

सिपेट : एस. ए. आर. पि.-पॉलीमेरीक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला

रसायन एवं पेट्रोसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्पलेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS

Dept. of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Govt. of India

B/25, C.N.I. Complex, Patia, Bhubaneswar-751 024, Odisha

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E-mail : larpm@cipet.gov.in, Web : www.larpm.gov.in



सिपेट CIPET



LARPM/CIPET/Testing/2024-25/833

Date- 18.03.2025

To,

M/s. Plastopower Polymers Pvt. Ltd.

Pole – H-07/0960/1, Dangadighila Karbala Para,

Bandipur, Parganas North, West Bengal, India - 700119

Mob: 6290936310

विषय: परीक्षण रिपोर्ट संबंध में।

Sub –Test Report–Reg.

Dear Sir,

संदर्भ संख्या: १) SSF दिनांक 22.05.2024 & email दिनांक 17.02.2024 ।

Ref No: 1) SSF dated 22.05.2024 & email dated 17.02.2024.

२) कार्य आदेश क्रमांक : LARPM/BBS./2024-25/040 दिनांक 17.05.2024 ।

2) Work Order No.: LARPM/BBS./2024-25/040 dated 17.05.2024.

उपरोक्त उद्धृत विषय के संदर्भ में, कृपया यहां संलग्न परीक्षण रिपोर्ट संख्या 01618 दिनांक 18.03.2025 ।

With reference to the above cited subject, please find enclosed here with Test Report No. 01618 dated 18.03.2025.

कृपया इसकी प्राप्ति स्वीकार करें।

Kindly acknowledge the receipt of the same.

Thanks & Regards,

Principal Director & Head
(Sr. Principal Scientist)

Encl: As above

: एस. ए. आर. पि.-पॉलिमरोंक, मटेरियल में अत्याधुनिक अनुसंधान हतु प्रयागशाला

रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार

बी/२५, सि.एन.आई.कॉम्प्लेक्स, पटिआ, भुवनेश्वर-751024, ओडिशा

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सिपेट CIPET



CERTIFICATE OF ANALYSIS AS PER ISO 17088:2021

LARPM/CIPET/Testing/2024-25/

Date-18.03.2025

To,

M/s. Plastopower Polymers Pvt. Ltd.

Pole – H-07/0960/1, Dangadighila Karbala Para,

Bandipur, Parganas North, West Bengal, India - 700119

Sub –Test Report–Reg.

Dear Sir,

Ref No : 1) SSF dated 22.05.2024 & email dated 17.02.2024

2) Our Work Order No.: LARPM/BBS./2024-25/040 dated 17.05.2024

With reference to the above, the submitted sample was analyzed as per ISO 17088:2021. The summary detail of testing & analysis is given below:

Company Name & Address	: M/s. Plastopower Polymers Pvt. Ltd. Pole – H-07/0960/1, Dangadighila Karbala Para, Bandipur, Parganas North, West Bengal, India - 700119
Sample Details	: “Biodegradable carry bag” – as stated by the party.
Test Report No	: 01618 & dated 18.03.2025
Date of Receipt of sample	: 17.05.2024
Date of Initiation	: 24.06.2024
Date of Completion	: 18.03.2025
Percentage of Compostability In 165 days	: 90.92
Requirement of Compostability in 180 days as per ISO 17088:2021	: 90 %

The sample submitted by M/s. Plastopower Polymers Pvt. Ltd. is Biodegradable carry bag and the percentage of compostability in 165 days reported vide test report No. 01618 is 90.92%.

The submitted sample also complies with the terms of compostability seed germination and disintegration as per ISO 17088:2021.

Thanks & Regards,

Dr. Akshaya Kumar Palai
(Quality Manager)

Encl : Analysis Report



ANALYSIS REPORT

Report No. : 01618

Date : 18.03.2025

Issued to

M/s. Plastopower Polymers Pvt. Ltd.

Pole – H-07/0960/1, Dangadighila Karbala Para,

Bandipur, Parganas North, West Bengal, India - 700119

Customer Ref. No. & Date : SSF dated 22.05.2024 & email dated 17.02.2024

Work order Ref. No. & Date : LARPM/BBS./2024-25/040 dated 17.05.2024.

As per Standard : Refer part C

PART A: PARTICULARS OF SAMPLE SUBMITTED

- | | |
|--|---|
| a) Name of the Sample | : Biodegradable carry bag - as stated by the party. |
| b) Grade/verity/Type/Size/Class etc. | : Nil. |
| c) Code No. | : Nil. |
| d) Quantity (pcs./mtr/gm/nos) | : 500 gm approx. |
| e) Mode of packing
(Sealed carton/polypouch/container or not) | : Packed in Carton. |
| f) Date of receipt of sample | : 17.05.2024. |
| g) Date of Performance of test | : 24.06.2024 – 18.03.2025 |
| h) Any other information | : Interim report No. 01483 dated 17.12.2024. |

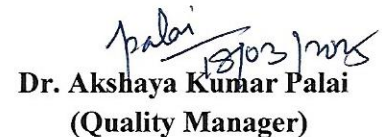
PART B: SUPPLEMENTARY INFORMATION

- | | |
|---|---------------------------------|
| a) Reference to sampling procedure | : Drawn & Supplied by the party |
| b) Supporting documents for
Measurements taken and results derived
like graphs, tables, sketches and/or
Photographs as appropriate to
test report if any (to be attached) | : As per part -C |
| c) Deviation from the test methods as
Prescribed in relevant ASTM/ISO/BIS/
Work Instructions, If any- | : Nil |


Mr. Pinaki Chatterjee

(Technical Manager)

REVIEWED BY & AUTHORISED SIGNATORY


Dr. Akshaya Kumar Palai

(Quality Manager)

AUTHORISED SIGNATORY

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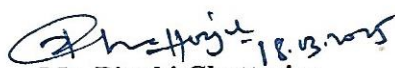
PART C: TEST RESULTS

ANALYSIS REPORT

Report No : 01618

Date : 18.03.2025

Sl. No	Name of the Test	Test Method/Standard	Unit	Results Obtained	Specified Requirements
Sample Details: Biodegradable carry bag – as stated by the party					
1.	Material Identification	FTIR/DSC	--	Polylactic Acid (PLA) & Polybutylene adipate terephthalate (PBAT) based material	---
2.	Disintegration (Dry mass remains in 2 mm sieve after 84 days)	Cl. 6.2 of ISO 17088:2021	%	8.28	Not more than 10% of its original dry mass
3.	Ultimate aerobic Biodegradation (with reference to 100% degradation of positive reference)	Cl. 6.3.1 of ISO 17088:2021 ISO:14855-1	%	90.92 (at the end of 165 days)	> 90 (at the end of the test period not more than 180 days.)
4.	Plant Growth study a) Monocotyledon (Rice) % Seed Emergence	Cl. 6.4.3 of ISO 17088:2021 (Annex C)	%	92.0	> 90
	b) Dicotyledon (Mung) % Seed Emergence		%	95.5	> 90



Mr. Pinaki Chatterjee
(Technical Manager)

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Dr. Akshaya Kumar Palai
(Quality Manager)

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PART C: TEST RESULTS

ANALYSIS REPORT

Report No : 01618

Date : 18.03.2025

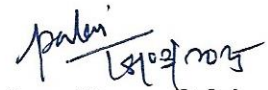
Sl. No	Name of the Test	Test Method/Standard	Unit	Results obtained	Specified Requirements
5.	Acute Ecotoxic Effects to earthworm				
a.	Survival of adult earthworm at the end of 7 days	Cl. 6.4.4 of ISO 17088-2021 (Annex D)	%	100	> 90% of those from the corresponding blank compost
b.	Survival of adult earthworm at the end of 14 days		%	100	
c.	Biomass at the end of 14 days		%	98.6	
6.	Chronic Ecotoxic Effects to earthworm				
a.	Survival of adult earthworm at the end of 28 days	Cl. 6.4.5 of ISO 17088-2021 (Annex E)	%	100	> 90% of those from the corresponding blank compost
b.	Offspring at the end of 56 days		%	100	
c.	Biomass at the end of 56 days		%	98.2	

Note: The detailed observation on biodegradability test is enclosed as **Annexure-I**.


Mr. Pinaki Chatterjee

(Technical Manager)

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Dr. Akshaya Kumar Palai

(Quality Manager)

AUTHORISED SIGNATORY



ANALYSIS REPORT

Report No.: 01618

Date : 18.03.2025

PART C: TEST RESULTS

Sl. No	Name of the Test	Test Method/ Standard	Unit	Results obtained	Specified Requirements (*)
7.	Heavy metals concentration				
a	Arsenic (As)	ISO 17088: 2021	mg/kg	2.29	10
b	Cadmium (Cd)			BDL (DL-0.25ppm)	5
c	Chromium (Cr)			41.55	50
d	Copper (Cu)			11.39	300
e	Lead (Pb)			8.40	100
f	Nickel (Ni)			20.66	50
g	Zinc (Zn)			49.62	1000

• **BDL:** Below Detection Limit, **DL:** Detection Limit.

(*) – Based on the solid waste management Rules, 2016 notified on 08th April 2016 by Ministry of Environment, Forests & Climate Change, Government of India.

PART D: REMARKS: NIL

- Note:**
1. This Test Report / Certificate is issued only for the samples submitted to CIPET:SARP-LARPM.
 2. The results stated above related only to the items tested.
 3. The quality of the subsequent production lot has to be ensured by the purchaser.
 4. This Test Report shall not be reproduced except in full without the written approval of the laboratory.
 5. Any anomaly/discrepancy in this report should be brought to the notice of CIPET:SARP-LARPM within 30 days from the date of issue.
 6. Subcontracted Tests (if any): Nil.

**** End of the Report ****

Pinaki Chatterjee
18.3.2025

Mr. Pinaki Chatterjee
(Technical Manager)

REVIEWED BY & AUTHORISED SIGNATORY

Dr. Akshaya Kumar Palai
18.3.2025

Dr. Akshaya Kumar Palai
(Quality Manager)

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TR.NO. -01618

ANALYSIS RESULT

OBSERVATION FOR BIODEGRADABILITY TEST AS PER ISO 17088:2021

To

M/s. Plastopower Polymers Pvt. Ltd.
Pole – H-07/0960/1, Dangadighila Karbala Para,
Bandipur, Parganas North, West Bengal, India - 700119

Date of Initiation : 24.06.2024
Date of Completion : 18.03.2025

1. Sample detail: Biodegradable carry bag - as stated by the party.
2. Material Identification by DSC & FTIR: DSC & FTIR graph indicates the base material of the supplied sample is Polylactic Acid (PLA) & Polybutylene adipate terephthalate (PBAT) based material.

3. Observation: -

a. Conditions of reaction mixtures

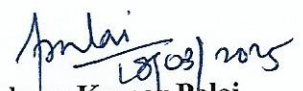
Origin of compost: Vermicompost, Garden Waste & Municipality waste.
Reaction Temperature : 58°C ($\pm 2^\circ\text{C}$)
Dry Solid : 53.19(%)
Volatile Solid : 32.83(%)
Test duration : 165 days
Reference material : Cellulose
Volume of reaction vessel : 3000 ml

b. pH of test medium:-

Sl. No.	Composting Vessel	pH(before)	pH(After)
1	Blank 1	7.6	7.5
2	Blank 2	7.7	7.6
3	Blank 3	7.8	7.7
4	Cellulose1	7.5	7.6
5	Cellulose2	7.7	7.5
6	Cellulose3	7.6	7.4
7	Negative 1	7.4	7.4
8	Negative 2	7.8	7.7
9	Negative3	7.6	7.5
10	Sample 1	7.7	7.6
11	Sample 2	7.5	7.4
12	Sample 3	7.6	7.5


Mr. Pinaki Chatterjee
(Technical Manager)

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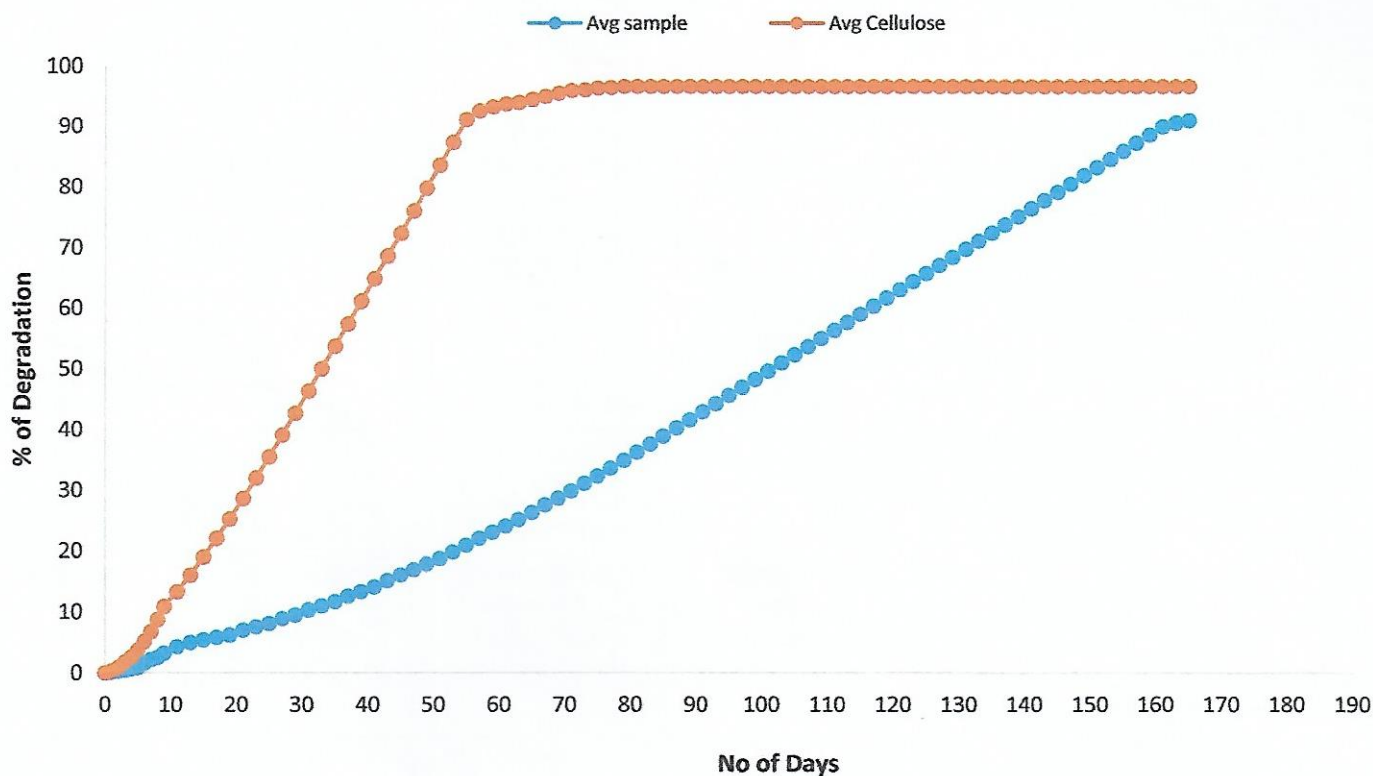

Dr. Akshaya Kumar Palai
(Quality Manager)
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4. Result: Percentage biodegradation relative to positive reference

MEAN(%) : 90.92 %

The reference material-cellulose (%) : 100

Sample code-2405040

Degradation Graph of Sample & Cellulose**5. Visual Observation:-**

	Week 1	Week 2	Week 3	Week 4	Week 5
Structure	Film Sample	Film Sample	Film Sample	Film Sample	Film Sample
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level
Color	Milky White	Milky White	Milky White	Milky White	Milky White
Fungal Development	None	None	None	None	None
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

Pinaki Chatterjee
18/03/2025

Mr. Pinaki Chatterjee

(Technical Manager)

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18/03/2025

Dr. Akshaya Kumar Palai

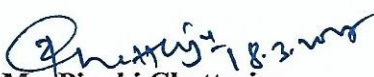
(Quality Manager)

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	Week 6	Week 7	Week 8	Week 9	Week 10
Structure	Film Sample	Film Sample	Film Sample	Disintegration initiated	Disintegration observed
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level
Color	Milky White	Faded Milky White	Faded Milky White	Faded Milky White	----
Fungal Development	None	None	None	None	None
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

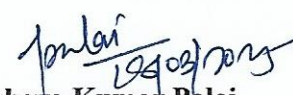
	Week 11	Week 12	Week 13	Week 14	Week 15
Structure	Disintegration observed	Disintegration observed	Disintegration observed	Disintegration observed	Disintegration observed
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level
Color	---	---	----	---	---
Fungal Development	None	None	None	None	None
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

	Week 16	Week 17/18	Week 19/20	Week 21/22	Week 23/24
Structure	Disintegration observed	Disintegration observed	Disintegration observed	Disintegration observed	Disintegration observed
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level
Color	---	---	---	---	---
Fungal Development	None	None	None	None	None
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

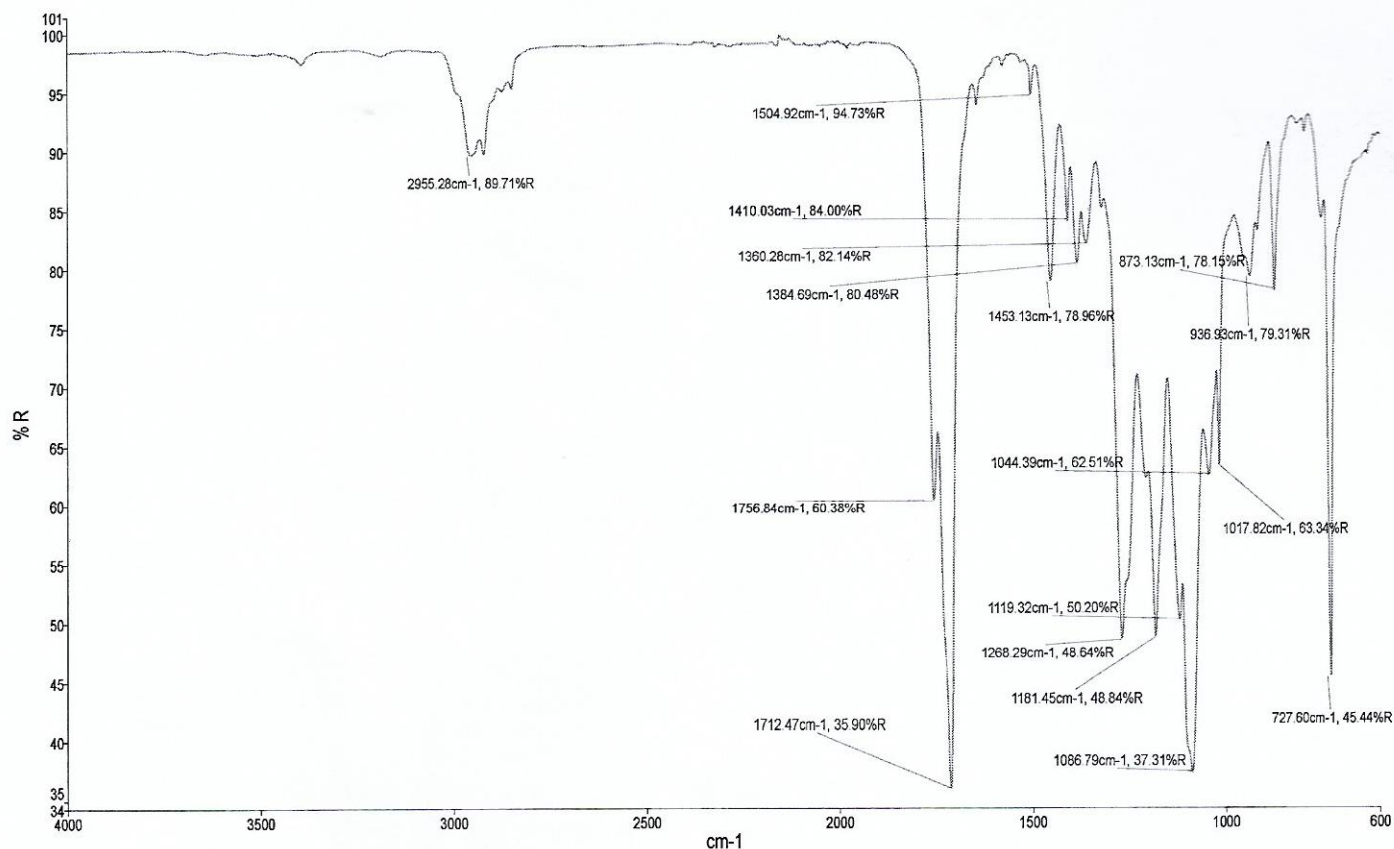

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(Technical Manager)

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(Quality Manager)

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6. FTIR Analysis:-

Wave number (cm ⁻¹)	Possible Nature of Bond
2955.28	CH Stretch
1712.47, 1756.84	C=O Stretch
1410.03	CH ₂ Bend
1268.29, 1181.45, 1086.79	C-O Stretch
727.60	Bending Vibration of CH plane of benzene ring

Pinaki Chatterjee
Mr. Pinaki Chatterjee

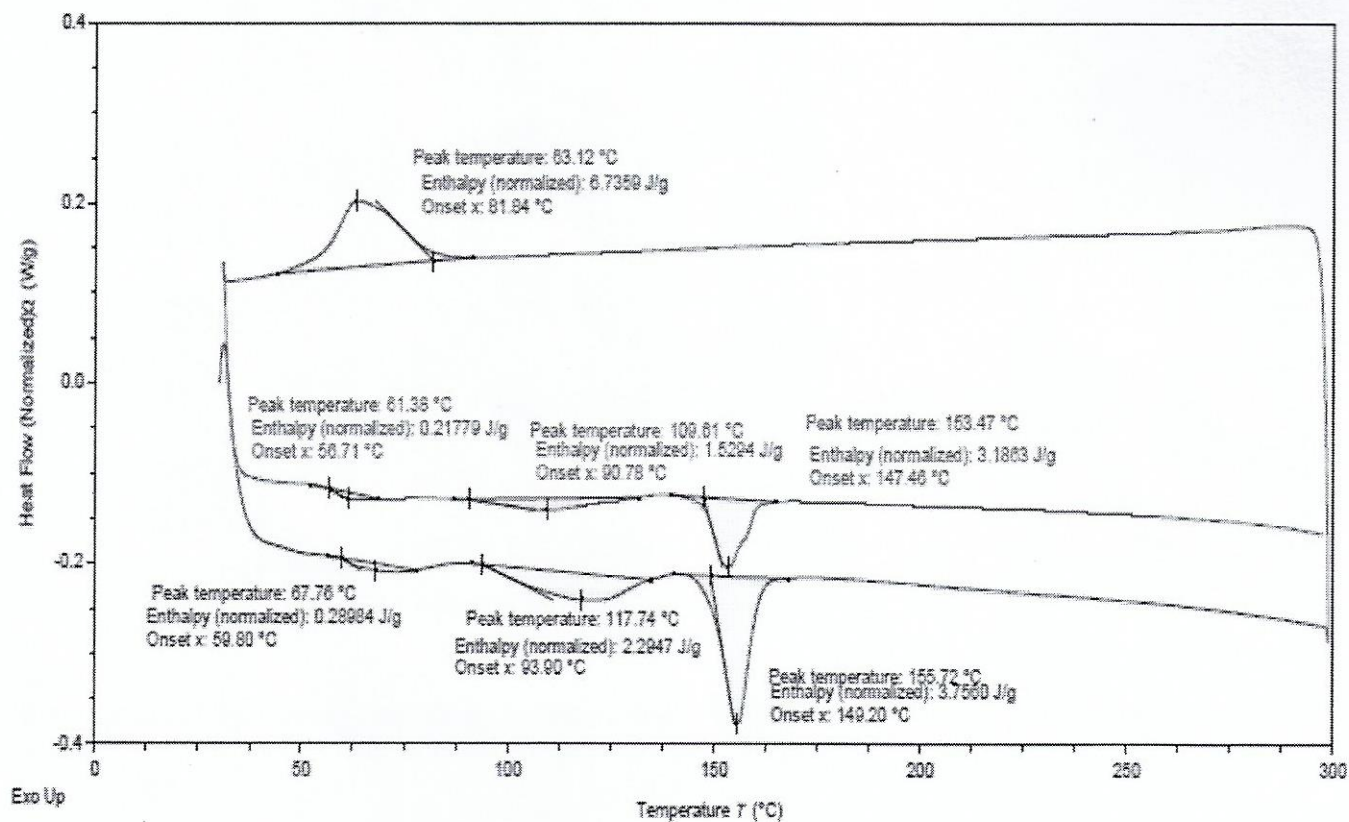
(Technical Manager)

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Dr. Akshaya Kumar Palai
Dr. Akshaya Kumar Palai

(Quality Manager)

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7. DSC Analysis:-

Comment: DSC & FTIR graph indicates the above sample is Polylactic Acid (PLA) & Polybutylene adipate terephthalate (PBAT) based material.

Pinaki Chatterjee
18/03/2025

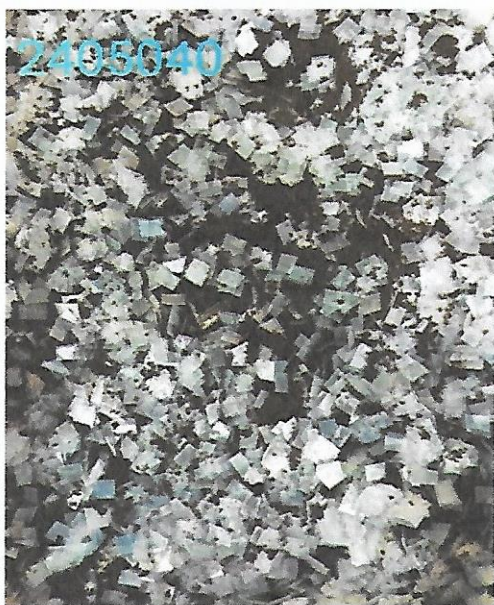
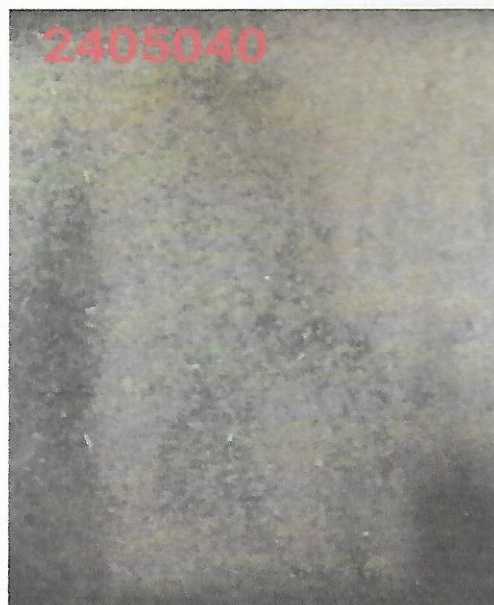
Mr. Pinaki Chatterjee
(Technical Manager)

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Dr. Akshaya Kumar Palai
18/03/2025

Dr. Akshaya Kumar Palai
(Quality Manager)

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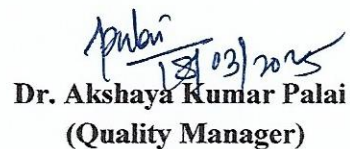
8. DISINTEGRATION- AFTER 12 WEEKS**BEFORE DISINTEGRATION****AFTER DISINTEGRATION****Comment:-**

The disintegration of the supplied sample by passing through 2 mm sieve after 12 week in composting condition as per ISO 17088-2021 was found not more than 10% of original dry mass remain.



Mr. Pinaki Chatterjee
(Technical Manager)

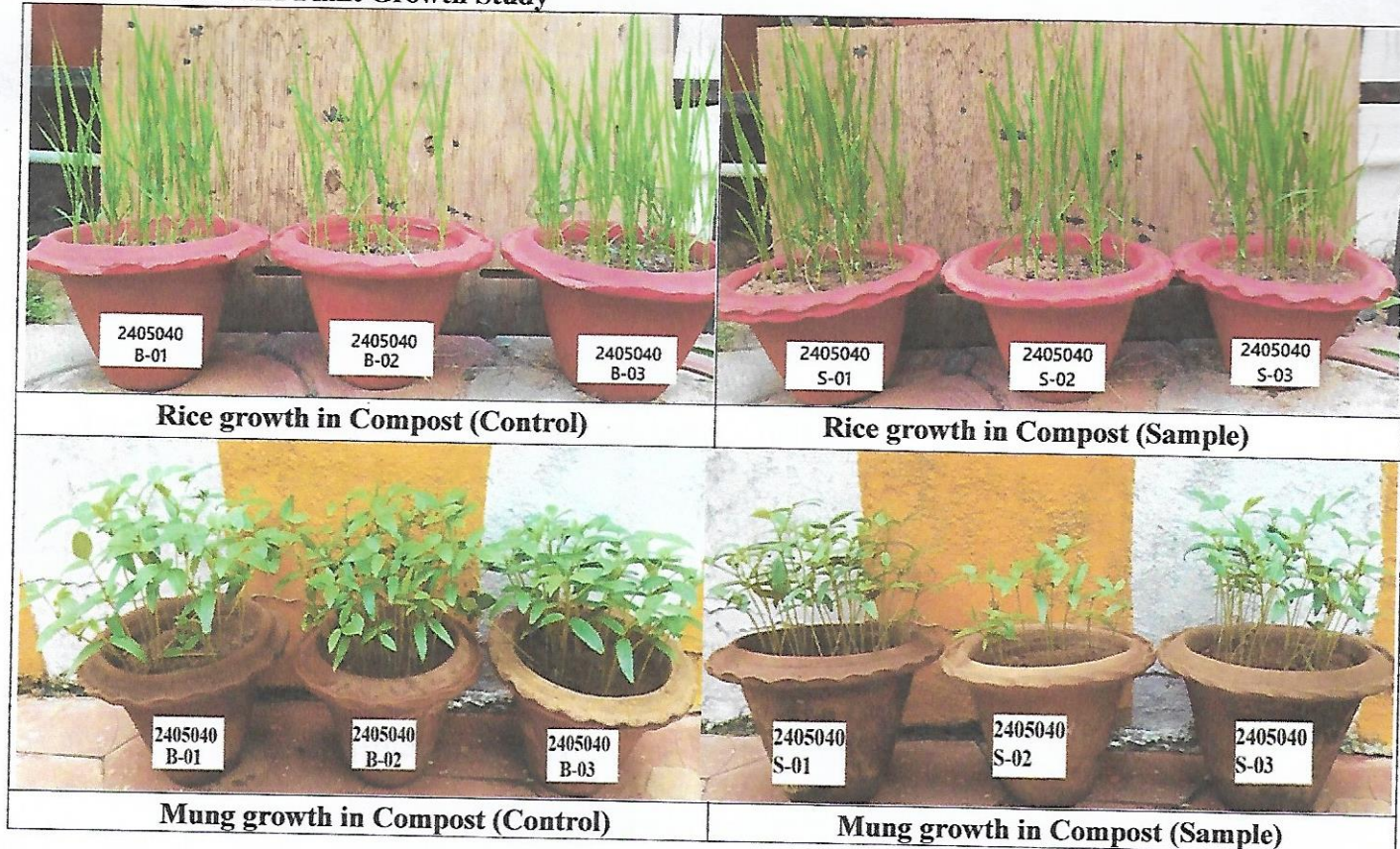
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Dr. Akshaya Kumar Palai
(Quality Manager)

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9. Germination and Plant Growth Study



The percentage of seedling germination rate was found greater than 90% for both control and sample.

Pinaki Chatterjee 18.3.2025

Mr. Pinaki Chatterjee
(Technical Manager)

REVIEWED BY & AUTHORISED SIGNATORY

Akshaya Kumar Palai 18/03/2025

Dr. Akshaya Kumar Palai
(Quality Manager)

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