

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

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

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

CIPET : SARP - LABORATORY FOR ADVANCED RESEARCH IN POLYMERIC MATERIALS



सिपेट CIPET

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

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

Ph : 0674 - 2742852, 2740173, Fax : 0674 - 2740463

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

LARPM/CIPET/Testing/2023-24/

Date- 09.10.2023

To,

Mr. SAYANTAN BASAK

M/s. ITC Limited Paperboards & Specialty Papers Division,

Unit-Bollaram, Anrich Industrial Estate,

Bollaram Village, Jinnarammandal,

Sangareddy, Telangana – 502325

Mob: 9007755038

Sub –Test Report –Reg.

Dear Sir,

Ref No: 1) SSF dated 01.08.2022 & email dated 30.06.2022 & 16.06.2023

2) Our Work Order No.: LARPM/BBS./2022-23/137 dated 08.09.2022

With reference to the above cited subject, please find enclosed herewith **Test Report No. 00988** dated **09.10.2023**.

Kindly acknowledge the receipt of the same.

Thanks & Regards,

Director & Head
(Principal Scientist)

Encl: As above

सिपेट : एस. ए. आर. पि.-पॉलीमेरीक, मटेरीयल में अत्याधुनिक अनुसंधान हेतु प्रयोगशाला
रसायन एवं पेट्रोरसायन विभाग, रसायन एवं उर्वरक मंत्रालय, भारत सरकार
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CERTIFICATE OF ANALYSIS AS PER ISO 17088:2021

LARPM/CIPET/Testing/2023-24/

Date-09.10.2023

To,
M/s. ITC Limited Paperboards & Specialty Papers Division,
Unit-Bollaram, Anrich Industrial Estate,
Bollaram Village, Jinnarammandal,
Sangareddy, Telangana – 502325

Sub –Test Report–Reg.

Dear Sir,

Ref No : 1) SSF dated 01.08.2022 & email dated 30.06.2022 & 16.06.2023

2) Our Work Order No.: LARPM/BBS./2022-23/137 dated 08.09.2022

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. ITC Limited Paperboards & Specialty Papers Division,
Unit-Bollaram, Anrich Industrial Estate,
Bollaram Village, Jinnarammandal,
Sangareddy, Telangana – 502325

Sample Details : “FiloPack/FiloBev/FiloTub” - as stated by the party

Test Report No : 00988 & dated 09.10.2023

Date of Receipt of sample : 08.09.2022

Date of Initiation : 20.01.2023

Date of Completion : 09.10.2023

Percentage of Compostability : 90.81

In 180 days

Requirement of Compostability in : 90 %

180 days as per ISO 17088:2021

The sample submitted by M/s. ITC Limited Paperboards & Specialty Papers Division is compostable and the percentage of compostability in 180 days reported vide test report No. 00988 is 90.81%.

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. : 00988

Date : 09.10.2023

Issued to

M/s. ITC Limited Paperboards & Specialty Papers Division,
Unit-Bollaram, Anrich Industrial Estate,
Bollaram Village, Jinnarammandal,
Sangareddy, Telangana – 502325

Customer Ref. No. & Date : SSF dated 01.08.2022 & email dated 30.06.2022 & 16.06.2023

Work order Ref. No. & Date : LARPM/BBS./2022-23/137 dated 08.09.2022

As per Standard : Refer part C

PART A: PARTICULARS OF SAMPLE SUBMITTED

- a) Name of the Sample : "FiloPack/FiloBev/FiloTub"-as stated by the party.
b) Grade/verity/Type/Size/Class etc. : Nil.
c) Code No. : Nil.
d) Quantity (pcs./mtr/gm/nos) : 500g.
e) Mode of packing
(Sealed carton/polypouch/container or not) : Packed in Carton.
f) Date of receipt of sample : 08.09.2022
g) Date of Performance of test : 20.01.2023 – 09.10.2023
h) Any other information : Interim Report No. 00923 dated 03.08.2023

PART B: SUPPLEMENTARY INFORMATION

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


Mr. Pinaki Chatterjee

(Technical Manager)

AUTHORISED SIGNATORY


Dr. Akshaya Kumar Palai
(Quality Manager)

AUTHORISED SIGNATORY

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

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Page : 02 of 04

PART C: TEST RESULTS

ANALYSIS REPORT

Report No : 00988

Date : 09.10.2023

Sl. No	Name of the Test	Test Method/Standard	Unit	Results Obtained	Specified Requirements
Sample Details: "FiloPack/FiloBev/FiloTub- as stated by the party					
1.	Material Identification	FTIR/DSC	--	Paper material , one side ethylene acrylic based dispersion coating & other side CaCO ₃ based dispersion coating	---
2.	Disintegration (Dry mass remains in 2 mm sieve after 84 days)	Cl. 6.2 of ISO 17088:2021	%	8.00	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	%	90.81 (at the end of 180 days)	> 90 (at the end of the test period not more than 180 days.)
4.	Plant Growth study				
	a) Monocotyledon (Rice)	Cl. 6.4.3 of ISO 17088:2021 (Annex C)			
	% Seed Emergence		%	95.73	> 90
	b) Dicotyledon (Mung)				
	% Seed Emergence		%	96.03	> 90

Mr. Pinaki Chatterjee
(Technical Manager)

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PART C: TEST RESULTS

ANALYSIS REPORT

Report No : 00988

Date : 09.10.2023

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		%	98.25	
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		%	93.6	
c.	Biomass at the end of 56 days		%	100	

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

Pinaki Chatterjee
09.10.2023

Mr. Pinaki Chatterjee
(Technical Manager)
AUTHORISED SIGNATORY

Dr. Akshaya Kumar Palai
09.10.2023

Dr. Akshaya Kumar Palai
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सिपेट CIPET

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

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ANALYSIS REPORT

Report No.: 00988

Date : 09.10.2023

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	0.03	10
b	Cadmium (Cd)			0.01	5
c	Chromium (Cr)			0.82	50
d	Copper (Cu)			0.71	300
e	Lead (Pb)			1.06	100
f	Mercury (Hg)			0.01	0.15
g	Nickel (Ni)			0.86	50
h	Zinc (Zn)			1.18	1000

(*) – 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 ****


Mr. Pinaki Chatterjee

(Technical Manager)

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Dr. Akshaya Kumar Palai

(Quality Manager)

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OBSERVATION FOR BIODEGRADABILITY TEST AS PER ISO 17088:2021

To

M/s. ITC Limited Paperboards & Specialty Papers Division,
Unit-Bollaram, Anrich Industrial Estate,
Bollaram Village, Jinnarammandal,
Sangareddy, Telangana – 502325

Date of Initiation : 20.01.2023

Date of Completion : 09.10.2023

1. **Sample detail:** FiloPack/FiloBev/FiloTub - as stated by the party.
2. **Material Identification by DSC & FTIR:** DSC & FTIR graph indicates the base material of the supplied sample is Paper material , one side ethylene acrylic based dispersion coating & other side CaCO₃ based dispersion coating.

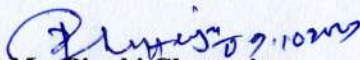
3. Observation: -

a. Conditions of reaction mixtures

Origin of compost: Vermicompost, garden waste, Municipality waste Reaction
Temperature : 58°C (±2°C)
Dry Solid : 52.74(%)
Volatile Solid : 30.29 (%)
Test duration : 180 days
Reference material : Cellulose
Volume of reaction vessel : 3000 ml

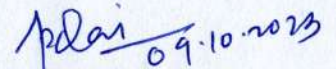
b. pH of test medium:-

Sl. No.	Composting Vessel	pH(before)	pH(After)
1	Blank 1	7.4	7.3
2	Blank 2	7.3	7.3
3	Blank 3	7.5	7.4
4	Positive 1	7.3	7.4
5	Positive 2	7.6	7.5
6	Positive 3	7.5	7.4
7	Negative 1	7.6	7.5
8	Negative 2	7.7	7.5
9	Negative 3	7.6	7.4
10	Sample-1	7.4	7.3
11	Sample-2	7.5	7.5
12	Sample-3	7.7	7.6



Mr. Pinaki Chatterjee
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Dr. Alahuya Kumar Pulul
(Quality Manager)

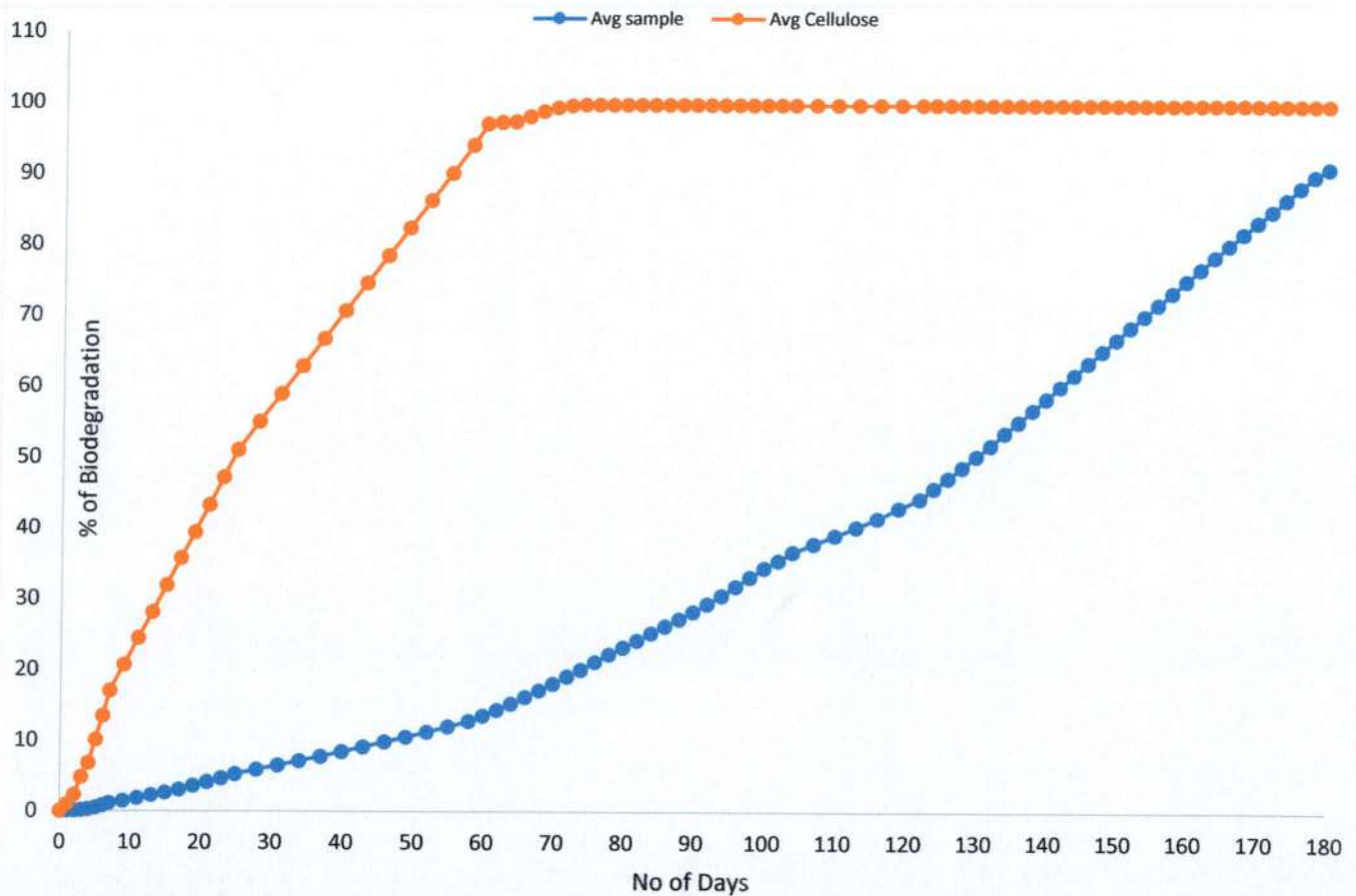
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4. Result: Percentage biodegradation relative to positive reference

MEAN(%) : 90.81 %

The reference material-cellulose (%) : 100

Biodegradation Graph of Sample & Cellulose



5. Visual Observation:-

	Week 1	Week 2	Week 3	Week 4	Week 5
Structure	Paper	Paper	Paper	Paper	Paper
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level
Color	White	White	White	White	White
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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TR.NO. -00988

ANALYSIS RESULT

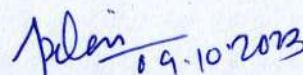
	Week 6	Week 7	Week 8	Week 9	Week 10
Structure	Paper	Paper	Paper	Paper	Paper
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level
Color	White	White	White	White	White
Fungal Development	None	None	None	None	None
Smell	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 initiated	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

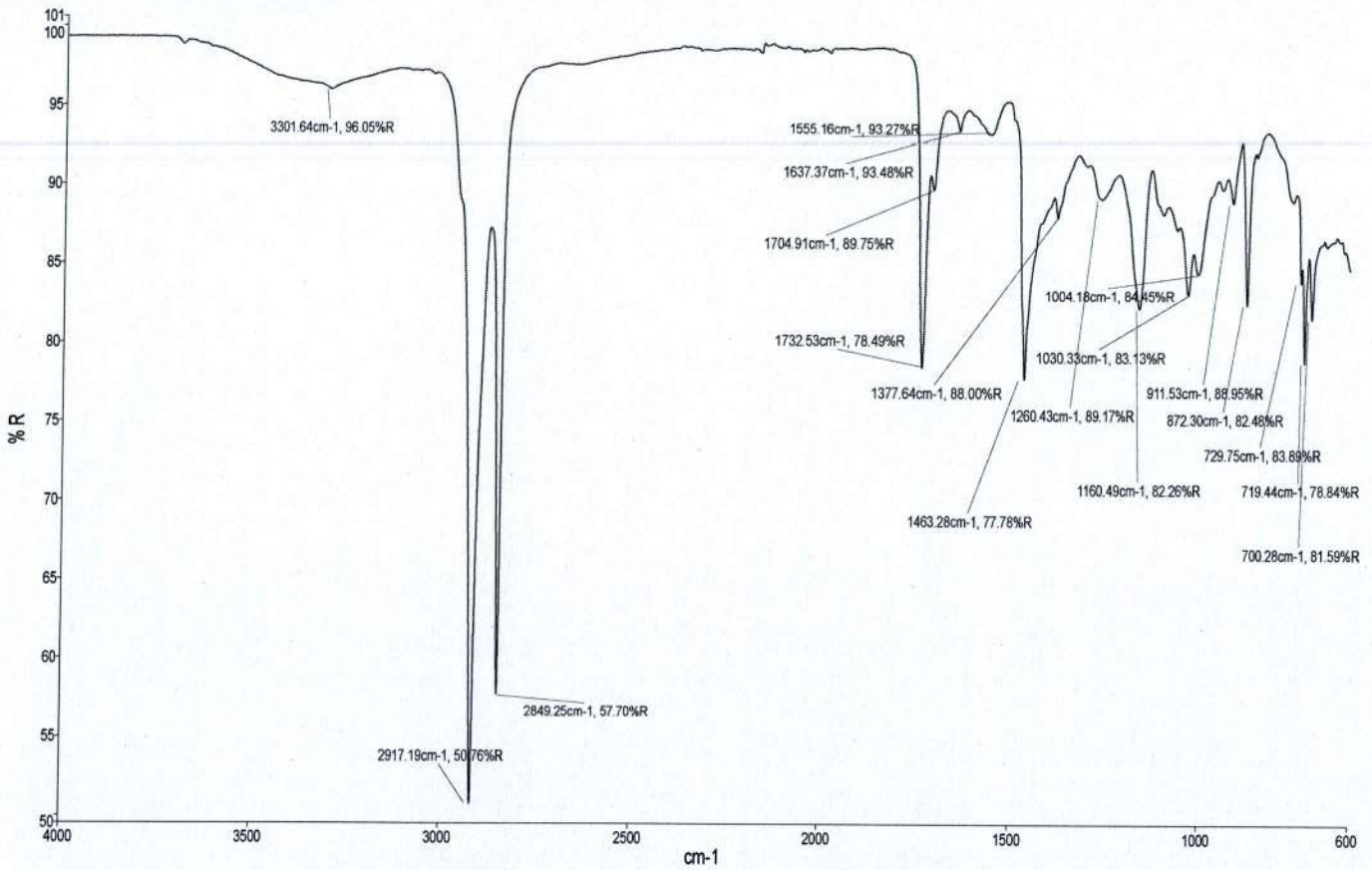
	Week 16	Week 17	Week 18	Week 19	Week 20
Structure	Disintegration observed	Disintegration observed	Disintegration observed	Disintegration observed	Disintegration observed
Moisture	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture Level	Appropriate moisture 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 21	Week 22	Week 23	Week 24	Week 25/26
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


Mr. Pinaki Chatterjee
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6. FTIR Analysis:-

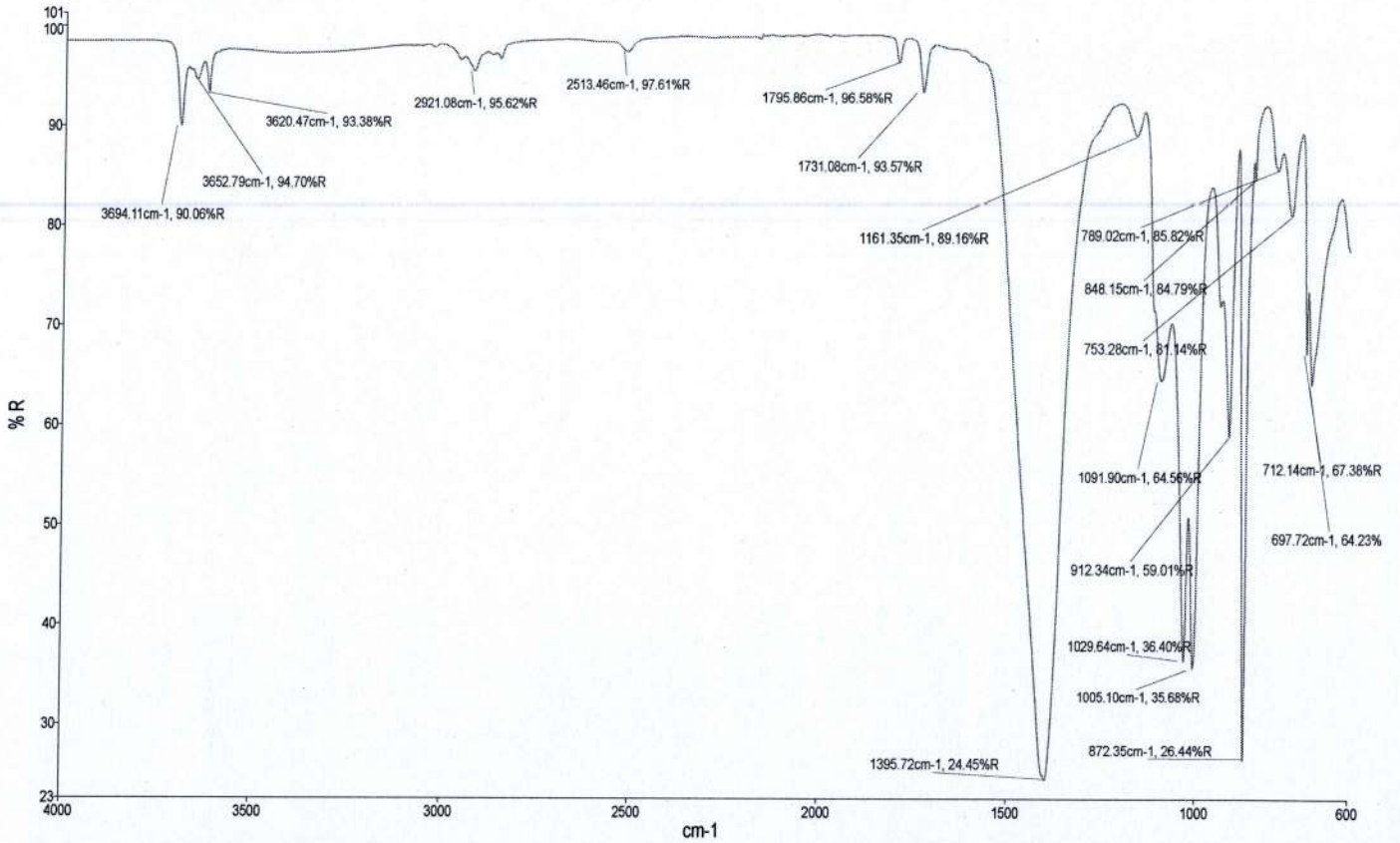


Wave number (cm ⁻¹)	Possible Nature of Bond
2917.19, 2849.25	CH Stretch
1704.91, 1732.53	C=O Stretch
1463.28	CH Bend
719.44	CH ₂ Rock

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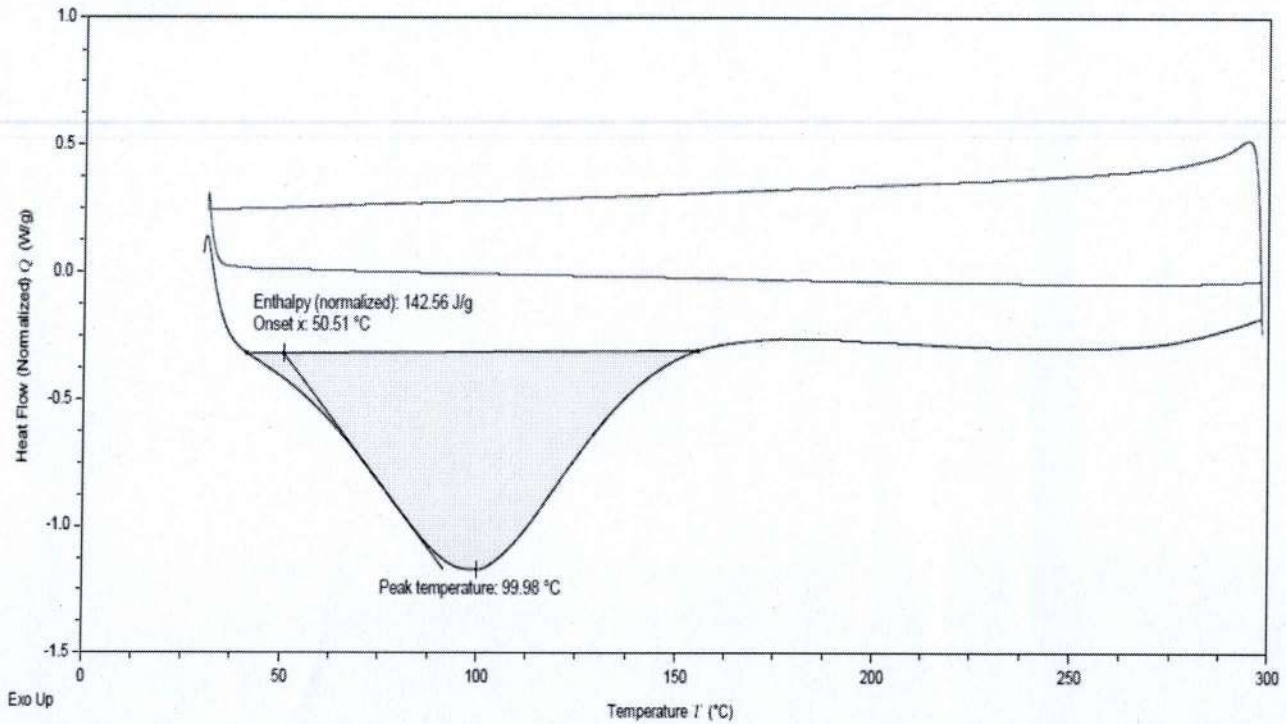
6.1 FTIR Analysis:-



Wave number (cm ⁻¹)	Possible Nature of Bond
1395.72	V ₃ Asymmetric stretch
872.35	V ₂ out of plane bend
712.14	V ₄ In plane bend

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7. DSC Analysis:-

Comment: DSC & FTIR graph indicates the above sample is Paper material , one side ethylene acrylic based dispersion coating & other side CaCO₃ based dispersion coating.

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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.

Pinaki Chatterjee 09.10.2023

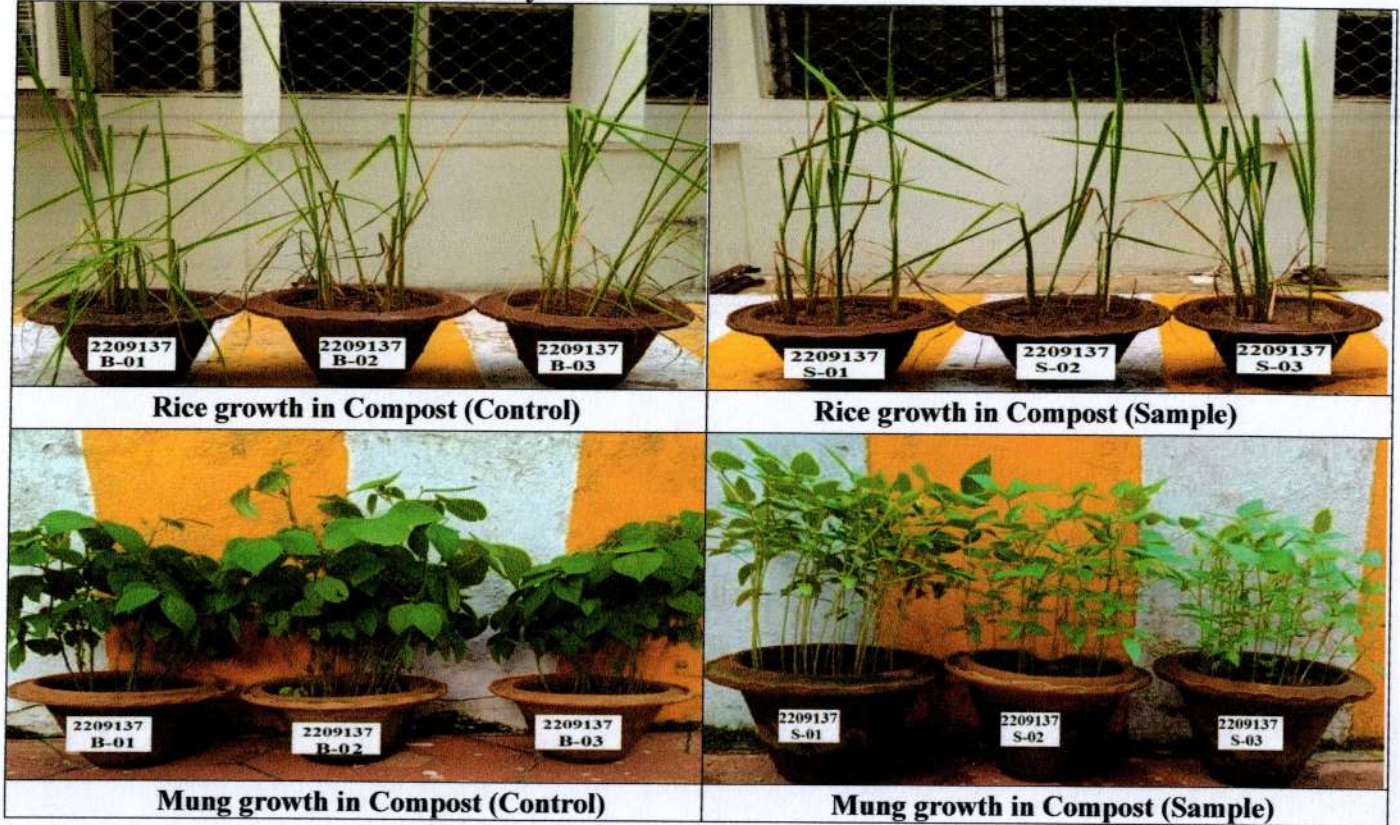
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Akshaya Kumar Palai 09.10.2023

Dr. Akshaya Kumar Palai
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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.

Mr. Pinaki Chatterjee
09.10.2023

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