September 21, 2009

Federal Trade Commission, Office of the Secretary,
Room H-135 (Annex D),
600 Pennsylvania Avenue, NW,
Washington, DC 20580

Ref: Dyna-E International, Docket No. 9336

This letter summarizes the comments from the Biodegradable Products Institute (BPI), regarding Dyna-E International's consent order (Docket No. 9336).

Overall, the BPI strongly supports the Commission's findings that Dyna-E's "biodegradable" claims are misleading. Claims such as these lead consumers to incorrectly believe that products will disappear in relatively short periods of times, regardless of where they are disposed (even landfills), according to consumer data previously provided to the Commission.

This case differs from others, in the following ways:

1. The product is made of viscous rayon, which is chemically similar to cellulose. These materials have demonstrated records of fully biodegrading under both aerobic and anaerobic laboratory conditions.
2. The defendant employed a 3rd party laboratory to test the overall rate and extent of biodegradation, via OECD 311, an internationally recognized test method, to measure conversion to carbon dioxide and methane. The test data shows that 92% of the material was converted into gas in 38 days, indicating that the material had the potential to fully biodegrade (based on the attached test report obtained from the defendant's website).

Despite this information, the Commission found the defendant's claims misleading because where the defendants product's were disposed (primarily landfills) is of more importance than the product's chemical characteristics or that test data was provided.

For this reason, this decision has significant ramifications, in terms of restricting the use of the term "biodegradable" for all products and packaging that are primarily disposed as solid waste in landfills and incinerators.

With this in mind, the BPI recommends that the Commission clearly state in its findings that Dyna-E's claims were found to be misleading, even though Dyna-E provided laboratory test data showing that an overwhelming majority of their product would, in fact, biodegrade under anaerobic conditions. Further, it is hoped that the Commission would make it clear that these findings should apply to all products and packaging where disposal is primarily in landfills or incinerators and provide clear direction to all manufacturers and retailers.

Below are recommended revisions (in italics) to the Analysis of the Proposed Consent Order found on the FTC website, which illustrate my points.

> "The complaint alleges respondents' biodegradable claim is false because a substantial majority of total household waste is disposed of either in landfills, incinerators, or recycling facilities. *These customary disposal methods, (especially landfills) are not designed to promote biodegradation and therefore do not create the conditions that would consistent allow* for Lightload Towels to completely break down and return to nature, *i.e.*, decompose into elements found in nature, within a reasonably short period of time. The complaint further alleges that respondents failed to have substantiation for their biodegradable claim. *Lightload Towels are made from viscous rayon and were found to achieve a 92% level of biodegradation using an internationally recognized test method for measuring anaerobic biodegradation, OECD 311, which were made available to the public via the Dyna-E's website.*
>
> *This decision is consistent with prior Commission decisions, where unqualified "biodegradable" claims were deemed to be misleading because the product's were disposed primarily in landfills, incinerators or recycling facilities. This fact takes precedence to the chemical composition of the product itself or testing results.*
>
> *The most recent findings in this area are Kmart and Tender corporations, FTC Docket #s C-4263 & C4261*
> *http://www2.ftc.gov/os/caselist/0823186/090717kmartdo.pdf*
> *http://www.ftc.gov/os/caselist/0823188/090717tenderdo.pdf*
>
> The proposed consent order contains provisions designed to prevent respondents from engaging in similar acts and practices in the future**."**

By expanding the findings of the case, as outlined above in the Commission's Agreement, Analysis and press releases, I believe that this decision along with the ones in July, 2009 will send a strong message to manufacturer's and

retailer's and help to reduce the growing number of inappropriate "biodegradable" claims.

The BPI is designed to be a multi-stakeholder group, involving people and companies that produce, use or recover compostable products. Major composters throughout North America and other organizations around the world recognize our efforts. As such, we have developed significant expertise in the area of assessing "biodegradation" in many environments. Further, we have provided the Commission with relevant consumer information and discussed the issues associated with "biodegradable" claims in great depth on a number of occasions.

Sincerely,
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Project Report

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PREPARED FOR:

Dyna-E International

PROJECT NUMBER: 2230

Biodegradability Testing of Lightload Towels

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Project Summary

Samples of a viscose rayon fabric marketed as "Lightload Towels" were tested for biodegradability under anoxic conditions by the standard OECD 311 protocol. In 38 days incubation, the samples were visually disintegrated and more than 90% of the theoretical yield was recovered as inorganic carbon. Thus the product was rapidly and ultimately biodegradable by standard definitions. Because the anaerobic assay simulates the most challenging conditions, and because of the extensive scientific publications on biodegradation of viscose rayon, it is reasonable to assume that the product, excluding the packaging, is biodegradable in virtually any biologically-active environment, including soils, aquatic habitats, sewage, and biologically-active landfill conditions.

Project: Description

Samples of disposable towels, submitted by Dyna-E International were subjected to biodegradation testing by the OECD 311 protocol. This is an anaerobic closed-bottle gas evolution assay. This simulates the environment in sewage digesters and is considered representative of all anaerobic environments, such as sediments and bioactive landfills. The anaerobic protocol was chosen as being more stringent than aerobic biodegradability assays. Thus materials that are biodegraded under these conditions should also biodegrade in all biologically active environments where they may be deposited. A residue-after-ignition test was also performed to assess susceptibility of the material to incineration.

Sample Description

A package of compressed disposable towels was received in the laboratory on 9 January, 2009. The sample consisted of unopened consumer packages of "Lightload Towels" 30 x 60 cm and 90 x 150 cm. The product UPC numbers were 56147 00001 (for individual small towels), 5147 00002 7 (for packages of 3 small towels) and 56147 00003 (for large towels.) According to the client, and a third-party analysis, the material consisted of 100% viscose rayon. Only the towel material was tested, not the packaging.

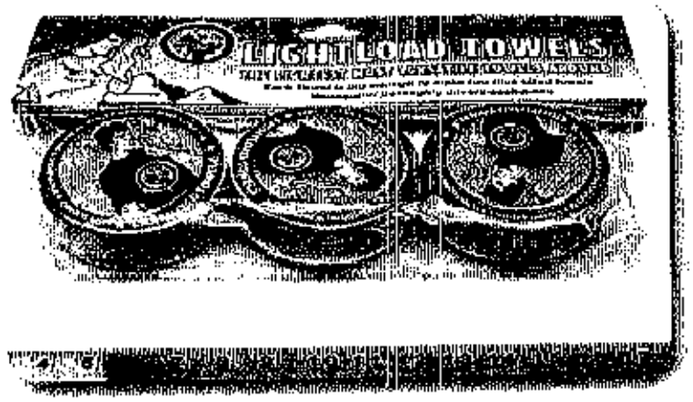

Figure 1A. Appearance of samples received

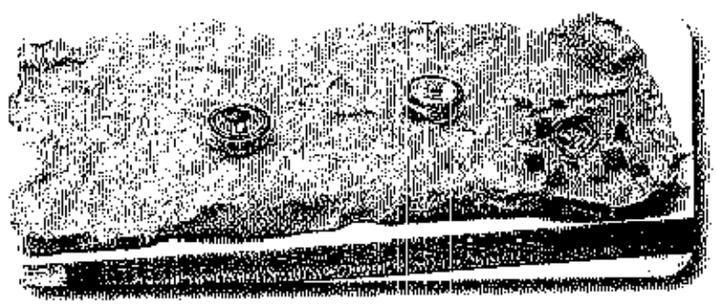

Figure 1B. Appearance of unexposed sample material

Because the samples were insoluble in water, insoluble reference materials were selected. Reference samples consisted of granular cellulose, (Sigma-Aldrich C6413) as a positive control and polyethylene terephthalate as a negative control.

Sample Preparation

Samples were prepared by unfolding the compressed towels and cutting portions into squares ca 1 cm x 1 cm. These were dried at room temperature in a dessicator to remove residual water. Because the samples came in three different colors (orange, white, green) all three were used and tested in separate bottles. Subamples were analyzed for total C, H, O and N content by Mldwest Microlabs. This was necessary to determine how gas production in experiments relates to percent biodegradation of the product, and for standardization of the experiments.

Figure 1C. Appearance of additional sample material

Results were as follows:

Table 1. Elemental Composition of Sample

small towel	41.65	6.16	0.15	46.55	3.00	97.51
large towel	39.67	5.96	0.12	48.64	3.10	97.49
cellulose	44.4	6.2	0.0	49.3	0.0	100.0

Two different samples of towel - the small size and the large size - were tested, and were apparently identical, except for the size of the finished article. As expected for rayon materials, the composition was very close to that of cellulose, except for about 3% ash, which represents mineral salt content.

Seed material, the source of microorganisms for this assay was collected from the municipal sewage treatment plant in The Dalles, Oregon. Anaerobic inoculum was digester solids, pumped from the bottom of the anaerobic digester. Seed materials were pretreated as described below.

Task 1. Anaerobic Biodegradation by OECD 311

In this experiment, test material was incubated under warm anaerobic conditions similar to those found in a sewage treatment plant. Sample material was incubated in an oxygen-free medium inoculated with sewage microorganisms. Interim biodegradation was assessed by measuring pressure changes caused by gas production in closed vessels. At the end of the

incubation, vessels were acidified to recover dissolved or precipitated inorganic carbon, and the total mineralization of substrates was calculated.

Experimental Protocol

Anaerobic sewage sludge was obtained from an active anaerobic digester owned by the City of The Dalles, OR. Sludge was incubated in the laboratory for one week under nitrogen gas to condition the sample and lower background gas production rates.

Anoxic medium was prepared containing (per liter)

KH_2PO_4	0.27 g	
$Na_2HPO_4.12\ H_2O$	1.12 g	
NH_4Cl	0.53 g	
$CaCl_2.2H_2O$	0.075 g	
$MgCl_2.6H_2O$	0.10 g	
$FeCl_2.4H_2O$	0.02 g	
Resazurin	0.001 g	indicator of oxygen contamination
$Na_2S.9H_2O$	0.10 g	reductant
Trace elements (Wolin)	1 ml	

Reduced Anaerobic Mineral Media (RAMM) was prepared using water boiled under a stream of N_2 and cooled, to remove oxygen. Then all ingredients were added under a continuous stream of N_2. The pH was adjusted to 7 with NaOH solution.

Sewage sludge solids were concentrated by centrifugation at 10000 g, and washed by discarding the supernatant and re-suspending the solids in 100 ml of RAMM. Solids were centrifuged and resuspended twice more to remove soluble organic material and dissolved inorganic material. All manipulations occurred in the anaerobic chamber, to avoid damaging oxygen-sensitive microorganisms, or introducing oxygen to the experiment. Finally, 200 ml of washed sludge was diluted in 2L of RAMM to make the experimental solution. Aliquots of 50 ml were measured into 24 serum bottles that contained substrates at 25 mg carbon per microcosm as follows:

Table 2. Design of Anaerobic Biodegradation Experiment

T test	sample 2230	60 mg	6
R reference	cellulose	60 mg	6
C control	none	-	6
I inhibition check	sample 2230	60 mg	6
	cellulose	60 mg	

Figure 2. Anaerobic microcosms

The test material was cut into small squares, in order to fit through the narrow mouth of the serum bottles, and to make weighing the aliquots more uniform and accurate. Bottles were sealed with buyl rubber stoppers and crimp seals, and incubated at 35°C in the dark, as shown in Figure 10. The incubation continued for 38 days, after which the degradation of reference and test material was essentially complete.

Periodically, the gas produced in the microcosms was measured with an electronic pressure transducer (Cole Parmer.) At the end of the experiment, the composition of headspace gas was measured by gas chromatography. The dissolved and precipitated inorganic carbon from three microcosms from each treatment (numbers 1 – 3) was determined by venting microcosms to ambient pressure, then acidifying the solution with 1 ml of 10 N H_2SO_4. After 24 hours, the amount of CO_2 liberated (from carbonates) to the headspace was measured.

Results

Biodegraoation of reference and control samples began immediately, as indicated by pressure increases in the microcosms (Figure 3.) The resazurin indicator in all microcosms remained colorless until the bottles were finally opened at the end of the experiment, indicating that all treatments remained completely anoxic at all times. Gas production in the negative control microcosms was less than 20% of that in reference microcosms. The reference material was more than 82% mineralized and exhibited ready biodegradation. Thus the assay was judged to have performed correctly, and was a valid test of biodegradability.

No differences between microcosms containing different colored towels (two each) were noted, so all data was averaged. After two weeks incubation, the dyes were no longer discernable. After three weeks incubation, the towel material had disintegrated and test microcosms became visually indistinguishable from the cellulose controls.

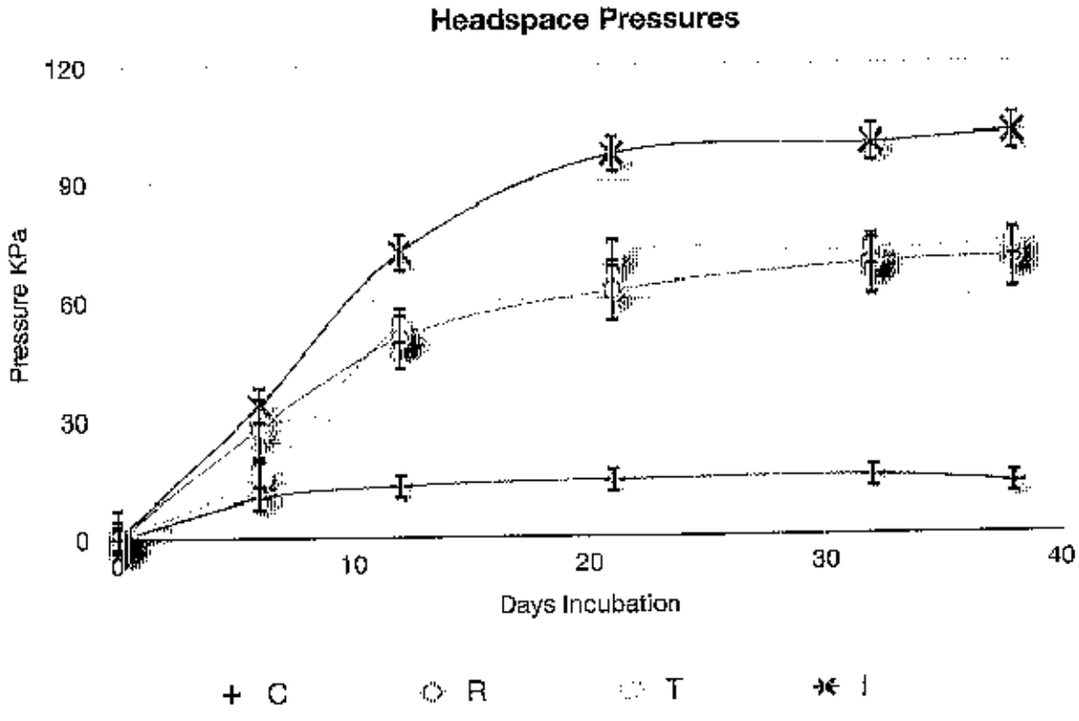

Figure 3. Headspace pressures in microcosms
C = control
R = reference
T = sample 2230
I = Inhibition check

The initial rate of degradation of the towel sample was significantly lower than for the cellulose reference material. However, after approximately one week, the rate increased to substantially faster mineralization than the reference. The total amount of inorganic carbon recovered from the test microcosms exceeded even the amount in the reference microcosms. This may have been due to the small amount of nitrogen in the test sample, which could enhance microbial metabolism. However, the difference was not significantly larger than the experimental error. Headspace gas compositions are shown in Figure 4. The ratio of methane to carbon dioxide was roughly 2:1.

Gas production in the Inhibition-check microcosms was significantly greater than either reference or test microcosms at all times. Thus, the sample was not toxic to microorganisms.

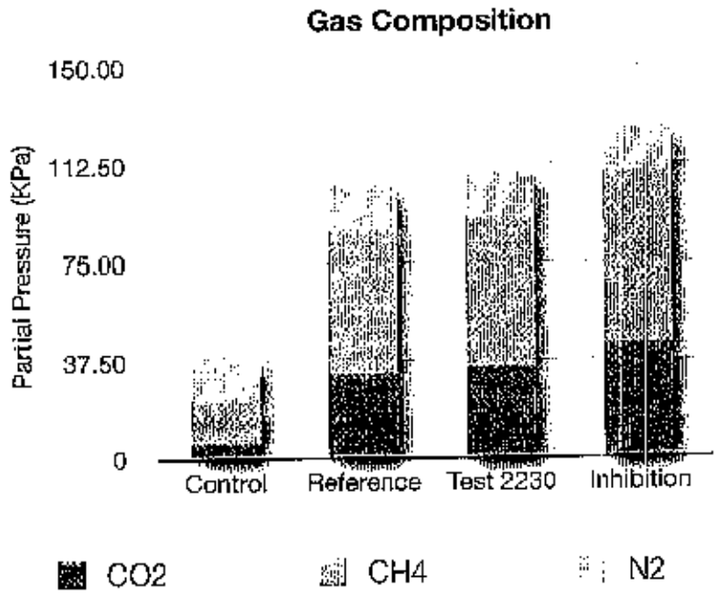

Figure 4. Headspace gas composition at the end of the experiment

The total carbon recovered as gas, dissolved inorganic carbon and carbonates are shown in Table 3. The amount of inorganic carbon recovered in control microcosms was subtracted from carbon in the other treatments, to determine the amount released by mineralization of the sample. Approximately 83% of the reference material and 92% of the test material was mineralized to inorganic carbon during the assay.

Table 3. Carbon Balance and Biodegradation Summary

Treatment	Added C	Headspace C	Solution C	Mineralized C	Biodegradation
Control	0	4.49	5.03	9.52	
Reference	25	24.57	5.63	30.20	82.719
Test	25	25.99	6.45	32.44	91.6812
Inhibition	50	35.80	7.17	42.97	66.9123

Discussion of Results

The OECD 311 assay measures biodegradability in strictly anoxic environments, such as those encountered in anaerobic digesters and buried bioactive landfills. If more than 75-80% of the theoretical inorganic carbon yield is observed during the assay, a substance is assumed to be ultimately biodegradable, meaning that it is completely mineralized to inorganic components.

The test samples were visually disintegrated after three weeks, and more than 90% of the theoretical yield was recovered as inorganic carbon. Thus, the samples are ultimately biodegradable under anaerobic conditions.

Task 2. Residue After Ignition

Samples of towel material were were dessicated to constant weight and accurately weighed on an analytical balance. These samples were then heated in a crucible over a propane/air flame at 1800 °F for five minutes. Crucibles were cooled in the dessicator, then accurately weighed to determine the amount of residue remaining after combustion.

Results

The results of the ignition test are shown in Table 4. The samples all burned readily. Residues consisted of small soot stains and represented less than 0.1 percent of the original material. Note that a second combustion experiment was conducted in the course of the elemental analysis (Table 1.) In that case, approximately 3% mineral ash remained within the chamber of the elemental analyzer. That represented mineral salts, which may have been lost to smoke in our open combustion experiment.

We conclude that the sample is combustible during incineration, to a degree typical for organic material.

Table 4. Results of Residue after Combustion Experiment

2230 green	0.34448	0.00052	99.850
2230 orange	1.09171	0.00097	99.910
2230 white	0.35337	0.00016	99.960
		mean	99.907

Conclusions

Samples of "Lightload Towels" were tested for biodegradability under anaerobic conditions by OECD 311 protocol. The material was found to be ultimately biodegradable, and was mineralized to an even greater extent than the cellulose reference material. The result is not surprising, since rayon is merely a modified cellulose, and there is extensive documentation in the published scientific literature demonstrating that rayon materials are biodegradable under most conditions.

The anaerobic protocol was chosen because this is the most challenging condition for biodegradation of most materials. Organic materials that are mineralized under strictly anaerobic conditions can reasonably be assumed to be easily mineralized in any biologically active environment, including soils, water, composts, sewage, and landfills.

While the current assay and the body of scientific literature clearly justify describing rayon products as "biodegradable," we recommend the use of qualifying statements in making marketing claims for any product. The extent of biodegradation of any material depends on the nature of the material, the presence of appropriate microorganisms, and the environmental conditions. Some suggested examples include:

Biodegradable according to OECD 311 guidelines

Biodegradable when disposed of properly

Product (excluding packaging) is composed entirely of materials proven to be biodegradable

One could also list various environments where the product would biodegrade, such as sewage treatment plants, biologically-active landfills, soils, etc. However, this might seem to promote improper disposal that could potentially cause litter, clogged drains, or other adverse outcomes. Therefore, we do not recommend this option.

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