITU BIOSCIS. LLC, http://www.situbiosciences.com/quality-control-testing/oecd-302b-inherent-biodegradation/ (last visited Mar. 14, 2019).

168. The test runs for about twelve weeks and is often requested for plastic products. These conditions are in a composting environment, where there is aerobic biodegradation. For anerobic degradation conditions, the D5511 protocol is most commonly used. *ISO 16929 – Pilot Scale Composting Test*, SITU BIOSCIS. LLC, http://www.situbiosciences.com/biodegradation/iso-16929-pilot-scale-composting-test/ (last visited Mar. 14, 2019).

169. *Id.*

170. *Landfills*, ENVTL. PROT. AGENCY, https://www.epa.gov/landfills (last visited Jan. 2, 2019).

biodegradability. The agency would choose a scientific measurement test and decide on the parameters of the experiment as well.[171]

Lastly, there are other methods of measuring biodegradability. The above methods are solely gas evolution testing methods that monitor carbon dioxide, methane, and oxygen levels. Scientists also measure biodegradability through gel permeation chromatography and nuclear magnetic resonance ("NMR"), which provide more information about the structure of the plastic and byproducts found in the surrounding environment.[172] These testing methods are also available when creating a uniform biodegradability method.

It is more feasible to require companies to run certain lab tests than it is to have them try to substantiate timeframes for the biodegradability of their product. If companies were to invest in testing their products under consistent standard procedures and base their biodegradability claims and advertisements on those procedures, consumers would have a better understanding of the environmental impact of the product. The FTC would also not have to engage in analyzing every different scientific method employed by a company that attempts to substantiate their claims. It is important that companies that invest in creating biodegradable products are encouraged to continue to innovate and decrease the life span of plastic products. By setting the one-year limit on unqualified claims, the guidelines restrict this development by making it difficult for companies to market their new products that are more eco-friendly than regular plastic. Instead of worrying about making unqualified deceptive claims, all products can visibly label on the packaging this new scientific "biodegradability scale" created by a clearer definition. Companies would have a way of accurately expressing their progress and the capability of their product. The consumer would also be put on notice regarding the product's capabilities and how it compares to other similar products. This method provides for a more flexible spectrum of biodegradability claims that companies could make and encourages competition.

ECM now labels their product as "49.28% biodegradable in 900 days under non-typical conditions."[173] Although this labeling is understandable, a consumer

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171. For example, the agencies could decide on a "typical landfill temperature" for all scientific experiments testing a product's biodegradability. Currently, typical landfill temperatures range from 24–46ºC. If all lab tests were done under these conditions, then the consumer could infer that if the environment were colder the rate of biodegradation would decrease. This scenario also assumes that the temperatures are not extreme. Extreme temperatures would potentially kill the microorganisms degrading the product and completely alter the biodegradability results. Elevated Landfill Temperatures a Concern for Operators. Megan Greenwalt, *Elevated Landfill Temperatures a Concern for Operators*, WASTE360, https://www.waste360.com/operations/elevated-landfill-temperatures-concern-operators (last visited Jan. 2, 2019).

172. *See generally* Michela Siotto et al., *Monitoring Biodegradation of Poly(butylene sebacate) by Gel Permeation Chromatography, ^{1}H-NMR and ^{31}P-NMR Techniques*, 166 J. OF ENVTL. MGMT. 27 (2013); *see also* B.R. ZAIDI & S.H. IMAM, *Biodegradability*, ENCYCLOPEDIA OF ECOLOGY 357, 357–66 (2008); *Nuclear Magnetic Resonance Spectroscopy Analysis of Polymers*, INTERTEK, http://www.intertek.com/polymers/nmr-analysis/ (last visited Jan. 2, 2019).

173. *Cutting-Edge Additives for Manufacturing Biodegradable* Plastics*, *supra* note 37.

would have trouble comparing this product with another plastic additive if the other products' labeling was under typical conditions within a different time frame. Furthermore, the consumer does not know what a "typical" or "non-typical" condition means, and landfills do not have a "typical" condition. Another suggestion to clarify the labeling would be to include the normal rate of plastic degradation on the product, making it easier for consumers to understand how the additives change a product's biodegradability as compared to normal plastic under those same conditions.[174] Providing this detailed uniform information would ensure that consumers have a better understanding of the additive's capability and that companies have a more efficient and accurate way to advertise it.

CONCLUSION

Biodegradability is a complex process that is difficult to define and measure. After *ECM BioFilms*, companies must meet strict disclosure requirements to avoid making deceptive implied claims about when their product will biodegrade. In response, eco-friendly companies should invest in more sophisticated customer surveys that consider the consumer's prior knowledge of biodegradation and the demographic information of the consumers to prevent deceptive claims. But more importantly, the Green Guides should include a better method for labeling the biodegradability of a product. Because of the difficulty of defining and understanding biodegradability, companies should be required to label all claims they are making. The requirements should be based on universal lab experiments that attempt to mimic a standard landfill condition determined by the agency rather than the timeframes suggested by the Green Guides. Time factors do not provide a realistic representation of the actual biodegradability of the material and can be unduly burdensome for companies to prove. Rather, by establishing a uniform test with set temperature, timeframe, pressure, pH, and other variable conditions, companies can market their products by relying on established and accepted scientific methods. Such consistent labeling would allow consumers to have a better understanding of, and to make more informed decisions about, purchasing eco-friendly products.

174. The labeling can include something as simple as, "Plastic without manufacturer's additive biodegrades by *x* rate or *x* % under the same testing conditions."