GUANGDONG DETECTION CENTER OF MICROBIOLOGY

REPORT FOR ANALYSIS

Report №. 2025ESQ00111R01E

Name of Sample Lyocell

Applicant Jiangsu Huasaier New Material Technology Co., Ltd.

Test Type Entrustment Test

Address: Building 66, No.100 Central Xianlie Road, Guangzhou, China

Postcode: 510070

Tel: (020) 87684423 87137666

Fax: (020) 87684423 87137668

Website: www.gddcm.com

广微测 Gmicro Testing

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

REPORT FOR ANALYSIS

Report №. 2025ESQ00111R01E Verification Code: EGBW6SF3

Name of Sample	Lyocell	Test Type	Entrustment Test
Applicant	Jiangsu Huasaier New Material Technology Co., Ltd.	Address	No. 21, Peigong Road, Pei County, Xuzhou City, Jiangsu Province, China
Sample Source	Submitted for Testing by the Applicant	Sample Quantity	500 g
Spec and Lot № of Sample	1.33dtex*38mm	State and Characteristic	White cotton-like
Sample Received Date	2025-02-28	Test Completion Date	2025-09-29
Item Tested	Ultimate aerobic biodegradability		
Test Standard and Method	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions — Method by analysis of evolved carbon dioxide —Part 1: General method GB/T 19277.1-2011		
Test Result	The percentage biodegradation of the test material at the end of the test on day 180 was 75.9%. The rate of biodegradation of the test material, compared of the reference material(reference was set to100%) was 94.8%. Issue Date: 2025-09-29 (Official Seal)		
Remarks	The following information is provided by the client: 1. Manufacturer: Jiangsu Huasaier New Material Technology Co., Ltd.; 2. Manufacturer's Address: No. 21, Peigong Road, Pei County, Xuzhou City, Jiangsu Province, China.		

Editor: Lv zi yi **Verifier:** Deng Guirong

Auditor: Liang Yanzhen **Approver:** Mei Cheng-fang

GUANGDONG DETECTION CENTER OF MICROBIOLOGY ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

1 Test results

Percentage biodegradation of the test material at the end of the test on day 180	Mean	75.9%		
	Three replicates	77.3%	77.9%	72.7%
Percentage biodegradation of the rate of biodegradable in the test material, compared of the reference material at the end of the test on day 180		94.8%		

2 Validity criteria

2.1 The degree of biodegradation of reference material after 45 days > 70 %?

☑Yes, it was 71.1% ☐No

2.2 The maximum relative deviation between the biodegradation rates of each composting test bottle in each test group less than 20% at the end of the experiment?

☑Yes, The maximum relative deviation was 4.8% ☐No

2.3 Mean CO_2 production in the blank vessels after 10 days in the range 50 mg to 150 mg CO_2 /g volatile solids?

☑Yes, it was 108.2 mg CO_2 /g volatile solids ☐No

3 Characteristics of test material, reference material and inoculum

Object / Index	Test material	Reference material	Inoculum
Name	Lyocell	Microcrystalline cellulose	Matured compost
Visual appearance	White cotton-like	White powder	Granular
Pre-treatment	After liquid nitrogen pulverization, it was used for test	/	Sieve the compost on a screen of 0.5 cm
pH value	/	/	7.50
Moisture content, %	9.4	4.6	41.7
Total dry solids, %	90.6	95.4	50% to 55%
Total organic carbon (TOC), %	45.0(dry weight)	43.9(dry weight)	15.7(dry weight)
Total nitrogen content, g/g	1.81×10^{-4} (dry weight)	/	1.38×10^{-2} (dry weight)
Source	Applicant	Sinopharm Chemical Reagent Co., Ltd	Laboratory homemade

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

4 Test condition

In the testing, the ratio of the dry mass of the inoculum to the dry mass of the test material or reference material was about 6:1. Aerating the test system with carbon-dioxide-free air, and the oxygen concentration in the exhaust air from the composting vessels was not be allowed to drop below 6 %. Place the composting vessels in the test environment at 58 ℃ ± 2 ℃ and darkness. The amount of carbon evolved as CO_2 was measured by titration.

5 Details of test result

5.1 Cumulative amounts of carbon dioxide during the test, in grams per vessel

Time (d)	Test material				Reference material				Blank			
	Ves 1	Ves 2	Ves 3	Mean	Ves 4	Ves 5	Ves 6	Mean	Ves 7	Ves 8	Ves 9	Mean
1	1.97	2.18	1.91	2.02	4.91	3.79	4.39	4.36	1.97	2.73	2.51	2.40
2	5.37	6.01	5.31	5.56	18.74	17.16	16.32	17.41	4.37	4.86	5.11	4.78
3	8.01	8.81	8.43	8.41	25.57	25.04	23.60	24.74	5.82	6.21	6.92	6.31
4	10.72	11.10	10.88	10.90	30.61	31.76	28.94	30.43	7.41	8.08	8.46	7.98
5	12.99	13.43	12.85	13.09	35.29	37.58	35.76	36.21	8.54	9.28	9.97	9.26
6	14.47	14.85	14.10	14.47	39.40	42.55	40.20	40.72	9.97	10.23	11.30	10.50
7	15.74	16.83	15.20	15.92	44.17	45.95	44.79	44.97	10.74	11.32	12.56	11.54
8	18.14	18.93	16.94	18.00	49.63	51.41	49.46	50.17	12.28	11.83	13.45	12.52
9	19.71	20.22	17.83	19.25	53.72	54.92	52.92	53.86	12.96	12.37	14.10	13.15
10	21.07	21.16	18.84	20.36	56.45	57.63	55.69	56.59	13.32	12.74	14.70	13.59
13	26.48	25.06	21.69	24.41	66.81	67.19	65.24	66.41	15.07	14.89	16.60	15.52
14	28.57	26.44	22.57	25.86	69.77	70.25	67.64	69.22	15.61	15.54	17.27	16.14
17	33.07	30.06	24.99	29.37	75.85	75.10	72.68	74.55	17.34	17.16	18.85	17.79
21	36.45	32.74	27.17	32.12	81.26	79.47	77.82	79.51	18.96	18.82	20.55	19.44
24	39.62	35.05	29.14	34.60	84.86	82.57	81.57	83.00	20.40	20.16	22.07	20.88
27	41.57	36.85	30.77	36.40	87.06	84.50	83.80	85.12	21.46	21.13	22.91	21.83
30	44.17	39.34	33.96	39.16	89.52	86.86	86.50	87.63	22.33	21.64	24.19	22.72
33	46.66	41.73	36.72	41.70	91.37	88.63	88.17	89.39	23.22	22.75	25.04	23.67
36	49.86	45.41	40.82	45.36	93.69	90.77	90.46	91.64	24.15	24.00	26.44	24.87
39	52.92	49.03	43.86	48.60	95.25	92.39	92.08	93.24	25.04	25.10	27.53	25.89
42	55.10	51.61	45.99	50.90	96.42	93.45	93.08	94.32	25.62	25.75	28.23	26.53
45	58.96	56.07	50.08	55.04	98.67	96.11	95.91	96.89	27.24	27.39	30.03	28.22

Note: Ves = test vessel

广微测
Gmicro Testing

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

Time (d)	Test material				Reference material				Blank			
	Ves 1	Ves 2	Ves 3	Mean	Ves 4	Ves 5	Ves 6	Mean	Ves 7	Ves 8	Ves 9	Mean
48	61.85	59.58	54.69	58.71	100.13	97.77	97.55	98.48	28.36	28.56	31.14	29.35
52	66.69	64.88	60.96	64.18	102.80	99.98	99.93	100.90	30.51	30.11	32.73	31.12
55	70.04	68.81	64.83	67.89	104.17	101.22	101.06	102.15	31.94	31.15	33.72	32.27
59	73.95	73.58	69.11	72.21	106.27	102.98	102.87	104.04	32.82	32.60	35.11	33.51
61	76.53	76.21	71.06	74.60	107.06	103.64	103.47	104.72	33.51	33.20	35.80	34.17
63	78.19	77.98	72.80	76.32	107.66	104.11	103.86	105.21	33.91	33.64	36.17	34.57
67	83.31	82.72	78.04	81.36	109.40	105.52	105.28	106.73	35.27	34.88	37.47	35.87
70	86.74	85.71	81.22	84.56	110.53	106.56	106.12	107.74	36.38	35.96	38.21	36.85
73	90.20	88.60	84.37	87.72	111.79	107.55	107.09	108.81	37.44	36.97	39.00	37.80
77	94.58	91.74	88.22	91.52	112.96	108.50	107.86	109.77	38.43	37.92	39.71	38.69
80	97.74	94.76	91.18	94.56	114.21	109.58	108.83	110.87	39.01	38.65	40.61	39.42
83	100.17	97.21	93.45	96.94	115.10	110.31	109.58	111.66	39.56	39.23	41.10	39.96
87	103.01	99.97	96.03	99.67	116.23	111.35	110.64	112.74	40.37	40.13	41.89	40.79
90	104.85	102.03	97.73	101.54	116.95	111.86	111.28	113.36	40.99	40.80	42.36	41.38
94	107.19	104.54	100.10	103.94	117.90	112.85	112.23	114.32	41.83	41.68	43.19	42.23
97	108.64	106.55	101.75	105.64	118.52	113.32	112.74	114.86	42.30	42.32	43.61	42.74
101	110.54	109.01	103.90	107.82	119.49	114.24	113.60	115.77	43.11	42.92	44.34	43.46
104	111.96	110.81	105.37	109.38	120.27	114.88	114.20	116.45	43.44	43.43	44.85	43.91
108	113.84	112.81	107.28	111.31	121.39	115.90	115.19	117.49	43.93	44.07	45.54	44.52
111	115.10	114.24	108.69	112.68	122.10	116.72	115.79	118.20	44.31	44.71	46.09	45.04
115	116.82	115.77	110.44	114.34	123.21	117.89	116.85	119.32	44.97	45.57	46.97	45.84
118	117.71	116.68	111.45	115.28	123.80	118.51	117.43	119.91	45.39	46.12	47.48	46.33
122	118.99	118.04	113.02	116.68	124.60	119.53	118.34	120.83	45.99	46.65	48.10	46.91
126	120.16	119.33	114.35	117.95	125.44	120.46	119.28	121.73	46.54	47.10	48.63	47.42
130	121.58	120.57	115.70	119.29	126.65	121.52	120.39	122.85	46.98	47.58	49.27	47.94
133	122.30	121.34	116.36	120.00	127.30	122.18	121.23	123.57	47.34	47.87	49.60	48.27
137	123.65	122.89	117.82	121.45	128.54	123.37	122.60	124.84	47.95	48.60	50.49	49.01

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

Time (d)	Test material				Reference material				Blank			
	Ves 1	Ves 2	Ves 3	Mean	Ves 4	Ves 5	Ves 6	Mean	Ves 7	Ves 8	Ves 9	Mean
140	124.38	123.82	118.80	122.34	129.31	124.06	123.38	125.58	48.22	49.06	51.06	49.44
144	125.18	124.81	119.79	123.26	130.15	124.83	124.10	126.36	48.53	49.62	51.70	49.95
147	125.82	125.58	120.43	123.94	130.72	125.32	124.70	126.91	48.89	50.06	52.21	50.39
151	126.64	126.53	121.25	124.81	131.41	126.03	125.48	127.64	49.24	50.65	52.85	50.91
154	127.34	127.31	122.05	125.57	131.90	126.63	126.01	128.18	49.77	51.21	53.32	51.43
158	128.08	128.17	122.93	126.39	132.62	127.24	126.71	128.85	50.59	51.69	53.83	52.04
161	128.58	128.81	123.57	126.99	133.22	127.69	127.18	129.36	51.05	52.07	54.27	52.46
165	129.31	129.61	124.28	127.73	133.89	128.39	127.82	130.03	51.56	52.58	54.89	53.01
168	129.87	130.23	125.05	128.39	134.39	129.13	128.53	130.68	51.94	53.15	55.64	53.58
172	130.64	130.98	125.78	129.13	135.05	129.83	129.26	131.38	52.36	53.55	56.33	54.08
175	131.08	131.44	126.27	129.60	135.41	130.21	129.63	131.75	52.64	53.86	56.68	54.39
180	131.56	132.13	127.00	130.23	136.07	130.83	130.23	132.38	53.33	54.79	57.01	55.05

(Brought down)

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

5.2 Percentage biodegradation during the test, %

Time (d)	Test material				Reference material			
	Ves 1	Ves 2	Ves 3	Mean	Ves 4	Ves 5	Ves 6	Mean
1	-0.4	-0.2	-0.5	0.0	2.6	1.4	2.1	2.0
2	0.6	1.2	0.5	0.8	14.5	12.8	12.0	13.1
3	1.7	2.5	2.1	2.1	19.9	19.4	17.9	19.1
4	2.8	3.1	2.9	2.9	23.4	24.6	21.7	23.2
5	3.8	4.2	3.6	3.9	26.9	29.3	27.4	27.9
6	4.0	4.4	3.6	4.0	29.9	33.2	30.8	31.3
7	4.2	5.3	3.7	4.4	33.8	35.6	34.4	34.6
8	5.7	6.5	4.5	5.5	38.4	40.3	38.3	39.0
9	6.6	7.1	4.7	6.2	42.0	43.3	41.2	42.2
10	7.6	7.7	5.3	6.8	44.4	45.6	43.6	44.5
13	11.1	9.6	6.2	9.0	53.1	53.5	51.5	52.7
14	12.6	10.4	6.5	9.8	55.5	56.0	53.3	55.0
17	15.4	12.4	7.3	11.7	60.1	59.3	56.8	58.8
21	17.2	13.4	7.8	12.8	64.0	62.2	60.4	62.2
24	18.9	14.3	8.3	13.9	66.2	63.9	62.8	64.3
27	19.9	15.2	9.0	14.7	67.5	64.9	64.2	65.5
30	21.7	16.8	11.4	16.6	69.2	66.4	66.0	67.2
33	23.2	18.2	13.2	18.2	70.1	67.3	66.8	68.0
36	25.3	20.7	16.1	20.7	71.3	68.2	67.9	69.1
39	27.3	23.4	18.1	22.9	71.8	68.9	68.5	69.7
42	28.9	25.3	19.7	24.6	72.4	69.3	68.9	70.2
45	31.1	28.1	22.1	27.1	72.9	70.3	70.1	71.1
48	32.8	30.5	25.6	29.6	73.3	70.8	70.6	71.6
52	35.9	34.1	30.1	33.4	74.2	71.3	71.2	72.3
55	38.1	36.9	32.9	36.0	74.4	71.4	71.2	72.4
59	40.9	40.5	36.0	39.1	75.3	71.9	71.8	73.0

Note: The negative value of percentage biodegradation was regarded as 0% in the calculating of mean and plotting biodegradation curve.

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

Time (d)	Test material				Reference material			
	Ves 1	Ves 2	Ves 3	Mean	Ves 4	Ves 5	Ves 6	Mean
61	42.8	42.5	37.3	40.8	75.5	71.9	71.8	73.0
63	44.1	43.8	38.6	42.2	75.7	72.0	71.7	73.1
67	47.9	47.3	42.6	45.9	76.1	72.1	71.9	73.4
70	50.4	49.4	44.8	48.2	76.3	72.2	71.7	73.4
73	52.9	51.3	47.0	50.4	76.6	72.2	71.7	73.5
77	56.5	53.6	50.0	53.4	76.9	72.3	71.6	73.6
80	58.9	55.9	52.3	55.7	77.4	72.6	71.9	74.0
83	60.8	57.8	54.0	57.6	77.8	72.8	72.1	74.2
87	62.8	59.8	55.8	59.5	78.1	73.1	72.3	74.5
90	64.1	61.3	56.9	60.8	78.2	73.0	72.4	74.5
94	65.6	62.9	58.5	62.3	78.3	73.1	72.5	74.6
97	66.6	64.4	59.6	63.5	78.5	73.1	72.5	74.7
101	67.8	66.2	61.1	65.0	78.7	73.3	72.6	74.9
104	68.7	67.6	62.1	66.1	79.1	73.5	72.8	75.1
108	70.0	69.0	63.4	67.5	79.6	73.9	73.2	75.6
111	70.8	69.9	64.3	68.3	79.8	74.2	73.3	75.8
115	71.7	70.6	65.3	69.2	80.1	74.6	73.5	76.1
118	72.1	71.1	65.8	69.6	80.2	74.7	73.6	76.2
122	72.8	71.8	66.8	70.5	80.4	75.2	74.0	76.5
126	73.5	72.6	67.6	71.2	80.8	75.6	74.4	76.9
130	74.4	73.4	68.4	72.1	81.5	76.2	75.0	77.6
133	74.8	73.8	68.8	72.5	81.8	76.5	75.5	78.0
137	75.4	74.6	69.5	73.2	82.3	77.0	76.2	78.5
140	75.7	75.1	70.1	73.6	82.7	77.3	76.6	78.8
144	76.0	75.6	70.5	74.1	83.0	77.5	76.8	79.1
147	76.2	75.9	70.7	74.3	83.2	77.6	76.9	79.2

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

Time (d)	Test material				Reference material			
	Ves 1	Ves 2	Ves 3	Mean	Ves 4	Ves 5	Ves 6	Mean
151	76.5	76.4	71.1	74.6	83.4	77.8	77.2	79.4
154	76.7	76.6	71.3	74.9	83.3	77.9	77.2	79.5
158	76.8	76.9	71.6	75.1	83.4	77.9	77.3	79.5
161	76.9	77.1	71.8	75.3	83.6	77.9	77.4	79.6
165	77.1	77.4	72.0	75.5	83.7	78.0	77.5	79.7
168	77.1	77.4	72.2	75.6	83.7	78.2	77.6	79.8
172	77.3	77.7	72.4	75.8	83.8	78.4	77.8	80.0
175	77.5	77.8	72.6	76.0	83.9	78.5	77.9	80.1
180	77.3	77.9	72.7	75.9	83.9	78.5	77.8	80.1

(Brought down)

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

6 Percentage carbon dioxide evolution curve

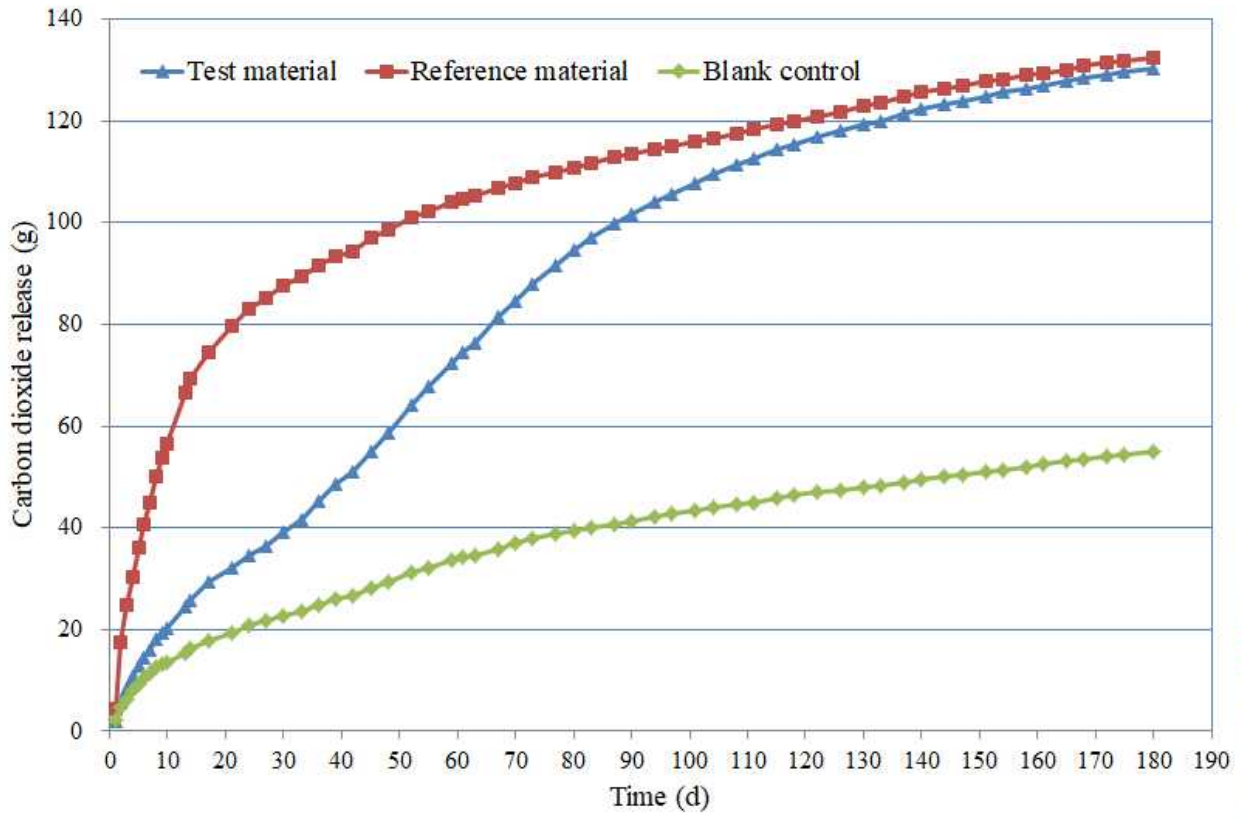


Fig.1 Percentage carbon dioxide evolution curve of the test

GUANGDONG DETECTION CENTER OF MICROBIOLOGY ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

7 Percentage biodegradation curve

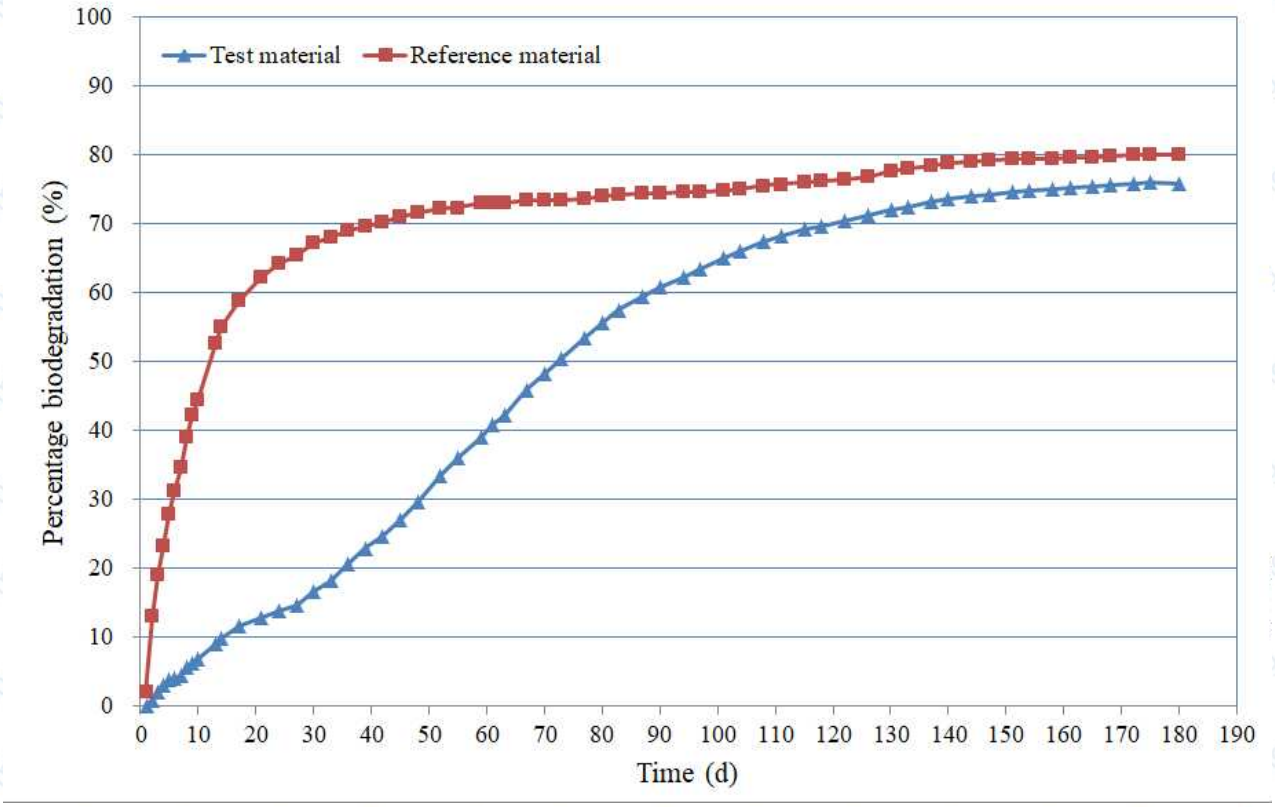


Fig.2 Percentage biodegradation curves of the test

GUANGDONG DETECTION CENTER OF MICROBIOLOGY

ANALYSIS AND TEST RESULT

Report №. 2025ESQ00111R01E

8 Sample photograph



Fig.3 Sample before test

(Blank below)

Notice Items

1. The test report is invalid without the special stamp of testing and paging seal.

2. The test report is invalid without the signatures of the verifier and the approver.

3. The test report is invalid if being supplemented, deleted or altered.

4. Without prior written permission, the test report cannot be reproduced, except in full.

5. Unless otherwise stated, the results shown in this test report refer only to the sample(s) tested.

6. Any dispute of the test report must be raised to the testing institution within 15 days after the test report is received, exceeding which the dispute will not be accepted.

7. For the sample(s) submitted for testing, the sample information is provided by the applicant, and this testing institution is not responsible for its authenticity.