

Eden Research Laboratory

Up-  
date

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To: BioNatur Plastics

Date: March 18, 2024

From: Thomas Poth

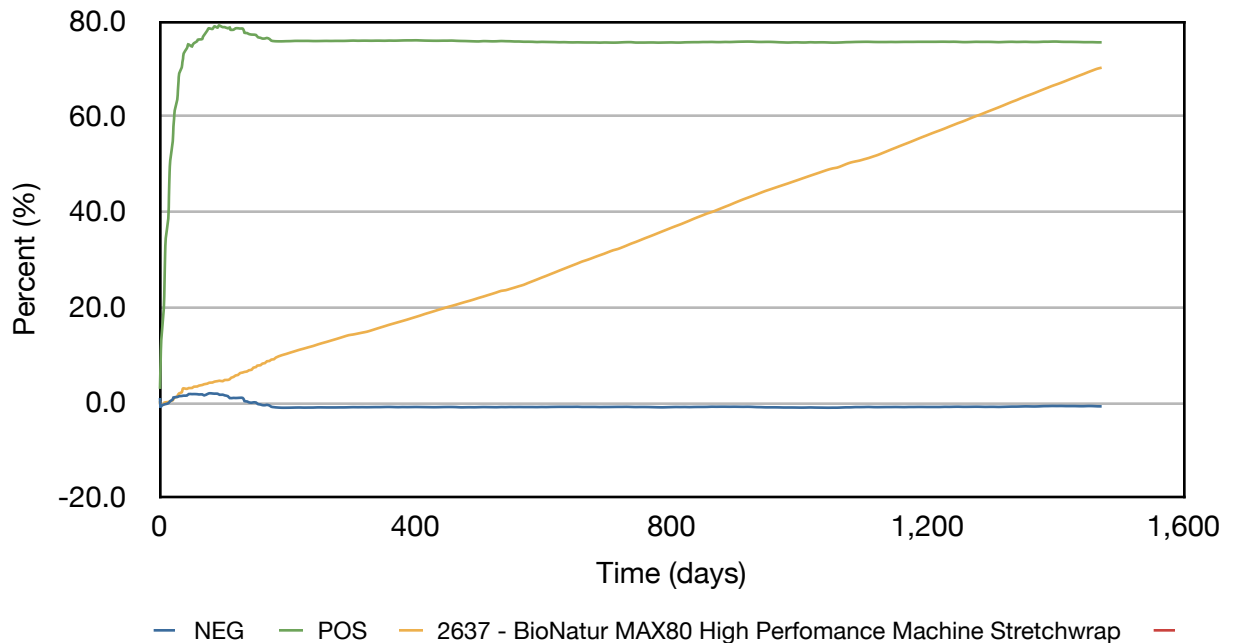
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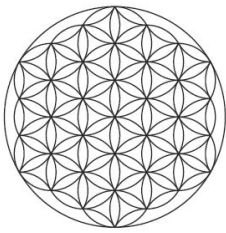
Regarding: ASTM D5511 for BioNatur Plastics Samples in 1473 days

	Inoculum	Negative	Positive	2637 - BioNatur MAX80 High Performance Machine Stretch-wrap
Cumulative Gas Volume (mL)	2039.1	1960.4	9482.9	27091.3
Percent CH <sub>4</sub> (%)	45.4	44.2	38.3	54.8
Volume CH <sub>4</sub> (mL)	926.7	867.1	3629.3	14844.0
Mass CH <sub>4</sub> (g)	0.66	0.62	2.59	10.60
Percent CO <sub>2</sub> (%)	38.8	38.1	43.2	34.9
Volume CO <sub>2</sub> (mL)	791.8	746.6	4095.7	9448.4
Mass CO <sub>2</sub> (g)	1.56	1.47	8.05	18.56
Sample Mass (g)	10	10	10	20.0
Theoretical Sample Mass (g)	0.0	8.6	4.2	17.1
Biodegraded Mass (g)	0.92	0.86	4.14	13.01
Percent Biodegraded (%)		-0.7	76.3	70.6
* Adjusted Percent Biodegraded (%)		-0.9	100.0	92.5

\* Outside of the ASTM D5511 method and on the assumption that the positive control (Cellulose) will fully biodegrade, all value have been proportionally adjusted.

### Biodegradation





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Date: August 7, 2015

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Regarding: ASTM D5526 results for HDPE/LDPE Samples in 391 days

	Inoculum			Negative			Positive		
Percent Solid	60%	45%	35%	60%	45%	35%	60%	45%	35%
Cumulative Atmos	5.12	5.56	6.35	5.21	5.66	6.29	10.30	11.10	11.93
Converted Gas Volume (mL)	7910	8590	9811	8049	8745	9718	15914	17150	18432
Percent CH <sub>4</sub> (%)	50.4	51.8	51.2	49.3	50.5	51.5	50.2	51.4	53.1
Volume CH <sub>4</sub> (mL)	3987	4450	5023	3968	4416	5005	7989	8815	9787
Mass CH <sub>4</sub> (g)	2.85	3.18	3.59	2.83	3.15	3.57	5.71	6.30	6.99
Percent CO <sub>2</sub> (%)	37.4	38.2	40.1	38.1	38.8	41.8	38.9	35.6	34.1
Volume CO <sub>2</sub> (mL)	2958	3281	3934	3067	3393	4062	6190	6105	6285
Mass CO <sub>2</sub> (g)	5.81	6.45	7.73	6.02	6.66	7.98	12.16	11.99	12.35
Sample Mass (g)	1000	1000	1000	20	20	20	10	10	10
Theoretical Sample Mass (g)	0.0	0.0	0.00	17.14	17.14	17.14	4.42	4.42	4.42
Biodegraded Mass (g)	3.72	4.14	4.80	3.77	4.18	4.86	7.60	7.99	8.61
Percent Biodegraded (%)				0.3	0.2	0.3	87.7	87.1	86.2

	Inoculum			HDPE Bags			LDPE Bags		
Percent Solid	60%	45%	35%	60%	45%	35%	60%	45%	35%
Cumulative Atmos	5.12	5.56	6.35	8.5	9.7	11.2	9.6	10.9	12.2
Converted Gas Volume (mL)	7910	8590	9811	13055	14909	17366	14758	16871	18895
Percent CH <sub>4</sub> (%)	50.4	51.8	51.2	37.8	38.5	40.4	38.5	40.5	43.2
Volume CH <sub>4</sub> (mL)	3987	4450	5023	4935	5740	7016	5681	6833	8163
Mass CH <sub>4</sub> (g)	2.85	3.18	3.59	3.52	4.10	5.01	4.06	4.88	5.83
Percent CO <sub>2</sub> (%)	37.4	38.2	40.1	38.4	40.3	43.2	41.5	42.3	44.8
Volume CO <sub>2</sub> (mL)	2958	3281	3934	5013	6008	7502	6123	7137	8465
Mass CO <sub>2</sub> (g)	5.81	6.45	7.73	9.85	11.80	14.74	12.03	14.02	16.63
Sample Mass (g)	1000	1000	1000	10	10	10	10	10	10
Theoretical Sample Mass (g)	0.0	0.0	0.00	8.13	8.13	8.13	8.57	8.57	8.57
Biodegraded Mass (g)	3.72	4.14	4.80	5.33	6.29	7.78	6.32	7.48	8.91
Percent Biodegraded (%)				19.8	26.5	36.6	30.4	39.0	47.9