

distributors and customers have disseminated, or have caused the dissemination of, the advertising claims in these promotional materials to end-use consumers.

5. In its advertising and promotional materials, including, but not limited to, those shown in Exhibits 1-4, respondent has made the following statements and depictions:

A. Respondent's Website (Exhibit 1A, disseminated until approximately October 2012):

i. Website Banner Tagline:



(Ex. 1A at 1-12).

ii. Home Page:

“Transform any Plastic into Biodegradable Plastic! . . . The revolutionary additive technology, when combined as a one-percent load to the most widely-used plastic resins, renders the finished plastic products biodegradable while maintaining their other desired characteristics. The potential uses of this technology are limited only by the imagination.” (Id. at 1).

iii. Product Overview Page:

“MasterBatch Pellets™ is a revolutionary additive, which when combined as a one-percent load to the most widely used plastic resins, renders the finished plastic products biodegradable while maintaining their other desired characteristics. . . .” (Id. at 5).

“Plastic products made with ECM additives:

- Fully biodegrade in 9 months to 5 years
- Fully biodegrade when disposed of in a biodegrading environment, either anaerobically or aerobically:
 - in landfills” (Id.).

iv. Comparison to Alternative Products Page:



Comparison of Products Produced with ECM MasterBatch Pellets™ to Alternative Products

	ECM MasterBatch™	Oxo-Degrader*	Bioplastics+
For Biodegradation			
100% Biodegradable (on land, in land, in water)	True	False	False
100% Biodegradable in landfill, as litter or backyard compost	True	False	False

(Ex. 1A at 8).

v. Technology Page:

“The plastic products made with our additives will break down in approximately 9 months to 5 years in nearly all landfills or wherever else they may end up.” (Id. at 10).

“Material treated with ECM has been tested and proved as biodegradable and safe for the environment by using the following: . . . ASTM 5511 [sic] ‘Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions’.” (Id.).

B. Respondent’s Website (Exhibit 1B, disseminated on or around October 2012 to present):

i. Website Banner Tagline:



(E.g., Ex. 1B at 1, 3, 5).

BIODEGRADABLE* PLASTICS QUALIFIER

* Plastic products manufactured with ECM BioFilms' additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.

(*E.g.*, Id. at 2, 4, 9).

ii. Home Page:

“Cutting-edge additives for manufacturing biodegradable* plastics . . . Unlike other degradable plastic technologies which require very specific conditions, plastic products manufactured with ECM MasterBatch Pellets will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year. This revolutionary additive technology, when combined as a 1% load to the most widely-used plastic resins, renders the resulting plastic products biodegradable* while maintaining their other desired characteristics. The potential uses of this technology are limited only by the imagination.” (Id. at 1).

“BIODEGRADABLE* PLASTICS QUALIFIER

* Plastic products manufactured with ECM BioFilms' additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.” (Id.).

iii. MasterBatch Pellets, Additives for Manufacturing Biodegradable* Plastics Page:

“ECM MasterBatch Pellets™ are a revolutionary additive technology for manufacturing biodegradable* plastics . . . When combined as a 1% load with the most widely-used plastic resins, they render the resulting plastic products biodegradable*.” (Id. at 10).

“Plastic products made with ECM BioFilms' additives: . . .

- Biodegrade* in any biologically-active environment in some period greater than a year
- Biodegrade* when disposed of in a biodegrading environment, either anaerobically or aerobically:
 - in landfills
 - in compost (backyard compost or commercial facilities)
 - if buried or littered in the ground

- in agricultural and erosion-control settings” (Id. at 10-11).

“BIODEGRADABLE* PLASTICS QUALIFIER

* Plastic products manufactured with ECM BioFilms’ additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.” (Id. at 11).

iv. Comparison to Alternative Products Page:



(Id. at 12).

v. MasterBatch Pellets, ECM Technology Page:

“The plastic products made with our additives will break down in more than one year but less than a hundred plus years in nearly all landfills or wherever else they may end up” (Id. at 14).

“Material treated with ECM has been tested and proved as biodegradable* and safe for the environment by using the following: . . . ASTM 5511 [sic] ‘Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions’.” (Id.).

vi. MasterBatch Pellets, Mechanism Page:

“We have determined, through years of testing both internally and through independent laboratories, that plastic products that are manufactured with at least a one percent (1%) load, by weight, of our ECM MasterBatch Pellets will biodegrade once they are placed in conditions wherein they are in constant contact with other biodegrading materials.” (Id. at 16).

vii. MasterBatch Pellets, Life Expectancy Page

“Concerning the life expectancy of the plastic products manufactured with our additives once they are placed in constant contact with other biodegrading materials, we certify the full biodegradation of most all plastic products manufactured with at least a one percent load of our additives. We can certify this situation due to the internal and external studies that have cost us hundreds of thousands of dollars.” (Id. at 19).

“Plastics manufactured with our additives will fully biodegrade in home compost heaps, commercial composting operations (both high heat and low heat, or even in vermiculture, processes), buried in the ground, buried in landfills, tilled into the soil, having been littered, etc. Most importantly, our process is by far the least expensive, most widely applicable, proven technology for the biodegradation of plastics in the world.” (Id.).

“Again, we certify the biodegradation* of polyolefins (any of the polyethylenes and polypropylenes), EVAs, PVCs, PETs, PSs, PUs and any combination of these resins, manufactured with at least a 1% load of our additives. We base this certification on more than ten years of testing worldwide by us, by universities, by customers, by prospects and by competitors.” (Id.).

“BIODEGRADABLE* PLASTICS QUALIFIER

* Plastic products manufactured with ECM BioFilms’ additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.” (Id.).

C. Respondent’s Print Materials:

i. Flyer (Exhibit 2):

[REDACTED]

[REDACTED]

ii. Brochure (Exhibit 3):

[REDACTED]

[REDACTED]

[REDACTED]

iii. Certificate of Biodegradability of Plastic Products (Exhibit 4):

“This is to certify that numerous plastic samples, submitted by ECM BioFilms, Inc., have been tested by independent laboratories in accordance with standard test methods The results of these tests and the related biodegradation and ecological impact experiments are contained in the Ecological Assessment of ECM Plastic report dated February 16, 1999, which certifies that plastic products manufactured with ECM additives can be marketed as biodegradable This Certificate and the Ecological Assessment of ECM Plastic report, along with Scanning Electron Microscope and other studies that have been conducted since the publication of the Ecological Assessment . . . may be used by [the certificate holder] to validate[i] ts claims to the biodegradability and environmental safety of plastic products that it manufactures” (Ex. 4 at 1).

6. Approximately 92 percent of total municipal solid waste in the United States is disposed of either in landfills, incinerators, or recycling facilities. These disposal methods do not present conditions that would allow ECM Plastics to completely break down and decompose into elements found in nature within a reasonably short period of time.
7. Consumers likely interpret unqualified degradable claims to mean that the entire product or package will completely decompose into elements found in nature within a reasonably short period of time after customary disposal.
8. The Ecological Assessment of ECM Plastic, American Society for Testing and Materials (“ASTM”) International D5511, *Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials under High Solids Anaerobic Digestion Conditions* (“ASTM D5511”), and other scientific tests relied on by respondent do not assure complete decomposition of ECM Plastics in a reasonably short period of time or in respondent’s stated timeframes, *e.g.*, nine months to five years, and do not replicate, *i.e.*, simulate, the physical conditions of either landfills, where most trash is disposed, or other disposal facilities stated in the representations.

VIOLATIONS OF SECTION 5 OF THE FTC ACT

FALSE OR MISLEADING REPRESENTATIONS

9. Through the means described in Paragraphs 2, 4, and 5, respondent has represented, expressly or by implication, that:
 - A. ECM Plastics are biodegradable, *i.e.*, will completely break down and decompose into elements found in nature within a reasonably short period of time after customary disposal;
 - B. ECM Plastics are biodegradable in a landfill;
 - C. ECM Plastics are biodegradable in a stated qualified timeframe; and
 - D. ECM Plastics have been shown to be biodegradable, biodegradable in a landfill, or biodegradable in a stated qualified timeframe under various scientific tests including, but not limited to, ASTM D5511.
10. In truth and in fact:
 - A. ECM Plastics will not completely break down and decompose into elements found in nature within a reasonably short period of time after customary disposal;
 - B. ECM Plastics will not completely break down and decompose into elements found in nature within a reasonably short period of time after disposal in a

landfill;

- C. ECM Plastics will not completely break down and decompose into elements found in nature within respondent's stated qualified timeframes after customary disposal; and
- D. ECM Plastics have not been shown to completely break down and decompose into elements found in nature within a reasonably short period of time after customary disposal, after disposal in a landfill, or within respondent's stated qualified timeframe, under various scientific tests, including, but not limited to, ASTM D5511.

11. Therefore, the representations set forth in Paragraph 9 were, and are, false or misleading.

UNSUBSTANTIATED REPRESENTATIONS

12. Through the means described in Paragraphs 2, 4, and 5, in numerous instances respondent has represented, expressly or by implication, that it possessed and relied upon a reasonable basis that substantiated the representations set forth in Paragraph 9, at the time the representations were made.

13. In truth and in fact, at the time respondent made the representations referred to in Paragraph 9, respondent did not possess and rely upon a reasonable basis that substantiated such representations. Therefore, the representation set forth in Paragraph 12 is false or misleading.

MEANS AND INSTRUMENTALITIES

14. Respondent has distributed the promotional materials described in Paragraphs 4 and 5 to its customers and independent distributors. In so doing, respondent has provided them with the means and instrumentalities for the commission of deceptive acts or practices.

15. Respondent's practices, as alleged in this complaint, therefore constitute deceptive acts or practices in or affecting commerce in violation of Section 5(a) of the Federal Trade Commission Act.

NOTICE

Notice is hereby given to the respondent that the eighteenth day of June, 2014, at 10:00 a.m., is hereby fixed as the time, and the Federal Trade Commission offices at 600 Pennsylvania Avenue, N.W., Room 532-H, Washington, D.C. 20580, as the place when and where a hearing will be had before an Administrative Law Judge of the Federal Trade Commission, on the charges set forth in this complaint, at which time and place you will have the right under the Federal Trade Commission Act to appear and show

cause why an order should not be entered requiring you to cease and desist from the violations of law charged in this complaint.

You are notified that the opportunity is afforded you to file with the Federal Trade Commission an answer to this complaint on or before the fourteenth (14th) day after service of it upon you. An answer in which the allegations of the complaint are contested shall contain a concise statement of the facts constituting each ground of defense; and specific admission, denial, or explanation of each fact alleged in the complaint or, if you are without knowledge thereof, a statement to that effect. Allegations of the complaint not thus answered shall be deemed to have been admitted.

If you elect not to contest the allegations of fact set forth in the complaint, the answer shall consist of a statement that you admit all of the material facts to be true. Such an answer shall constitute a waiver of hearings as to the facts alleged in the complaint and, together with the complaint, will provide a record basis on which the Commission shall issue a final decision containing appropriate findings and conclusions, and a final order disposing of the proceeding. In such answer, you may, however, reserve the right to submit proposed findings of fact and conclusions of law under Rule 3.46 of the Commission's Rules of Practice for Adjudicative Proceedings.

Failure to answer within the time above provided shall be deemed to constitute a waiver of your right to appear and to contest the allegations of the complaint, and shall authorize the Commission, without further notice to you, to find the facts to be as alleged in the complaint and to enter a final decision containing appropriate findings and conclusions and a final order disposing of the proceeding.

The Administrative Law Judge shall hold a prehearing scheduling conference not later than ten (10) days after the answer is filed by the respondent. Unless otherwise directed by the Administrative Law Judge, the scheduling conference and further proceedings will take place at the Federal Trade Commission, 600 Pennsylvania Avenue, N.W., Room 532-H, Washington, D.C. 20580. Rule 3.21(a) requires a meeting of the parties' counsel as early as practicable before the prehearing scheduling conference, but in any event no later than five (5) days after the answer is filed by the respondent. Rule 3.31(b) obligates counsel for each party, within five (5) days of receiving respondent's answer, to make certain disclosures without awaiting a formal discovery request.

The following is the form of order which the Commission has reason to believe should issue if the facts are found to be as alleged in the complaint. If, however, the Commission should conclude from record facts developed in any adjudicative proceedings in this matter that the proposed order provisions as to ECM BioFilms, Inc., also d/b/a Enviroplastics International might be inadequate to fully protect the consuming public, the Commission may order such other relief as it finds necessary or appropriate, including corrective advertising or other affirmative disclosure.

Moreover, the Commission has reason to believe that, if the facts are found as alleged in the complaint, it may be necessary and appropriate for the Commission to seek

relief to redress injury to consumers, or other persons, partnerships or corporations, in the form of restitution and refunds for past, present, and future consumers and such other types of relief as are set forth in Section 19(b) of the Federal Trade Commission Act. The Commission will determine whether to apply to a court for such relief on the basis of the adjudicative proceedings in this matter and such other factors as are relevant to consider the necessity and appropriateness of such action.

ORDER

DEFINITIONS

For purposes of this order, the following definitions shall apply:

1. “Clearly and Prominently” shall mean as follows:
 - A. In print communications, the disclosure shall be presented in a manner that stands out from the accompanying text, so that it is sufficiently prominent, because of its type size, contrast, location, or other characteristics, for an ordinary consumer to notice, read and comprehend it;
 - B. In communications made through an electronic medium (such as television, video, radio, and interactive media such as the Internet, online services, and software), the disclosure shall be presented simultaneously in both the audio and visual portions of the communication. In any communication presented solely through visual or audio means, the disclosure shall be made through the same means through which the communication is presented. In any communication disseminated by means of an interactive electronic medium such as software, the Internet, or online services, the disclosure must be unavoidable. Any audio disclosure shall be delivered in a volume and cadence sufficient for an ordinary consumer to hear and comprehend it. Any visual disclosure shall be presented in a manner that stands out in the context in which it is presented, so that it is sufficiently prominent, due to its size and shade, contrast to the background against which it appears, the length of time it appears on the screen, and its location, for an ordinary consumer to notice, read and comprehend it; and
 - C. Regardless of the medium used to disseminate it, the disclosure shall be in understandable language and syntax. Nothing contrary to, inconsistent with, or in mitigation of the disclosure shall be used in any communication.
2. “Close proximity” means on the same print page, web page, online service page, or other electronic page, and proximate to the triggering representation, and not accessed or displayed through hyperlinks, pop-ups, interstitials, or other means.

3. “Commerce” shall mean as defined in Section 4 of the Federal Trade Commission Act, 15 U.S.C. § 44.

4. “Competent and reliable scientific evidence” shall mean tests, analyses, research, or studies that have been conducted and evaluated in an objective manner by qualified persons, that are generally accepted in the profession to yield accurate and reliable results, and that are sufficient in quality and quantity based on standards generally accepted in the relevant scientific fields, when considered in light of the entire body of relevant and reliable scientific evidence, to substantiate that a representation is true. Specifically:

- A. For unqualified biodegradability claims, any scientific technical protocol (or combination of protocols) substantiating such claims must assure complete decomposition within one year and replicate, *i.e.*, simulate, the physical conditions found in landfills, where most trash is disposed.
- B. For qualified biodegradability claims, any scientific technical protocol (or combination of protocols) substantiating such claims must both:
 - i. assure the entire product will (1) completely decompose into elements found in nature in the stated timeframe or, if not qualified by time, within one year; or (2) decompose into elements found in nature at the rate and to the extent stated in the representation; and
 - ii. replicate, *i.e.*, simulate, the physical conditions found in the type of disposal facility or method stated in the representation or, if not qualified by disposal facility or method, the conditions found in landfills, where most trash is disposed.

For example, results from ASTM (American Society for Testing and Materials) International D5511-12, *Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials under High Solids Anaerobic Digestion Conditions*, or any prior version thereof, are not competent and reliable scientific evidence supporting unqualified claims, or claims of outcomes beyond the parameters and results of the actual test performed.

5. “Customary disposal” means any disposal method whereby respondent’s products ultimately will be disposed of in a landfill, in an incinerator, or in a recycling facility.

6. “Degradable” includes biodegradable, oxo-biodegradable, oxo-degradable, or photodegradable, or any variation thereof.

7. “Landfill” means a municipal solid waste landfill that receives household waste. “Landfill” does not include landfills that are operated as bioreactors or those that are actively managed to enhance decomposition.

8. “Means and instrumentalities” shall mean any information, including, but not necessarily limited to, any advertising, labeling, or promotional, sales training, or purported substantiation materials, for use by trade customers in their marketing of any product, package, or service, in or affecting commerce.

9. Unless otherwise specified, “respondent” shall mean ECM BioFilms, Inc., a corporation, and its successors and assigns.

I.

IT IS ORDERED that respondent, and its officers, agents, representatives, and employees, directly or through any corporation, partnership, subsidiary, division, or other device, in connection with the manufacturing, labeling, advertising, promotion, offering for sale, sale, or distribution of any product, package, or service, in or affecting commerce, shall not represent, in any manner, directly or indirectly, expressly or by implication:

- A. That any product or package is degradable, or that any product, package, or service affects a product or package’s degradability, unless
 - i. the entire item will completely decompose into elements found in nature within one year after customary disposal; or
 - ii. the representation is clearly and prominently and in close proximity qualified by:
 - a. Either (1) the time to complete decomposition into elements found in nature; or (2) the rate and extent of decomposition into elements found in nature, provided that such qualification must disclose that the stated rate and extent of decomposition does not mean that the product or package will continue to decompose; and
 - b. If the product will not decompose in a customary disposal facility or by a customary method of disposal, both (1) the type of non-customary disposal facility or method and (2) the availability of such disposal facility or method to consumers where the product or package is marketed or sold

and such representation is true, not misleading, and, at the time it is made, respondent possesses and relies upon competent and reliable scientific evidence that substantiates the representation.

- B. That any such product, package, or service offers any environmental benefit, unless the representation is true, not misleading, and, at the time it

is made, respondent possesses and relies upon competent and reliable evidence, which when appropriate must be competent and reliable scientific evidence, that substantiates the representation.

II.

IT IS FURTHER ORDERED that respondent, and its officers, agents, representatives, and employees, directly or through any corporation, partnership, subsidiary, division, or other device, in connection with the manufacturing, labeling, advertising, promotion, offering for sale, sale, or distribution of any product, package, or service in or affecting commerce, shall not provide to others the means and instrumentalities with which to make, directly or indirectly, expressly or by implication, including through the use of endorsements or trade names, any false, unsubstantiated, or otherwise misleading representation of material fact regarding any environmental benefit.

III.

IT IS FURTHER ORDERED that respondent shall, for five (5) years after the last date of dissemination of any representation covered by this order, maintain and upon request make available to the Commission for inspection and copying:

- A. All advertisements, labeling, packaging and promotional materials containing the representations specified in Parts I and II;
- B. All materials that were relied upon in disseminating the representations specified in Parts I and II;
- C. All tests, reports, studies, surveys, demonstrations, or other evidence in its possession or control that contradict, qualify, or call into question the representation, or the basis relied upon for the representation, including complaints and other communications with consumers or with governmental or consumer protection organizations; and
- D. All acknowledgments of receipt of this order obtained pursuant to Part IV.

IV.

IT IS FURTHER ORDERED that respondent shall deliver a copy of this order to all current and future subsidiaries, current and future principals, officers, directors, and managers, and to all current and future employees, agents, and representatives having responsibilities relating to the subject matter of this order. Respondent shall secure from each such person a signed and dated statement acknowledging receipt of the order, with any electronic signatures complying with the requirements of the E-Sign Act, 15 U.S.C. § 7001 *et seq.* Respondent shall deliver this order to current personnel within thirty (30) days after the date of service of this order, and to future personnel within thirty (30) days after the person assumes such position or responsibilities.

V.

IT IS FURTHER ORDERED that respondent shall notify the Commission at least thirty (30) days prior to any change in the corporation that may affect compliance obligations arising under this order, including, but not limited to, a dissolution, assignment, sale, merger, or other action that would result in the emergence of a successor entity; the creation or dissolution of a subsidiary, parent, or affiliate that engages in any acts or practices subject to this order; the proposed filing of a bankruptcy petition; or a change in the business or corporate name or address. Provided, however, that, with respect to any proposed change in the corporation about which respondent learns less than thirty (30) days prior to the date such action is to take place, respondent shall notify the Commission as soon as is practicable after obtaining such knowledge.

Unless otherwise directed by a representative of the Commission in writing, all notices required by this Part shall be emailed to Debrief@ftc.gov or sent by overnight courier (not the U.S. Postal Service) to: Associate Director for Enforcement, Bureau of Consumer Protection, Federal Trade Commission, 600 Pennsylvania Avenue NW, Mail Stop M-8102B, Washington, DC 20580. The subject line must begin: “ECM BioFilms, Inc., Docket No. 9358, File No. 122 3118.”

VI.

IT IS FURTHER ORDERED that respondent shall, within sixty (60) days after the date of service of this order file with the Commission a true and accurate report, in writing, setting forth in detail the manner and form in which respondent has complied with this order. Within ten (10) days of receipt of written notice from a representative of the Commission, respondent shall submit additional true and accurate written reports. Unless otherwise directed by a representative of the Commission in writing, all notices required by this Part shall be emailed to Debrief@ftc.gov or sent by overnight courier (not the U.S. Postal Service) to: Associate Director for Enforcement, Bureau of Consumer Protection, Federal Trade Commission, 600 Pennsylvania Avenue NW, Mail Stop 8102-B, Washington, DC 20580. The subject line must begin: “ECM BioFilms, Inc., Docket No. 9358, File No. 122 3118.”

VII.

This order will terminate twenty (20) years from the date of its issuance, or twenty (20) years from the most recent date that the United States or the Commission files a complaint (with or without an accompanying consent decree) in federal court alleging any violation of the order, whichever comes later; provided, however, that the filing of such a complaint will not affect the duration of:

- A. Any Part in this order that terminates in less than twenty (20) years;
- B. This order's application to any respondent that is not named as a defendant in such complaint; and
- C. This order if such complaint is filed after the order has terminated pursuant to this Part.

Provided, further, that if such complaint is dismissed or a federal court rules that the respondent did not violate any provision of the order, and the dismissal or ruling is either not appealed or upheld on appeal, then the order will terminate according to this Part as though the complaint had never been filed, except that the order will not terminate between the date such complaint is filed and the later of the deadline for appealing such dismissal or ruling and the date such dismissal or ruling is upheld on appeal.

IN WITNESS WHEREOF, the Federal Trade Commission has issued this complaint against respondent and has caused it to be signed by its Secretary and its official seal to be hereto affixed, at Washington, D.C. this eighteenth day of October, 2013.

By the Commission.

Donald S. Clark
Secretary

SEAL

EXHIBIT 1A

Transform any Plastic into Biodegradable Plastic!

ECM BioFilms, Inc. is a manufacturing company founded in 1998, which is dedicated to developing and revolutionizing the plastics market by offering an additive to standard plastic resins making them biodegradable. These biodegradable plastic products are priced competitively with, and have the same mechanical characteristics as, traditional non-degradable products.

The revolutionary additive technology, when combined as a one-percent load to the most widely-used plastic resins, renders the finished plastic products biodegradable while maintaining their other desired characteristics. The potential uses of this technology are limited only by the imagination.

ECM's mission is to constantly provide the best possible value to its customers and suppliers while dedicating efforts towards eliminating disposal and environmental issues surrounding the plastics industry.

Can be used in plastic water bottles...



CLICK HERE TO GO GREEN!



ECM LATEST NEWS



[Sitemap](#)

[Website design and development by 78 Design House](#)

Green Impact



Many organizations (among them, Greenpeace and The Environmental Research Foundation) have claimed that plastics and the consumer acceptance of plastics is declining...mainly because businesses and organizations don't know what to do with the plastics after use. In fact, the Society of Plastics Industries' Larry Thomas has stated:

According to the Clean Air Council:

- In the U.S., 4.39 pounds of trash per day and up to 56 ton of trash per year are created by the average person.
- Only about one-tenth of all solid garbage in the United States gets recycled.
- Every year we fill enough garbage trucks to form a line that would stretch from the earth, halfway to the moon.
- Each day the United States throws away enough trash to fill 63,000 garbage trucks.
- Almost 1/3 of the waste generated in the U.S. is packaging
- Americans throw away 2.5 million plastic bottles every hour.
- Every year, Americans make enough plastic film to shrink-wrap the state of Texas.
- Seventy percent of U.S. municipal solid waste gets buried in landfills.

READ MORE...

CLEAN AIR COUNCIL

Our waste, from paper and soda cans to old refrigerators and television. . .
[read more](#)

ECO-PLASTIC

Every year US landfills receive tens of millions of tons of plastic. . .
[read more](#)

BIODEGRADABLE CLOSE-UP

ECM is a relatively new firm that tailors a range of biodegradable. . .
[read more](#)

DOWN TO EARTH SWITCHES

The biodegradable bags from Down to Earth are made using. . .
[read more](#)



Contact Us

<input type="text"/> First Name*	<input type="text"/> Last Name*	<input type="text"/> Title
<input type="text"/> Company*	<input type="text"/> Email Address*	<input type="text"/> Phone number
<input type="text"/> Address One	<input type="text"/> Address Two	
<input type="text"/> City	<input type="text"/> State	<input type="text"/> Zip
<input type="text"/> Country		

What types of end-products & resins are you interested in for the use of ECM technology?

Additional questions or comments:

Security Code: Please enter the words you see in the box, in order and separated by a space.



*Required Fields

stop spam.
read books.



Victoria Place - Suite 225
100 South Park Place
Painesville, Ohio 44077 U.S.A

Phone: 440-350-1400
Toll Free: 888-220-2792
Fax: 440-350-1444

[click here to contact by email](#)



Big News



ECM LAUNCHES NEW WEBSITE

ECM Biofilms, Inc. is proud to announce the launch of our completely redesigned website. With a totally fresh appearance, the new website contains important information about ECM and our exclusive MasterBatch Pellets™. The clean graphics paired with our cutting edge additive technology provides an informative and visually appealing site for prospective customers. www.ECMbiofilms.com

READ MORE...

CLEAN AIR COUNCIL

Our waste, from paper and soda cans to old refrigerators and television. . . [read more](#)

ECO-PLASTIC

Every year US landfills receive tens of millions of tons of plastic. . . [read more](#)

BIODEGRADABLE CLOSE-UP

ECM is a relatively new firm that tailors a range of biodegradable. . . [read more](#)

DOWN TO EARTH SWITCHES

The biodegradable bags from Down to Earth are made using. . . [read more](#)



Our Product



ECM BioFilms, Inc. markets additives to plastic product manufacturers which produce biodegradable plastic products that can be priced competitively with, and have the same mechanical characteristics as, their traditional non-degradable products.

Plastic products made with ECM additives:

- Fully biodegrade in 9 months to 5 years
- Fully biodegrade when disposed of in a biodegrading environment, either anaerobically or aerobically:
 - in landfills
 - in compost (backyard compost or commercial facilities)
 - if buried or littered in the ground
 - in agricultural and erosion-control settings
- Are recyclable
- Can be made with recycled resins
- Do not use heat, light or mechanical stress to break them down
- Do not require special handling (unlike PLA and oxodegradable products)
- Do not contain heavy metals (unlike most oxodegradable products)



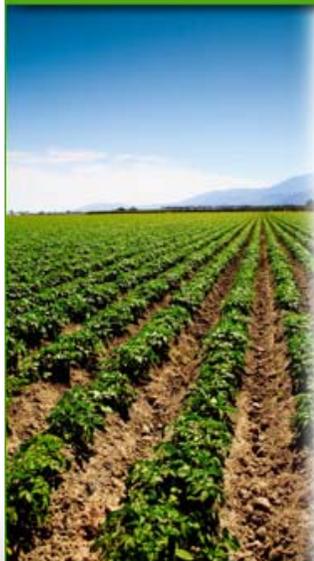
MASTERBATCH PELLETS

MasterBatch Pellets™ is a revolutionary additive, which when combined as a one-percent load to the most widely used plastic resins, renders the finished plastic products biodegradable while maintaining their other desired characteristics.

Click topic below to download PDF

- [PRODUCT COMPARISON](#)
- [BIODEGRADATION MECHANISM](#)
- [OUR TECHNOLOGY](#)
- [PRODUCT LIFE EXPECTANCY](#)

About ECM



ECM BioFilms is an Ohio Corporation founded in 1998 to develop and market a new technology which can be priced competitively with, and have the same mechanical characteristics as, the traditional non-degradable plastics.

The potential uses of this technology are limited only by the imagination.

ECM also nurtures and supports a healthy, creative, respectful and fun work environment where employees are fairly compensated and encouraged to respect its customers and support the continued quality of its products.



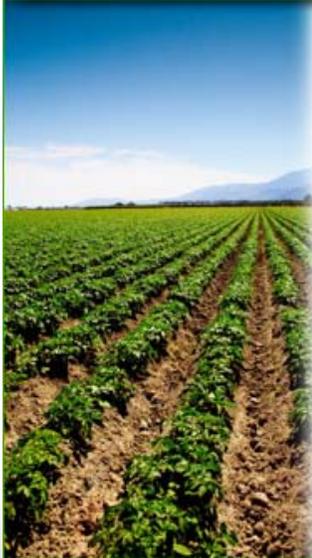
Strategic Partners

www.italcombiodegradabile.com

www.aiq.com.ar

www.return2green.com

EC M BioFilms Website Site map



[HOME: ECM Biofilms Additive Makes Plastic Biodegradable](#) - ECM BioFilms Transform any plastic into Biodegradable Plastic. We offer an additive to standard plastic resins making plastics biodegradable.

[GREEN IMPACT: How ECM Biofilms is making a Green Impact](#) - ECM BioFilms MasterBatch Pellet™ technology allows for the breakdown of plastic without the use of light, heat or some form of mechanical sensitivity.

[ABOUT ECM BIOFILMS: Our history and philosophy](#) - ECM BioFilms is an Ohio Corporation founded in 1998 to develop and market a new technology to produce biodegradable plastic products which can be priced competitively.

[OUR PRODUCT: About ECM BioFilms' Additive that Creates Biodegradable Plastic](#) - ECM BioFilms, Inc. markets additives to plastic product manufacturers which produce biodegradable plastic products that can be priced competitively with, and have the same mechanical characteristics as, their traditional non-degradable products.

- [ECM MasterBatch Pellets™ - Life Expectancy](#) - The life

Comparison of Products Produced with ECM MasterBatch Pellets™ to Alternative Products

	ECM MasterBatch™	Oxo-Degrader*	Bioplastics ⁺
For Biodegradation 100% Biodegradable (on land, in land, in water) 100% Biodegradable in landfill, as litter or backyard compost	True True	False False	False False
For Recycling 100% Recyclable at any time Compatible with the recycle stream	True True	False False	False False
For Properties No special storage conditions required Shelf life is indefinite Not degraded by exposure to heat, light or external stresses during storage, shipping, handling or use Does not fragment during degradation Degradation begins at the time of disposal - not before	True True True True True	False False False False False	False False False True False
For Performance When compared to the original material in the application, physical properties are unchanged and no redesign of end product needed UV or anti-oxidant additives are needed, inhibiting product performance Performance not negatively affected by over loading	True False True	False True False	False False n/a
For Processing Can be processed with conventional equipment No changes to the process settings required Biodegradable with 1% loading in PE, PP, PVC, PS and PET	True True True	True False False	False False n/a
For the Environment No heavy metals, ecologically safe Degraded product returns to the environment not as small particles, but as biomass and humus	True True	False False	True True ^o
For the Bottom Line Cost effective	True	False	False

* EPI Environmental Products Inc., Willow Ridge Plastics, Inc., Symphony Environmental, Inc., etc.

+ PLA, Mater-Bi®, PHB and combinations (NatureWorks LLC., Novamont S.p.A., et al.)

° Only in industrial/municipal composting facilities

Mechanism for the Biodegradation of Products Manufactured with ECM MasterBatch Pellets™

We have determined, through years of testing both internally and through independent laboratories, that plastic products that are manufactured with at least a one percent (1%) load, by weight, of our ECM MasterBatch Pellets will fully biodegrade once they are placed in conditions wherein they are in constant contact with other biodegrading materials.

Originally it was not known precisely what the threshold amount of our material was necessary to initiate and sustain the process. Much of the early testing was done with plastics manufactured with five percent (5%) or higher loads of the additives but it has been determined that all that is required is a minimum of a one percent (1%) load. This amount will initiate the process and any significant amount less than this amount will not permit the process to begin or be sustained.

People often wonder whether significantly greater quantities of our additive will reduce the biodegradation times. The answer is yes, but so very marginally that it is rarely worth the potential issues concerning other physical properties in the finished plastic products and cost. To explain this more fully, it will be helpful to understand the basics of the mechanism.

The presence of at least one percent of our additives in a plastic product, which is in contact with other biodegrading organic materials, structures communities of such organisms as are there present on the surfaces of the plastic in such a way that their interaction produces the ability to break down the long hydrocarbon chains of the “non-biodegradable” petrochemical plastics. As most people are aware, an example of a biofilm would be the scum that can form on the surface of a pond or on teeth, for that matter. In the cases of most pond biofilms, the surface layers with chlorophyllic, aerobic organisms can support layers of anaerobic organisms in the deeper layers and the interaction of all of the organisms makes for an ecosystem that in some cases produce byproducts that would not be formed without the interaction. The same can be said of the biofilms formed by the interaction of our additive materials and the naturally existing biota. Importantly, this structuring of communities of microorganism proceeds in anaerobic as well as aerobic conditions.

Once there are the structured communities of microorganisms interacting to produce schisms in the long hydrocarbon chains of the polymers the process continues until all the hydrocarbons are eventually transformed into the carbon dioxide and water (aerobic biodegradation) or carbon dioxide, methane and water (anaerobic biodegradation).

This leads us back to the reason why greater quantities of our additives do not significantly speed up the time for biodegradation. If you have four otherwise identical 100 kilograms of PE products, one with no ECM (100% PE), one with a half a percent of ECM (99.5% PE), one with one percent ECM (99% PE) and one with seven percent ECM (93% PE) disposed of under the same conditions you will see why this is.

The one with no ECM does not form the necessary biofilm and thereby 100-kg of PE sits in the ground in that form for hundreds or thousands of years or more. The one with a half a percent of ECM does not form the biofilm with sufficient sustainability to initiate and continue the biodegradation process so only the very surface amounts of the ECM biodegrades and you will have remaining all of the 99.5-kg of PE and most of the 0.5-kg of ECM for hundreds or thousands of years in that form. The product that has the one percent of ECM will form and sustain the biofilm that will continue to break apart the long chains of the 99-kg of PE until the entire quantity of PE is biodegraded. The sample that has 7 percent ECM will do the same thing; the only difference is that there will be only 93-kg of the difficult-to-biodegrade PE to degrade rather than 99-kg. The difference in biodegradation time is not terribly dramatic but it is less.

As a method of concluding, I think that it may be helpful to illustrate how the mechanism employed by this unique biodegradation technology is an important reason as to why the technology will continue the path it is on to become one of the world's leading technologies for the production of plastic products.

The fact that the mechanism is not based on photodegradation or thermal degradation means that the shelf life and usable life of the plastic products will be the same as they were without the ECM additives. The fact that there is a threshold quantity necessary for the initiation and sustainability of the biofilms responsible for the biodegradation means that the plastics with the ECM additive do not have to be segregated out of the plastics that might be recycled into plastic products that are not meant to biodegrade. And finally, the fact that the threshold quantity is so low (one percent by weight) means that the manufacturer is able to immediately make plastic products with all the same other properties they had when they were not biodegradable and at nearly the same cost.

ECM BioFilms, Inc.

Victoria Place - Suite 225, 100 South Park Place, Painesville, Ohio 44077 U.S.A.

Phone: 440.350.1400 · Toll Free in U.S.A.: 800.220.2792 · Fax: 440.350.1444

Email: biodeg@ecmbiofilms.com · Website: ecmbiofilms.com

Our Technology for the Biodegradation of Plastic Products

The technology is an additive which, when combined in small quantities with any of the popular plastic resins, renders the end products biodegradable while maintaining their other desired characteristics. It is sold as ECM MasterBatch Pellets and our Company has developed the technology to the point where most plastic products manufacturers can use the additive without having to modify their existing methods of production any more than if they were changing the product's color. The resulting plastic products exhibit the same desired mechanical properties, have effectively similar shelf-lives, and yet, when disposed of, are able to be metabolized into biomass by the communities of microorganisms commonly found almost everywhere on this planet.

This biodegradation process can take place aerobically and anaerobically. It can take place with or without the presence of light. These factors allow for biodegradation even in landfill conditions which are normally inconducive to any degradation of other technologies. Our technology differs significantly from other "degradable plastics" emerging in the market today because it does not attempt to replace the currently popular plastic resin formulations but instead enhances them by rendering them biodegradable.

Recognizing the environmental concerns related to plastics and the market potential, the corporate and scientific communities have long sought to develop degradable plastics. However, the Company believes that degradable plastics introduced to date possess several weaknesses that have prevented wide-spread acceptance in the marketplace. Photo-degradable products, for example, do not degrade in landfills due to the lack of sunlight (they are typically covered with another layer of trash before the degradation can occur). At the same time these photo-degradable products present difficult circumstances for storage before use due to their reactivity to light. Similarly, plastic products manufactured with PLA and such "renewable" replacement resins fail to biodegrade as litter or in a landfill, are very expensive to manufacture, and often do not achieve the requisite physical properties.

ECM's technology is a process which enables the microorganisms in the environment to metabolize the molecular structure of plastic products into humus that is beneficial to the environment. Our process utilizes several proprietary compounds that are combined into a masterbatch pellet that is easily added to plastic resins using existing technology.

ECM engaged several renowned testing laboratories to independently establish the biodegradability of plastic products made with ECM's additives. The tests concluded that the products were fully biodegradable under both aerobic and anaerobic conditions. In addition, the tests concluded that their biodegradation did not produce any toxic residue harmful to living organisms in land or water.

Technology Explanation

The plastic products made with our additives will break down in approximately 9 months to 5 years in nearly all landfills or wherever else they may end up. All sorts of factors determine the amount of microbes available in the soil and the soil conditions determine the rate of degradation. The plastic products made with ECM technology basically rely on the microbes in the soil to react with the additives and form communities, biofilms, which create the enzymes and acids that can attack the long-chain hydrocarbon molecules and break them down to the point that the microbes' natural acids and enzymes are then effective and the microbes can metabolize the simple hydrocarbons with CO₂ and water or methane being the waste products. This process continues until all the plastic product is fully biodegraded.

Material treated with ECM has been tested and proved as biodegradable and safe for the environment by using the following:

- ASTM D5209 "Standard Test Method for Determining the Aerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewage Sludge";
- ISO 14855 / ASTM D5338 "Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials under Controlled Composting Conditions"; and
- ASTM 5511 "Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions".

Where will it biodegrade?

- Home composting
- Commercial composting
- Landfills
- Buried in, or in contact with the soil
- Erosion / Agricultural netting & film
- Litter

Where won't it degrade?

- Warehouses
- Store shelves
- Offices & Home

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Life Expectancy of Products Manufactured with ECM MasterBatch Pellets™ Page 1

The life expectancy of plastic products that are manufactured with at least a one percent (1%) load, by weight, of our ECM MasterBatch Pellets can be explained through two types of life expectancies. The first type of life expectancy is the life expectancy of the plastic when it is on the warehouse or store shelf, in regular usage as packaging or other normal plastic usage. The second type of life expectancy has to do with the situation when the same plastic has been put in conditions wherein it has constant contact with other materials that are biodegrading.

Plastic products manufactured with ECM MasterBatch Pellets will have the same life expectancy as the same plastic product manufactured without our additives under all but the conditions mentioned above wherein they are placed in constant contact with other materials that are biodegrading (i.e. on or buried in the ground). This is a major reason why our technology for having biodegradable plastic products is so successful.

The principles concerned with the degradation of plastics that make use of our additive technology are truly involved with "bio"-degradation. Our technology does not rely on the use of photosensitivity or thermal sensitivity to photodegrade or thermally break down the plastics. For this reason, a blow-molded HDPE shampoo bottle or motor oil bottle manufactured with one of our additives will last in the warehouse and on the store shelf as long as it would without our additives. There is a considerable amount of interest in our additives for the plastics for the automotive and aviation industries for this reason.

There is the real concern for the technologies that make use of thermal or photodegradation that they are simply leaving smaller particles of plastic in the soil rather than having the material truly become the organic components of soil. This is especially of concern in the agricultural industry and for those needing erosion control products. Agricultural films, erosion control nettings, and other such products manufactured with our additives will last long enough to get the required use but will completely biodegrade into the soil; such plastic products completely biodegrade in a period of from 9 months to 5 years or less. It is not a "poof, it's gone" system but simply makes the plastic product biodegrade as if it were a stick or a branch off a tree rather than "sticking around" for hundreds of years.

To summarize the concept, the key to our technology is that the right conditions for biodegradation are not those found when the plastic product is in use, is on the store shelves or is being warehoused somewhere. Just like a wood bowl or a piece of wood furniture, which can be used for a lifetime or more, a plastic

product with our additives can be used for essentially the same period of time as the same plastic product without our additives could be used.

Concerning the life expectancy of the plastic products manufactured with our additives once they are placed in constant contact with other biodegrading materials, we certify the full biodegradation of most all plastic products manufactured with at least a one percent load of our additives. We can certify this situation due to the internal and external studies that have cost us hundreds of thousands of dollars. Our additives have been tested in all of the types of polyolefins, EVAs, PVCs, PETs, PSs, PUs and combinations thereof, with much of the testing having been performed using the various world-standardized tests in independent laboratories by independent scientists. We have had the various test data analyzed by independent scientists and their conclusions and some of the data have been sent to you in the presentation package and are what we base our certification on.

The basic concept is that biodegradation is a natural process that occurs around the world but at various speeds due to various conditions. Plastics with our additives behave like sticks, branches or trunks of trees. Due to this fact, we do not guarantee any particular time because the time depends on the same factors that the biodegradation of woods and most other organic materials on earth depend - ambient biota and other environmental conditions - but the time frame of between nine months to five years will give a good general idea for most conditions. Under specific composting conditions with additional accelerants sprayed on them, some customers have reported biodegradation in as little as a couple of months. Under the more usual, commercial composting conditions using high heat processes, a time frame of around one year is a reasonable expectation.

Petrochemical plastics would normally take hundreds or thousands of years or even longer to "biodegrade"; with our additives, these same plastic formulas biodegrade in a hundredth of that time or less.

Do not be confused by the claims of some companies that say that their resins fully biodegrade in 2 months or 3 months. They are speaking of biodegradation under very specific conditions. This has led to some confusion when the plastic products are in the end-consumers' hands, such as in the Kassel project in Germany when the bags and other plastic products marked with a "compostable" label were found not to be compostable by the town's citizens in their backyard compost heaps (they were only "compostable" under the very specific commercial

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Life Expectancy of Products Manufactured with ECM MasterBatch Pellets™ Page 2

composting standards where there is high heat, oxygenation, moisture control and high levels of microorganisms). When I spoke at the Biodegradable Plastics Conference in Frankfurt, Germany a few years ago, I argued with the companies involved in that project that they should be careful in not trying to confiscate generic terms for too specific conditions (i.e. they should label items as “Commercially Compostable” rather than simply “Compostable” when such conditions are required). As the use of our technology continues to grow to become the world’s leading technology for the production of biodegradable plastics, our viewpoint will continue to gain more and more adherents.

Plastics manufactured with our additives will fully biodegrade in home compost heaps, commercial composting operations (both high heat and low heat, or even in vermiculture, processes), buried in the ground, buried in landfills, tilled into the soil, having been littered, etc. Most importantly, our process is by far the least expensive, most widely applicable, proven technology for the biodegradation of plastics in the world.

Again, we certify the biodegradation of polyolefins (any of the polyethylenes and polypropylenes), EVAs, PVCs, PETs, PSs, PUs and any combination of these resins, manufactured with at least a 1% load of our additives. We base this certification on more than ten years of testing worldwide by us, by universities, by customers, by prospects and by competitors.

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EXHIBIT 1B



Call us toll-free in the USA at 1-888-220-2792



A sustainable vision for recycling hydrocarbons from plastics

Cutting-edge additives for manufacturing biodegradable* plastics

Forward-thinking, sustainable solutions for the plastics and landfill gas-to-energy industries

ECM BioFilms is leading the sustainability movement within the plastics and landfill gas-to-energy industries with an additives for manufacturing biodegradable* plastics—creating an entirely new and greatly desired end-of-life scenario for plastics—and simultaneously opening up exciting new opportunities for energy generation and recycling the hydrocarbons of old plastic products into new plastic resin.

The plastic products made with ECM BioFilms' technology are priced competitively with, and have the same mechanical characteristics as, traditional non-degradable products. Unlike [other degradable plastic technologies which require very specific conditions](#), plastic products manufactured with ECM MasterBatch Pellets will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year. This revolutionary additive technology, when combined as a 1% load with the most widely-used plastic resins, renders the resulting plastic products biodegradable* while maintaining their other desired characteristics.

“This revolutionary additive technology, when combined as a 1% load with the most widely-used plastic resins, renders the resulting plastic products biodegradable while maintaining their other desired characteristics”*

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The potential uses of this technology are limited only by the imagination.

View the side-by-side [Comparison of competing degradable plastic technologies](#).

NEWSLETTER SIGNUP

Sign up here to get the scoop on how truly biodegradable* plastics work, and how they have the potential to change our relationship with the environment.

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[Who's winning the war on plastics? Society or plastics?](#)

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Who's winning the war on plastics? Society or plastics?

Who's winning the war on plastics? Is society winning?

Sure..., concerned citizens and activists might win a battle with a ban against plastic bags every once in awhile.

But, while there are no hard and fast numbers, it's estimated there's somewhere between 250 to 300 million tons of plastics manufactured every year. 10% of plastics get recycled; the rest of it—millions and millions of tons go to landfills, or ends up as litter in the environment.

Plastics are clearly winning the war.

Should we capitulate?

Absolutely not! We just need to rethink our approach.

Maybe we need to approach plastics as if we were practicing Judo. In Judo, you use your opponent's energy to defeat him, and/or to teach him a lesson. The question is: How do we practice Judo against plastic, and start using plastic's energy to help, instead of hurt, our society?

“How do we practice Judo against plastic, and start using plastic's energy to help, instead of hurt, our society?”

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If we, as a society, had the will to manufacture biodegradable* plastics, we could. The technology exists. But it's really going to be necessary to come together, and re-frame the conversation about plastics. Is the plastics problem bad? Yes! There's entirely too much waste. But when you start thinking about biodegradable* plastics, particularly in the context of landfill gas-to-energy, it becomes an entirely different conversation.

A formula for sustainable plastics

1. Manufacturers add specially-formulated pellets to create biodegradable* plastics

During the manufacturing process, additives to manufacture biodegradable* plastics are added to plastic products.

A simple 1% load to the most widely-used plastic resins to render the finished plastic products biodegradable* while maintaining their other desired characteristics.

[\[Read more...\]](#)

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HOME ABOUT MASTERBATCH PELLETS BLOG EVENTS CONTACT

A sustainable vision for recycling hydrocarbons from plastics

Recycling hydrocarbons from discarded plastics into energy or new products would be an end-of-life scenario that could benefit everyone.

Thinking outoud: *“What if—all the discarded plastics that were sent to landfills were biodegradable and became a source of renewable energy?”*

It’s estimated there’s somewhere between 250 to 300 million tons of plastics manufactured every year. 10% of plastics get recycled; the rest of it—millions and millions of tons go to landfills, or ends up as litter in the environment.

Imagine garbage trucks in communities around the world propelled by bio-diesel engines powered with renewable natural gas derived in part by no-cost degraded plastics from actively managed landfills.

Despite the best intentions, only 10% of plastics get recycled. Practically everything else ends up in landfills or in the environment; millions and millions of tons of plastics every year.

The fact is that garbage itself emits methane gas, so if municipalities—and we, the people who live in them—desire to be good, socially responsible citizens, and do our part to reduce carbon emissions, it’s important that our cities, towns, and hamlets implement modern landfills, whether public or private, to capture these gases in landfill gas-to-energy programs.

Most modern landfill environments are either moist or actively managed; which means that the landfills accelerate the biodegradation process to produce energy in the form of CO2 and methane, which can then be used to produce renewable natural gas (RNG) energy to propel biodiesel engines or other such uses.

Instead of banning bags we should be biodegrading them

With this new scenario, instead of banning bags, communities would encourage merchants to use them. The value of the energy from the biodegradable bags and other biodegradable plastics could quite possibly pay for upgrading the landfill technologies, and create new jobs for the people who manage them.

Customers would enjoy the convenience of low-cost plastic bags and bottles. *Merchants* would enjoy a low-



RECYCLING HYDROCARBONS FROM PLASTICS

“Imagine garbage trucks in communities around the world propelled by bio-diesel engines powered with renewable natural gas derived in part by no-cost degraded plastics from actively managed landfills. ” [Tweet This](#)

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[Who’s winning the war on plastics? Society or plastics?](#)

cost service that is eco-friendly and sustainable. *The plastics industry* would continue to operate with a minimally disruptive technology and *municipalities* would expand a free source of renewable energy.

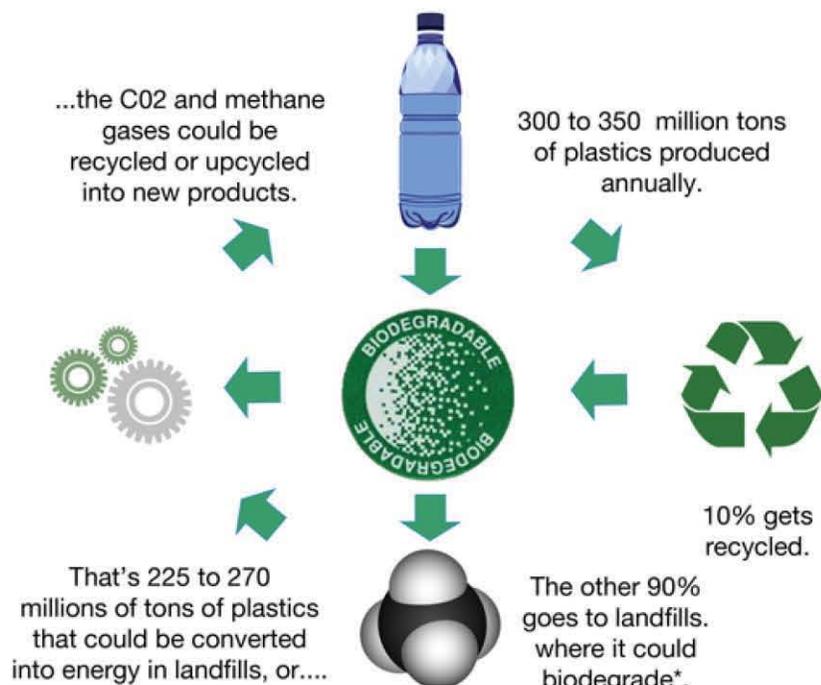
Why the world needs Biodegradable* Plastics

Turn off your mind for a moment, and just

Imagine

Garbage trucks in communities around the world propelled by **bio-diesel engines** powered with **renewable natural gas** derived in part by **no-cost degraded* plastics** from **actively managed landfills**. If this were the case...

“Instead of banning bags and bottles, we would biodegrade* them!”



Recycle, biodegrade*, and energy capture with truly biodegradable plastics and landfill gas-to-energy

#1 Win-win-win-win (1) *Customers* would enjoy the convenience of low-cost truly biodegradable plastics (2) *Merchants* and manufacturers benefit by offering a low-cost service that is eco-friendly and sustainable (3) *The Plastics Industry* would continue to operate with a minimally disruptive technology, and (4) *Municipalities* would expand a **free source of renewable energy**.

“Waste is Food”

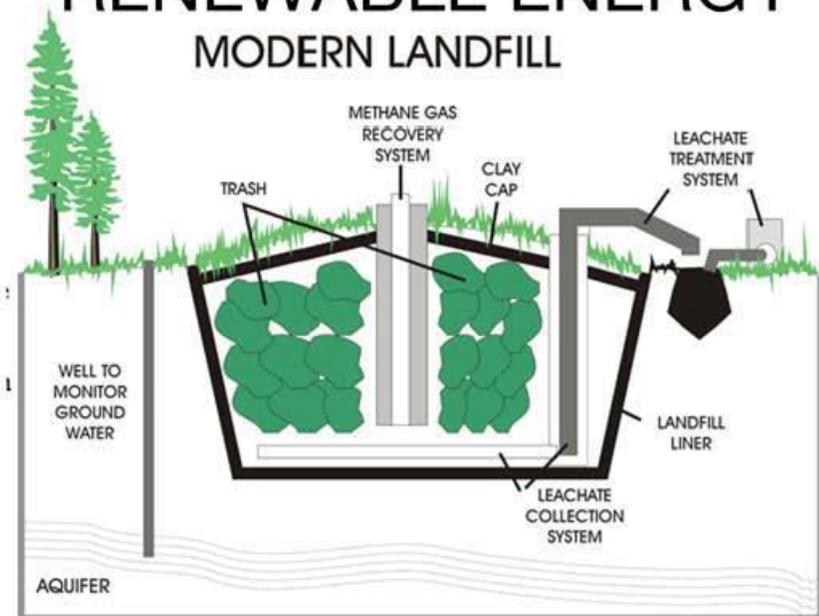
When it comes to truly biodegradable* plastics, it is not either/or. Biodegradable* plastics are both a technical nutrient and a biological nutrient that can be made useful or harmless under any scenario; whether recycled, landfilled, or litter.

End-of-life scenarios of types of Biodegradable* plastics in the context of “Cradle to Cradle”

	ECM MasterBatch™	Oxo-Degrader	‡Bioplastics+
<i>Nutrient cycle</i>			
If recycled => technical nutrient	✓	✗	✗
If landfill => bionutrient	✓	✗	✗
If litter => bionutrient	✓	✗	✗

‡ EPI Environmental Products Inc., Symphony Environmental, Inc., etc.
 + PLA, Mater-Bi®, PHB and combinations (NatureWorks LLC., Novamont S.p.A., et al.)

RENEWABLE ENERGY MODERN LANDFILL



#2 Win-win-win-win: By implementing this idea it would require major re-alignment of resources, but biodegradable* plastics when combined with landfill gas-to-energy could: (1) reduce or eliminate the plastics problem going forward (2) enhance a source of renewable energy (3) reduce carbon emissions, and (4) create tens of thousands of new jobs the plastics, energy, waste and recycling industries—making us better stewards of the earth’s resources.

“Creating a beneficial footprint for humans and the environment”

* Plastic products manufactured with ECM BioFilms’ additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.



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society?"

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Additives for Manufacturing Biodegradable* Plastics

ECM MasterBatch Pellets™ are a revolutionary additive technology for manufacturing biodegradable* plastics.

This additive technology offers companies a practical way to take tangible, measurable steps towards sustainability without interrupting or impacting their current production process whatsoever.

A major step towards greater sustainability

When combined as a 1% load with the most widely-used plastic resins, they render the resulting plastic products biodegradable*. Our process enables micro-organisms in the environment to metabolize the molecular structure of plastic products into humus that is beneficial to the environment. This process utilizes several proprietary compounds that are combined into a masterbatch pellet that is easily added to plastic resins using existing technology.

“Our process enables micro-organisms in the environment to metabolize the molecular structure of plastic products into humus that is beneficial to the environment”

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The plastic products produced with ECM MasterBatch Pellets can be priced competitively with, and have the same mechanical characteristics as, their traditional non-degradable products, but will be much more sustainable and environmentally-friendly because of their preferred end-of-life.



THESE ADDITIVES MAKE STANDARD PLASTIC RESINS BIODEGRADABLE*

Impact on Operations

Plastic products made with ECM BioFilms' additives:

ECM MASTERBATCH PELLETS



ECM MasterBatch Pellets™, when combined as a one-percent load to the most widely used plastic resins, render the finished plastic products biodegradable while maintaining their other desired characteristics.

DETAILED INFORMATION ABOUT OUR PRODUCTS

[Comparison of competing biodegradable plastic technologies](#)

[ECM Technology for the Biodegradation of Plastic Products](#)

[Mechanism for the Biodegradation of Products Manufactured with ECM MasterBatch Pellets™](#)

[Life Expectancy of Products Manufactured with ECM MasterBatch Pellets™](#)

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If you'd like more information about how you can create environmentally-friendly plastic products...

[**Click Here**](#)

- Are recycleable
- Can be made with recycled resins
- Biodegrade* in any biologically-active environment in some period greater than a year
- Biodegrade* when disposed of in a biodegrading environment, either anaerobically or aerobically:
 - in landfills
 - in compost (backyard compost or commercial facilities)
 - if buried or littered in the ground
 - in agricultural and erosion-control settings
- Do not use heat, light or mechanical stress to break them down
- Do not require special handling (unlike PLA and oxodegradable products)
- Do not contain heavy metals (unlike most oxodegradable products)

ECM MasterBatch Pellets are used for extruding film and sheet (blown or cast), blow molding, injection molding and rotomolding products and parts. The addition of MasterBatch Pellets allows your product to retain its desired attributes without adversely effecting its integrity and cosmetics.

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BIODEGRADABLE* PLASTICS QUALIFIER

* Plastic products manufactured with ECM BioFilms' additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.

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Comparison of competing biodegradable plastic technologies

	ECM MasterBatch™	Oxo-Degrader‡	Bioplastics+
For Biodegradation			
• Biodegradable* (on land, in land, in water)	✓	✗	✗
• Biodegradable* in landfill, as litter or backyard compost	✓	✗	✗
For Recycling			
• 100% Recyclable at any time	✓	✗	✗
• Compatible with the recycle stream	✓	✗	✗
For Properties			
• No special storage conditions required	✓	✗	✗
• Shelf life is indefinite	✓	✗	✗
• Not degraded by exposure to heat, light or external stresses during storage, shipping, handling or use	✓	✗	✗
• Does not fragment during degradation	✓	✗	✗
• Degradation begins at the time of disposal – not before	✓	✗	✗
For Performance			
• Performance not negatively affected by over loading	✓	✗	✗
• No UV or anti-oxidant additives are needed, improving product performance	✓	✗	✗
• When compared to the original material in the application, physical properties are unchanged and no redesign of end product needed	✓	✗	✗
For Processing			
• Can be processed with conventional equipment	✓	✗	✗
• No changes to the process settings required	✓	✗	✗
• Biodegradable with 1% loading in PE, PP, PVC, PS and PET	✓	✗	✗
For the Environment			

• No heavy metals, ecologically safe			
• Degraded product returns to the environment not as small particles, but as biomass and humus			
For the Bottom Line			
• Cost effective			

‡ EPI Environmental Products Inc., Symphony Environmental, Inc., etc.
 + PLA, Mater-Bi®, PHB and combinations (NatureWorks LLC., Novamont S.p.A., et al.)
 ° Only in industrial/municipal composting facilities

ECM BioFilms, Inc.
 Victoria Place – Suite 225, 100 South Park Place, Painesville, Ohio 44077 U.S.A.
 Phone: 440.350.1400 · Toll Free in U.S.A.: 888.220.2792 · Fax: 440.350.1444
 Email: biodeg@ecmbiofilms.com · Website: ecmbiofilms.com

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ECM Technology for the Biodegradation of Plastic Products

The technology is an additive which, when combined in small quantities with any of the popular plastic resins, renders the end products biodegradable* while maintaining their other desired characteristics. It is sold as ECM MasterBatch Pellets and our Company has developed the technology to the point where most plastic products manufacturers can use the additive without having to modify their existing methods of production any more than if they were changing the product's color. The resulting plastic products exhibit the same desired mechanical properties, have effectively similar shelf-lives, and yet, when disposed of, are able to be metabolized into biomass by the communities of microorganisms commonly found almost everywhere on this planet. This biodegradation process can take place aerobically and anaerobically. It can take place with or without the presence of light. These factors allow for biodegradation even in landfill conditions which are normally inconducive to any degradation of other technologies. Our technology differs significantly from other "degradable plastics" emerging in the market today because it does not attempt to replace the currently popular plastic resin formulations but instead enhances them by rendering them biodegradable*. Recognizing the environmental concerns related to plastics and the market potential, the corporate and scientific communities have long sought to develop degradable plastics. However, the Company believes that degradable plastics introduced to date possess several weaknesses that have prevented wide-spread acceptance in the marketplace. Photo-degradable products, for example, do not degrade in landfills due to the lack of sunlight (they are typically covered with another layer of trash before the degradation can occur). At the same time these photo-degradable products present difficult circumstances for storage before use due to their reactivity to light. Similarly, plastic products manufactured with PLA and such "renewable" replacement resins fail to biodegrade as litter or in a landfill, are very expensive to manufacture, and often do not achieve the requisite physical properties. ECM's technology is a process which enables the microorganisms in the environment to metabolize the molecular structure of plastic products into humus that is beneficial to the environment. Our process utilizes several

ECM engaged several renowned testing laboratories to independently establish the biodegradability of plastic products made with ECM's additives. The tests concluded that the products were biodegradable* under both aerobic and anaerobic conditions. In addition, the tests concluded that their biodegradation did not produce any toxic residue harmful to living organisms in land or water.

Technology Explanation

The plastic products made with our additives will break down in more than one year but less than a hundred plus years in nearly all landfills or wherever else they may end up. All sorts of factors determine the amount of microbes available in the soil and the soil conditions determine the rate of degradation. The plastic products made with ECM technology basically rely on the microbes in the soil to react with the additives and form communities, biofilms, which create the enzymes and acids that can attack the longchain hydrocarbon molecules and break them down to the point that the microbes' natural acids and enzymes are then effective and the microbes can metabolize the simple hydrocarbons with CO₂ and water or methane being the waste products. This process continues until all the plastic product is fully biodegraded.

Material treated with ECM has been tested and proved as biodegradable* and safe for the environment by using the following:

- ASTM D5209 "Standard Test Method for Determining the Aerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewage Sludge";
- ISO 14855 / ASTM D5338 "Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials under Controlled Composting Conditions"; and
- ASTM 5511 "Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions".

Where will it biodegrade*?

- Home composting
- Commercial composting
- Landfills
- Buried in, or in contact with the soil
- Erosion / Agricultural netting & film

proprietary compounds that are combined into a masterbatch pellet that is easily added to plastic resins using existing technology.

- Litter
- Where won't it degrade?
- Warehouses
- Store shelves
- Offices & Home

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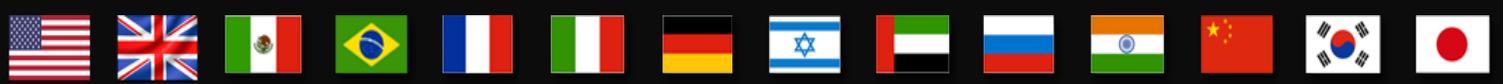
* Plastic products manufactured with ECM BioFilms' additives will biodegrade in any biologically-active environment (including most landfills) in some period greater than a year.

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Mechanism for the Biodegradation of Products Manufactured with ECM MasterBatch Pellets™

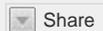
We have determined, through years of testing both internally and through independent laboratories, that plastic products that are manufactured with at least a one percent (1%) load, by weight, of our ECM MasterBatch Pellets will biodegrade once they are placed in conditions wherein they are in constant contact with other biodegrading materials. Originally it was not known precisely what the threshold amount of our material was necessary to initiate and sustain the process. Much of the early testing was done with plastics manufactured with five percent (5%) or higher loads of the additives but it has been determined that all that is required is a minimum of a one percent (1%) load. This amount will initiate the process and any significant amount less than this amount will not permit the process to begin or be sustained. People often wonder whether significantly greater quantities of our additive will reduce the biodegradation times. The answer is yes, but so very marginally that it is rarely worth the potential issues concerning other physical properties in the finished plastic products and cost. To explain this more fully, it will be helpful to understand the basics of the mechanism. The presence of at least one percent of our additives in a plastic product, which is in contact with other biodegrading organic materials, structures communities of such organisms as are there present on the surfaces of the plastic in such a way that their interaction produces the ability to break down the long hydrocarbon chains of the “non-biodegradable” petrochemical plastics. As most people are aware, an example of a biofilm would be the scum that can form on the surface of a pond or on teeth, for that matter. In the cases of most pond biofilms, the surface layers with chlorophyllic, aerobic organisms can support layers of anaerobic organisms in the deeper layers and the interaction of all of the organisms makes for an ecosystem that in some cases produce byproducts that would not be formed without the interaction. The same can be said of the biofilms formed by the interaction of our additive materials and the naturally existing biota. Importantly, this structuring of communities of microorganism proceeds in anaerobic as well as aerobic conditions.

This leads us back to the reason why greater quantities of our additives do not significantly speed up the time for biodegradation. If you have four otherwise identical 100 kilograms of PE products, one with no ECM (100% PE), one with a half a percent of ECM (99.5% PE), one with one percent ECM (99% PE) and one with seven percent ECM (93% PE) disposed of under the same conditions you will see why this is. The one with no ECM does not form the necessary biofilm and thereby 100-kg of PE sits in the ground in that form for hundreds or thousands of years or more. The one with a half a percent of ECM does not form the biofilm with sufficient sustainability to initiate and continue the biodegradation process so only the very surface amounts of the ECM biodegrades and you will have remaining all of the 99.5-kg of PE and most of the 0.5-kg of ECM for hundreds or thousands of years in that form. The product that has the one percent of ECM will form and sustain the biofilm that will continue to break apart the long chains of the 99-kg of PE until the entire quantity of PE is biodegraded. The sample that has 7 percent ECM will do the same thing; the only difference is that there will be only 93-kg of the difficult-to-biodegrade PE to degrade rather than 99-kg. The difference in biodegradation time is not terribly dramatic but it is less. As a method of concluding, I think that it may be helpful to illustrate how the mechanism employed by this unique biodegradation technology is an important reason as to why the technology will continue the path it is on to become one of the world’s leading technologies for the production of plastic products. The fact that the mechanism is not based on photodegradation or thermal degradation means that the shelf life and usable life of the plastic products will be the same as they were without the ECM additives. The fact that there is a threshold quantity necessary for the initiation and sustainability of the biofilms responsible for the biodegradation means that the plastics with the ECM additive do not have to be segregated out of the plastics that might be recycled into plastic products that are not meant to biodegrade. And finally, the fact that the threshold quantity is so low (one percent by weight) means that the

Once there are the structured communities of microorganisms interacting to produce schisms in the long hydrocarbon chains of the polymers the process continues until all the hydrocarbons are eventually transformed into the carbon dioxide and water (aerobic biodegradation) or carbon dioxide, methane and water (anaerobic biodegradation).

manufacturer is able to immediately make plastic products with all the same other properties they had when they were not biodegradable and at nearly the same cost.

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Life Expectancy of Products Manufactured with ECM MasterBatch Pellets™

The life expectancy of plastic products that are manufactured with at least a one percent (1%) load, by weight, of our ECM MasterBatch Pellets can be explained through two types of life expectancies. The first type of life expectancy is the life expectancy of the plastic when it is on the warehouse or store shelf, in regular usage as packaging or other normal plastic usage. The second type of life expectancy has to do with the situation when the same plastic has been put in conditions wherein it has constant contact with other materials that are biodegrading.

Plastic products manufactured with ECM MasterBatch Pellets will have the same life expectancy as the same plastic product manufactured without our additives under all but the conditions mentioned above wherein they are placed in constant contact with other materials that are biodegrading (i.e. on or buried in the ground). This is a major reason why our technology for having biodegradable* plastic products is so successful.

The principles concerned with the degradation* of plastics that make use of our additive technology are truly involved with “bio”-degradation*. Our technology does not rely on the use of photosensitivity or thermal sensitivity to photodegrade or thermally break down the plastics. For this reason, a blow-molded HDPE shampoo bottle or motor oil bottle manufactured with one of our additives will last in the warehouse and on the store shelf as long as it would without our additives. There is a considerable amount of interest in our additives for the plastics for the automotive and aviation industries for this reason.

There is the real concern for the technologies that make use of thermal or photodegradation that they are simply leaving smaller particles of plastic in the soil rather than having the material truly become the organic components of soil. This is especially of concern in the agricultural industry and for those needing erosion control products. Agricultural films, erosion control nettings, and other such products manufactured with our additives will last long enough to get the required use but will completely biodegrade into the soil; such plastic products completely biodegrade in a period of from 9 months to 5 years or less. It is not a “poof, it’s gone” system but simply makes the plastic product biodegrade as if it were a stick or a branch off a tree rather than “sticking around”

independent laboratories by independent scientists. We have had the various test data analyzed by independent scientists and their conclusions and some of the data have been sent to you in the presentation package and are what we base our certification on.

The basic concept is that biodegradation is a natural process that occurs around the world but at various speeds due to various conditions. Plastics with our additives behave like sticks, branches or trunks of trees. Due to this fact, we do not guarantee any particular time because the time depends on the same factors that the biodegradation of woods and most other organic materials on earth depend – ambient biota and other environmental conditions – but the time frame of between nine months to five years will give a good general idea for most conditions. Under specific composting conditions with additional accelerants sprayed on them, some customers have reported biodegradation in as little as a couple of months. Under the more usual, commercial composting conditions using high heat processes, a time frame of around one year is a reasonable expectation.

Petrochemical plastics would normally take hundreds or thousands of years or even longer to “biodegrade”; with our additives, these same plastic formulas biodegrade in a hundredth of that time or less.

Do not be confused by the claims of some companies that say that their resins fully biodegrade in 2 months or 3 months. They are speaking of biodegradation under very specific conditions. This has led to some confusion when the plastic products are in the end-consumers’ hands, such as in the Kassel project in Germany when the bags and other plastic products marked with a “compostable” label were found not to be compostable by the town’s citizens in their backyard compost heaps (they were only “compostable” under the very specific commercial composting standards where there is high heat, oxygenation, moisture control and high levels of microorganisms). When I spoke at the Biodegradable Plastics Conference in Frankfurt, Germany a few years ago, I argued with the companies involved in that project that they should be careful in not trying to confiscate generic terms for too specific conditions (i.e. they should label items as “Commercially Compostable” rather than simply “Compostable” when such conditions are required). As the use of our technology continues to grow to become the world’s leading technology for the production of biodegradable* plastics, our viewpoint will continue to gain more and

for hundreds of years.

To summarize the concept, the key to our technology is that the right conditions for biodegradation are not those found when the plastic product is in use, is on the store shelves or is being warehoused somewhere. Just like a wood bowl or a piece of wood furniture, which can be used for a lifetime or more, a plastic product with our additives can be used for essentially the same period of time as the same plastic product without our additives could be used.

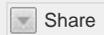
Concerning the life expectancy of the plastic products manufactured with our additives once they are placed in constant contact with other biodegrading materials, we certify the full biodegradation of most all plastic products manufactured with at least a one percent load of our additives. We can certify this situation due to the internal and external studies that have cost us hundreds of thousands of dollars. Our additives have been tested in all of the types of polyolefins, EVAs, PVCs, PETs, PSs, PUs and combinations thereof, with much of the testing having been performed using the various world-standardized tests in

more adherents.

Plastics manufactured with our additives will fully biodegrade in home compost heaps, commercial composting operations (both high heat and low heat, or even in vermiculture, processes), buried in the ground, buried in landfills, tilled into the soil, having been littered, etc. Most importantly, our process is by far the least expensive, most widely applicable, proven technology for the biodegradation of plastics in the world.

Again, we certify the biodegradation* of polyolefins (any of the polyethylenes and polypropylenes), EVAs, PVCs, PETs, PSs, PUs and any combination of these resins, manufactured with at least a 1% load of our additives. We base this certification on more than ten years of testing worldwide by us, by universities, by customers, by prospects and by competitors.

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EXHIBIT 2

**[Redacted From the Provisionally Redacted
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EXHIBIT 3

**[Redacted From the Provisionally Redacted
Public Version of the Complaint]**

EXHIBIT 4



CERTIFICATE
of
the Biodegradability of Plastic Products Made by
SL Plastic Co. LTD
that Incorporate the
ECM MasterBatch Pellet Technology



This is to certify that numerous plastic samples, submitted by ECM BioFilms, Inc., have been tested by independent laboratories in accordance with standard test methods approved by ASTM, ISO and other such standardization bodies to determine the rate and extent of biodegradation of plastic materials.

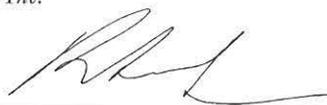
A Degradable Plastic is defined (ASTM D1991) as a plastic that is designed to undergo a significant change in its chemical structure under specific environmental conditions resulting in a loss of some properties that may vary as measured by standard test methods appropriate to the plastic and the application in a period of time that determines its classification. A Biodegradable Plastic is defined as a degradable plastic in which the degradation results from the action of naturally occurring microorganisms such as bacteria, fungi and algae.

The biodegradation of the submitted plastic samples were tested using ASTM D5209-91, "Standard Test Method for Determining the Aerobic Biodegradation of Plastic Materials in the Presence of Municipal Sewage Sludge", ASTM D5338-98, "Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials under Controlled Composting Conditions", which is equivalent to CEN prEN WI 261085, and the ISO 14855 method, "Evaluation of the Ultimate Aerobic Biodegradability and Disintegration of Plastics under Controlled Composting Conditions", ASTM D5511, "Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic Digestion Conditions." The results of these tests and the related biodegradation and ecological impact experiments in various environments are contained in the Ecological Assessment of ECM Plastic report dated February 16, 1999, which certifies that plastic products manufactured with ECM additives can be marketed as biodegradable, safe for the environment and complying with 94/62 EC for the EU.

*This Certificate and the Ecological Assessment of ECM Plastic report, along with Scanning Electron Microscope and other studies that have been conducted since the publication of the Ecological Assessment, all of which use a one percent loading rate for the ECM MasterBatch Pellets rather than the higher additive levels used earlier, have been presented to **SL Plastic Co. LTD**, and may be used by it to validate its claims to the biodegradability and environmental safety of plastic products that it manufactures that are made consistent with the manufacturing guidelines for uses of ECM MasterBatch Pellets presented to it by ECM BioFilms, Inc.*

Dated: February 8, 2011

Certified by: _____


Robert Sinclair, President
ECM BioFilms, Inc.