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Hong Kong
Productivity Council
香港生產力促進局

Materials Testing Laboratory

TEST REPORT

Job Number :	Project 10004971	**Date :**	31-12-18
Sample Description :	LDPE (50% Recycle +50% Virgin) with 0.2% P-life	**Page**	1 of 4
Sample Source :	Hong Kong Oxo-biodegradable Plastics Association Limited Unit F, 4/F, Southtex Building, 51 Tsun Yip Street, Kwun Tong, Kowloon, Hong Kong		
Sampling Done by :	The above company		
Receipt Date :	03-08-17		
Test Performing Date :	03-08-17 to 31-12-18		
Nature of Test :	Determining Anaerobic Biodegradation of Samples Under High-Solids Anaerobic-Digestion Conditions (In-house method with reference to ASTM D5511)		

Test Results :

I. Sample Description

Sample were submitted by the client. The sample information was supplied by the client and shown as follows:

Sample ID	Sample Description
1	LDPE (50% Recycle +50% Virgin) with 0.2% P-life

II. Objectives:

To determinate the anaerobic biodegradability of sample and reference materials under controlled composting conditions by measurement of the total amount of carbon dioxide and methane evolved.

III. Methods:

Determining Anaerobic Biodegradation of Plastic Materials Under High-Solids Anaerobic-Digestion Conditions (In-house method with reference to ASTM D5511)

IV. Instrumentation

ECHO respirometer

V. Reference Material

Cellulose, microcrystalline powder of 20 micron

For Enquiry Tel 查詢電話 27885076 / 27885505
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Test Results :

VI. Soil and Sample Information

1. The information of the inoculum

Parameters	Reading
Volatile solids	17%
pH	8.3
Dry solid	45%

2. The amount of material in each testing vessel

Vessel	Weight of Inoculum (g)	Weight of sample (g)
Blank	180	0
Cellulose (Reference)	180	16
LDPE	180	8

VII. Results:

1. The basic information of the sample

Sample	Dry solids (%)	Total organic carbon (TOC) of dry solids (g/g)	Theoretical total gaseous carbon (CO_2 + CH_4) produced (g)
Cellulose	97.8	0.410	6.41
LDPE	99.9	0.623	4.98

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Test Results :

2. The testing condition of the Incubation period

Chamber temperature (°C)	Air flow (ml/min)	Incubation period (day)
52±2	50	120

3. The results of the percentage biodegradation
   The total gas evolved and the degree of biodegradation of each vessel were listed in Table 1 in annex A.

Sample	Degree of biodegradation (%)
Cellulose (Reference)	73.6
LDPE	30.3

4. The average value of the degree of biodegradation of the sample was 30.3% after 120 days incubation.

5. The relative biodegradation rate of the sample with reference to the biodegrading rate of the reference material (cellulose) is 41.2% for 120 days incubation.

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Test Results :

VIII. Conclusion:

a. After 120 days of the biodegradable test, the degree of biodegradation of the sample is 30.3%.

b. After 120 days of the biodegradable test, the relative biodegradation rate of the sample to the reference materials (cellulose) is 41.2%.

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Principal Consultant,
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-End of Report-

1. The data and the graph for the total gas produced (in term of Carbon (g))

Day	Cellulose (reference)	LDPE
0	0	0
1	140.9	119.66
2	718.81	167.99
3	1110.74	219.8
4	1503.14	257.85
5	1373.88	302.85
6	1570.28	332.58
7	1812.16	Data checking
8	1984.63	
9	2008.64	
10	2052	
11	2087.18	
12	2115.89	743.46
13	2136.75	785.37
14	Data checking	816.76
15		859.02
16		874.91
17		913.02
18		962.32
19	2367.53	992.39
20	2466.86	1018.02
21	2564.05	1042.7
22	2706.55	1059.61
23	2799.68	1071.48
24	2983.16	1090.09
25	3332.86	1111.84
26	3569.11	1123.7
27	3771.82	1136.73
28	3944.59	1149.07
29	4130.8	1161.82
30	4238.8	1168.64

Day	Cellulose (reference)	LDPE
31	4389.07	1176.82
32	4630.36	1190.73
33	4739.05	1200.27
34	4885.16	1209.27
35	5027.93	1218.55
36	5152.09	1227
37	5224.16	1230
38	5319.14	1238.18
39	5470.98	1248.27
40	5570.66	1255.36
41	5664.14	1258.36
42	5750.52	1268.45
43	5831.11	1272.55
44	5861.11	1279.09
45	5931.2	1284.27
46	6013.09	1290
47	6070.57	1298.73
48	6091.09	1304.18
49	6159.14	1309.64
50	6182.45	1315.09
51	6220.23	1318.36
52	6253.23	1322.18
53	6277.7	1328.73
54	6318.14	1333.36
55	6341.18	1337.73
56	6363.41	1340.18
57	6384.27	1343.73
58	6394.98	1347.82
59	6410.93	1351.91
60	6436.36	1357.36
61	6454.5	1362.2

Day	Cellulose (reference)	LDPE
62	6469.09	1365.48
63	6478.09	1369.3
64	6489.48	1371.2
65	6506.52	1374.75
66	6521.18	1377.48
67	6540.95	1380.75
68	6550.5	1384.02
69	6564.89	1387.57
70	6573.89	1390.3
71	6580.7	1393.57
72	6591.89	1396.3
73	6602.52	1399.57
74	6611.45	1400.32
75	6621.55	1407.14
76	6631.09	1410.95
77	6639	1413.14
78	6648.27	1415.59
79	6657.55	Data checking
80	6664.09	
81	6673.02	
82	6681.75	1424.05
83	6689.93	1425.41
84	6696.75	1428.95
85	6700.57	1431.41
86	Data checking	1433.59
87		1435.5
88		1439.86
89	6717.48	1441.77
90	6721.3	1443.41
91	6724.3	1445.59
92	6728.39	1447.77

Day	Cellulose (reference)	LDPE
93	6731.66	1450.5
94	6746.73	1452.68
95	6752.73	1455.68
96	6756.55	1457.59
97	6759.82	1459.5
98	6763.09	1463.59
99	6768.55	1463.93
100	6771.55	1466.66
101	6775.09	1468.57
102	6779.73	1471.57
103	6782.73	1474.57
104	6787.36	1476
105	6792	1478.73
106	6793.64	1480.53
107	6797.73	1483.35
108	6800.45	1485.67
109	6804.82	1488.52
110	6810	1491.03
111	6814.91	1493.6
112	6817.28	1495.69
113	6820.28	1497.7
114	6824.42	1499.51
115	6827.41	1501.49
116	6831.95	1502.87
117	6834.78	1504.64
118	6838.86	1506.55
119	6842.3	1507.91
120	6845.11	1509.55

2. The data and the graph for the biodegradation rate of the cellulose and the LDPE

Day	Cellulose (reference) (%)	LDPE (%)
0	0	0
1	0.34	0.97
2	4.43	0.78
3	7.87	1.02
4	12.11	1.14
5	10.08	1.34
6	11.61	1.49
7	14.23	Data checking
8	15.93	
9	16.1	
10	16.41	
11	16.59	
12	16.71	11.82
13	16.84	12.25
14	Data checking	13.04
15		13.93
16		14.41
17		14.98
18		15.81
19	16.9	16.44
20	18.03	17.13
21	19.23	17.47
22	21.11	21.26
23	22.41	21.5
24	24.85	21.87
25	29.54	22.31
26	32.64	22.54
27	35.38	22.8
28	37.59	23.05
29	40.03	23.31
30	41.51	23.44

Day	Cellulose (reference) (%)	LDPE (%)
31	43.52	23.61
32	46.69	23.89
33	48.17	24.08
34	50.1	24.26
35	52.04	24.45
36	53.71	24.62
37	54.68	24.68
38	55.96	24.84
39	57.88	25.04
40	59.22	25.18
41	60.45	25.24
42	61.56	25.45
43	62.59	25.53
44	62.98	25.66
45	63.87	25.76
46	64.91	25.88
47	65.61	26.05
48	65.86	26.16
49	66.7	26.27
50	66.99	26.38
51	67.45	26.45
52	67.85	26.53
53	68.13	26.66
54	68.58	26.75
55	68.86	26.84
56	69.09	26.89
57	69.29	26.96
58	69.42	27.04
59	69.6	27.12
60	69.88	27.23
61	70.07	27.33

Day	Cellulose (reference) (%)	LDPE (%)
62	70.22	27.39
63	70.32	27.47
64	70.43	27.51
65	70.65	27.58
66	70.81	27.63
67	71.01	27.7
68	71.09	27.77
69	71.23	27.84
70	71.32	27.89
71	72.47	27.96
72	71.49	28.01
73	71.58	28.08
74	71.67	28.09
75	71.78	28.23
76	71.88	28.31
77	71.96	28.35
78	72.04	28.4
79	72.13	Data checking
80	72.2	
81	72.27	
82	72.35	28.57
83	72.43	28.6
84	72.49	28.67
85	72.53	28.72
86	Data checking	28.76
87		28.8
88		28.89
89	72.69	28.92
90	72.72	28.96
91	72.72	29
92	72.76	29.04
93	72.79	29.1
94	72.95	29.14

Day	Cellulose (reference) (%)	LDPE (%)
95	73.02	29.2
96	73.06	29.24
97	73.09	29.28
98	73.1	29.36
99	73.11	29.37
100	73.14	29.42
101	73.17	29.46
102	73.23	29.52
103	73.27	29.58
104	73.31	29.61
105	73.32	29.67
106	73.34	29.7
107	73.37	29.76
108	73.38	29.81
109	73.39	29.86
110	73.42	29.91
111	73.47	29.96
112	73.49	30.01
113	73.49	30.05
114	73.53	30.08
115	73.54	30.12
116	73.57	30.15
117	73.57	30.19
118	73.6	30.22
119	73.6	30.25
120	73.62	30.28