

केंद्रीय पेट्रोरसायन अभियांत्रिकी एवं प्रौद्योगिकी संस्थान(सिपेट)

(पूर्व में केंद्रीय प्लास्टिक्स इंजीनियरिंग एवं तकनीकी संस्थान)
रसायन एवं पेट्रोरसायन विभाग
रसायन एवं उर्वरक मंत्रालय, भारत सरकार
प्लॉट नं. जे - 3/2, एम.आई.डी.सी औद्योगिक क्षेत्र,
चिकलथाना, औरंगाबाद. - 431006
फोन. : 0240 -2478302-334
ईमेल : aurangabad@cipet.gov.in
वेबसाइट : www.cipet.gov.in
मुख्यालय : सिपेट, गिण्डी,चेन्नई-६०० ०३२



Central Institute of Petrochemicals Engineering & Technology (CIPET)
(Formerly Central Institute of Plastics Engineering & Technology)
Department of Chemicals & Petrochemicals,
Ministry of Chemicals & Fertilizers, Govt. of India
Plot No. J-3/2, MIDC Industrial Area,
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Tel. : 0240-2478302-334
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Head Office : CIPET, Guindy, Chennai-600 032



कोरियर / स्पीड पोस्ट / बाय हेन्ड

Courier / Speed Post / By Hand

क्र.:सिपेट : सी एस टी एस/औ.बाद/परीक्षण/कार्य आदेश/(1371/2024-25)2024-25/206

दिनांक: 28.04.2025

प्रति,

VAPAC BIO-PLASTICS PVT. LTD.
Unit 1, Sy. No. 92, Lakya Village,
Chikkamagaluru- 577168, KA, IN.

विषय : परीक्षण हेतु।

संदर्भ : Letter.

दिनांक: 28.09.2024.

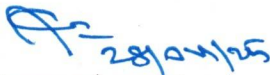
महोदय,

कृपया हमारी परीक्षण रिपोर्ट क्रमांक : 32348 along with Annexure दिनांक: 25.04.2025 प्राप्त करें।

संलग्न कस्टमर फीड बैंक फार्म भरकर वापस भेजने का कष्ट करें।

धन्यवाद,

भवदीय,



निदेशक एवं प्रमुख

संलग्न : उपरोक्तानुसार

सिपेट : सेन्टर फॉर स्किलिंग एण्ड
टेक्निकल सपोर्ट (सी एस टी एस)

रसायन एवं पेट्रो रसायन विभाग
रसायन एवं उर्वरक मंत्रालय, भारत सरकार
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मुख्यालय : सिपेट, गिण्डी, चेन्नै-600 032



सिपेट CIPET



CIPET : CENTRE FOR SKILLING AND
TECHNICAL SUPPORT (CSTS)

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

Plot No. J-3/2, MIDC Industrial Area,
Chikalthana, Aurangabad - 431006.

Tel. : 0240-2478310,312,302

E-mail : aurangabad@cipet.gov.in

Website : www.cipet.gov.in

Head Office : CIPET, Guindy, Chennai-600 032

श्रेणी / SERIES : A

क्रं / No. 29095

प्लास्टिक्स परीक्षण केंद्र
PLASTICS TESTING CENTRE

परीक्षण रिपोर्ट / Test Report

Issued to:

VAPAC BIO-PLASTICS PVT. LTD.
Unit 1, Sy. No. 92, Lakya Village,
Chikkamagaluru- 577168, KA, IN.

Test Report No : 32348
Dated : 25.04.2025
Your Ref : Letter
Dated : 28.09.2024

Page No. 1 of 3

Test Report

PART - A

PARTICULARS OF SAMPLE SUBMITTED

a) Name of Sample	:	"Bio Compostable Product Samples Compostable blow film samples
b) Grade/Variety/Type/Size/Class	:	used to produce carry bags, grocery bags, integral packaging bags, retail packaging bags, nursery bags, garbage bags, biohazard bags, protective packaging layers, meat and dairy packaging bags" as stated by party
c) Declared value, if any	:	Vapac Bio-Plastics produces eco-friendly bioplastic products using a blend of PBAT (Polybutylene Adipate Terephthalate), PLA (Polylactic Acid) - (As indicated on enclosed Annexure-A)
d) Code No	:	Nil
e) Batch No. and Date of Manufacturing	:	27.09.2024 - (As indicated on letter)
f) Quantity	:	01 kg (approx) x 02 No's.
g) Mode of Packing	:	Packed in Carton
h) Sealed or not	:	Not Sealed
i) Date of Receipt	:	10.10.2024
j) Date (s) of Performance of Test	:	10.10.2024 to 25.04.2025
k) Any other information	:	1 kg Sample VAPAC - (As manuscripted on sample packing)

PART - B

SUPPLEMENTARY INFORMATION

i) Reference to sampling procedure	:	Samples supplied by Party
ii) Supporting documents for the measurement taken and results derived	:	As given in Part C
iii) Deviation from the test method as prescribed in relevant work instruction, if any	:	Nil

25/4/25

25.04.2025



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Unit 1, Sy. No. 92, Lakya Village,
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PART-C					
Test Result					
Sl. No	Name of test	Test Method	Unit	Test Result	Specified requirements
01	Material Identification	FTIR / DSC	--	Polybutylene Adipate co Terephthalate Based Polymer	Polybutylene Adipate co Terephthalate / Poly Lactic Acid. <i>(As declared by party)</i>
02	Disintegration (Dry mass remains in 2mm sieve after 84 days)	Cl. 6.2 of IS/ISO 17088 : 2021	%	4.63	Not more than 10
03	Ultimate aerobic Biodegradation (with reference to 100% degradation of positive reference)	Cl. 6.3 of IS/ISO 17088 : 2021	%	93.00 % (At the end 105 days)	>90% (At the end of the test period not more than 180 days)
Plant Growth study					
04	Monocotyledon (corn) % Seed emergence	Cl 6.4.3 IS/ISO 17088 : 2021	%	94	>90
	Dicotyledon (chickpeas) % Seed emergence		%	96	>90
05	*Acute Ecotoxic Effects of Earthworm				
a.	Survival of adult earthworm at the end of 7 days	IS/ISO 17088 : 2021 Cl.No.6.4.4	%	100	>90
b.	Survival of adult earthworm at the end of 14 days		%	95	>90
c.	Biomass end of the 14 days		%	93	>90
06	Chronic ecotoxic effects to earthworm				
a.	Survival of adult earthworm at the end of 28 days	IS/ISO 17088 : 2021 Cl.No.6.4.5	%	92	>90
b.	Survival of adult earthworm at the end of 56 days		%	94	>90
c.	Offspring at the end of 56 days		%	95	>90
d.	Biomass end of the 56 days		%	94	>90

Note: The detailed observation on Biodegradability test is enclosed as Annexure.

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25/10/25

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25/10/25



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Page No. 3 of 3

Test Result					
Sr. No.	Name of the test	Test Method/ Standard	Unit	Results Obtained	Specified Requirements
07	*Heavy metals Concentration				
1.	Arsenic (As)	Cl.No. 6.5.2 of IS/ISO-17088:2021	mg/l	0.3142	10
2.	Copper (Cu)			0.1060	300
3.	Nickel (Ni)			0.0699	50
4.	Zinc (Zn)			0.4779	1000
5.	Cobalt(Co)			--	--
6.	Chromium (Cr)			0.0262	50
7.	Molybdenum (Mo)			0.0014	--
8.	Mercury (Hg)			0.0000	0.15
9.	Cadmium (Cd)			0.0001	5
10.	Lead (Pb)			0.0369	100
11.	Selenium (Se)			0.0000	--
(*) – Based on the solid waste management Rules, 2016 notified on 08 th April 2016 by Ministry of Environment, Forests & Climate Change, and Government of India.					
PART-D					
Remarks: Nil					
NOTE :					
01 This Test Report/ Certificate are issued only for the samples submitted to the laboratory.					
02 The results stated above related only to the items tested.					
03 The quality of the subsequent production lot has to be ensured by the purchaser.					
04 This Test Report shall not be reproduced except in full without the written approval of the laboratory.					
05 Any anomaly/discrepancy in this report should be brought to the notice of the laboratory within 30 days from the date of issue.					
06 Subcontracted Tests (if any): *Heavy metals Concentration Test Subcontracted from CIPET: SARP (APDDRL), Bengaluru.					

Reviewed by / Authorized Signatory
M.V. Kranthi Kumar
Sr. Tech. Asst.

Authorized Signatory
Kirankumar V. Koli
Technical Officer

ANALYSIS RESULT

Test Report No. : 32348

Page No. 1 of 6
Dated. 25.04.2025OBSERVATION FOR BIODEGRADABILITY TEST AS PER ISO 17088: 2021**Name of the Party :-**VAPAC BIO-PLASTICS PVT. LTD.
Unit 1, Sy. No. 92, Lakya Village,
Chikkamagaluru- 577168, KA, IN.**Customers Details****1. Sample Details (As stated the party)**

: "Bio Compostable Product Samples Compostable blow film samples used to produce carry bags, grocery bags, integral packaging bags, retail packaging bags, nursery bags, garbage bags, biohazard bags, protective packaging layers, meat and dairy packaging bags" - (As indicated on letter)

2. Material Identification by FTIR & DSC


: Polybutylene Adipate co Terephthalate Based Polymer

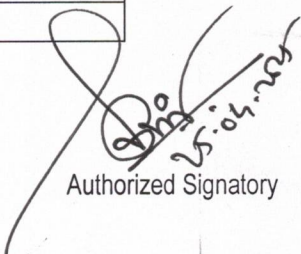
3. Observation:a. Conditions of reaction mixtures

Origin of Compost : Livestock excrement, municipal & vegetable
 Reaction Temperature : 58°C ($\pm 2^{\circ}\text{C}$)
 Dry Solid (%) : 56.73 %
 Volatile Content (%) : 54.36 %
 CO2 evolved during first 10days in blank vessels : 75.07 mg/g of volatile solids of compost.
 Test duration : 105 days
 Reference material : Cellulose
 Volume of reaction vessel : 3000ml

b. pH of test Medium:

Sr. No.	Composting vessel	pH (before)	pH (after)
1	Blank 1	7.5	7.0
2	Blank 2	7.5	7.5
3	Blank 3	7.0	7.0
4	Cellulose 1	8.0	7.5
5	Cellulose 2	7.5	8.0
6	Cellulose 3	7.0	7.5
7	Negative 1	7.5	7.5
8	Negative 2	7.0	7.0
9	Negative 3	7.5	7.0
10	Sample-1	7.5	7.5
11	Sample -2	7.0	7.0
12	Sample - 3	8.0	7.5

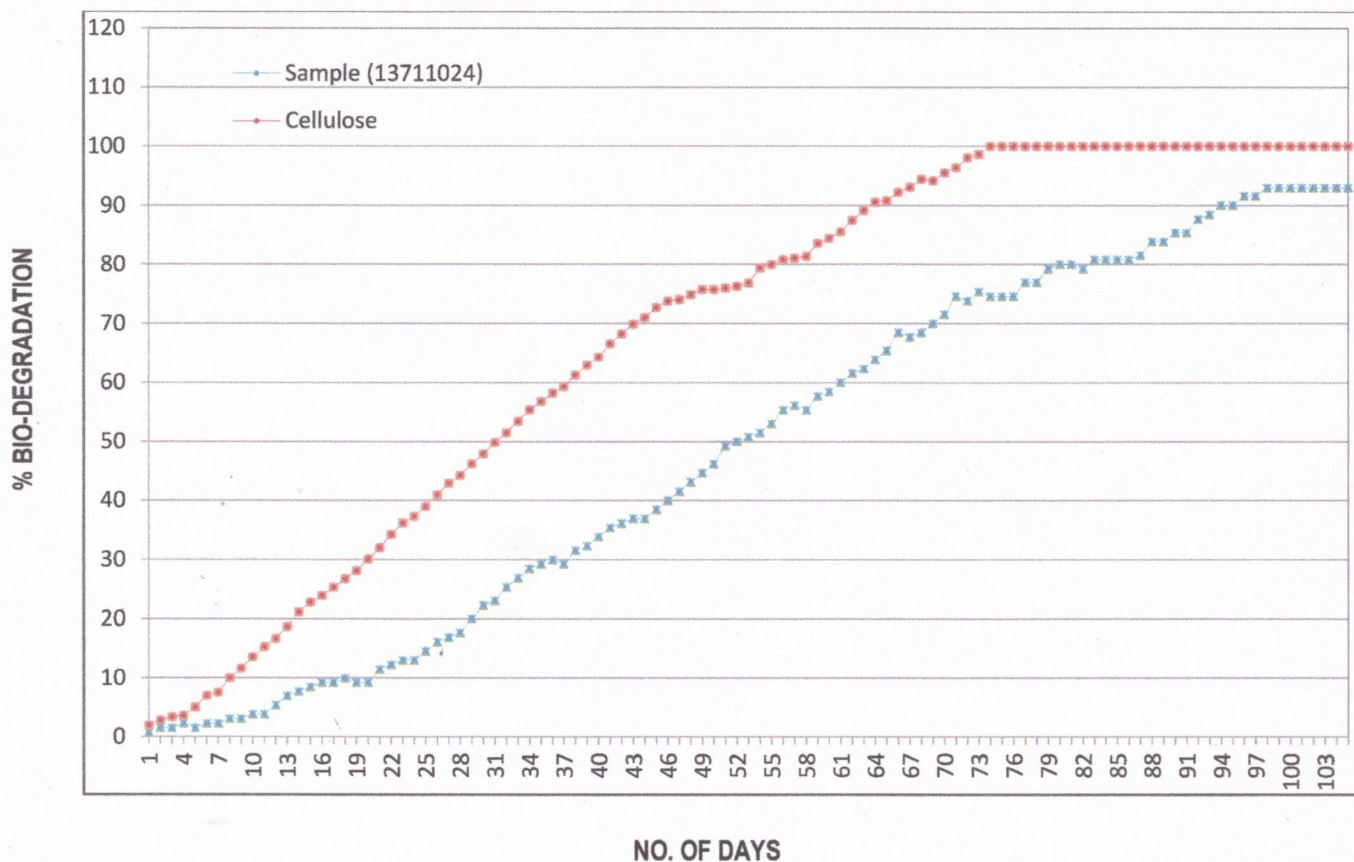

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4. Result: Percentage Biodegradation relative to positive reference

Mean (%): 93.00 %

The Reference material-cellulose (%): 100.00 %



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Test Report No. : 32348

ANALYSIS RESULT

5) Visual Observation of sample:

Description	Week 1/2	Week 3/4	Week 5/6	Week 7/8
Structure	Square Film	Square Film	Cracks on surface	Broken into the pieces
Moisture	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level
Colour	White color	White color	light Brown	light Brown
Fungal Development	None	None	None	None
Smell	No smell	No smell	Organic/Dirt like	Organic/Dirt like
Description	Week 9/10	Week 11/12	Week 13/14	Week 15
Structure	Broken into the pieces	Converted into small Particles	small pieces well mixed with compost	small pieces well mixed with compost
Moisture	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level
Colour	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Fungal Development	None	None	None	None
Smell	Organic/Dirt like	Organic/Dirt like	Organic/Dirt like	Organic/Dirt like

5) Visual Observation of Compost:

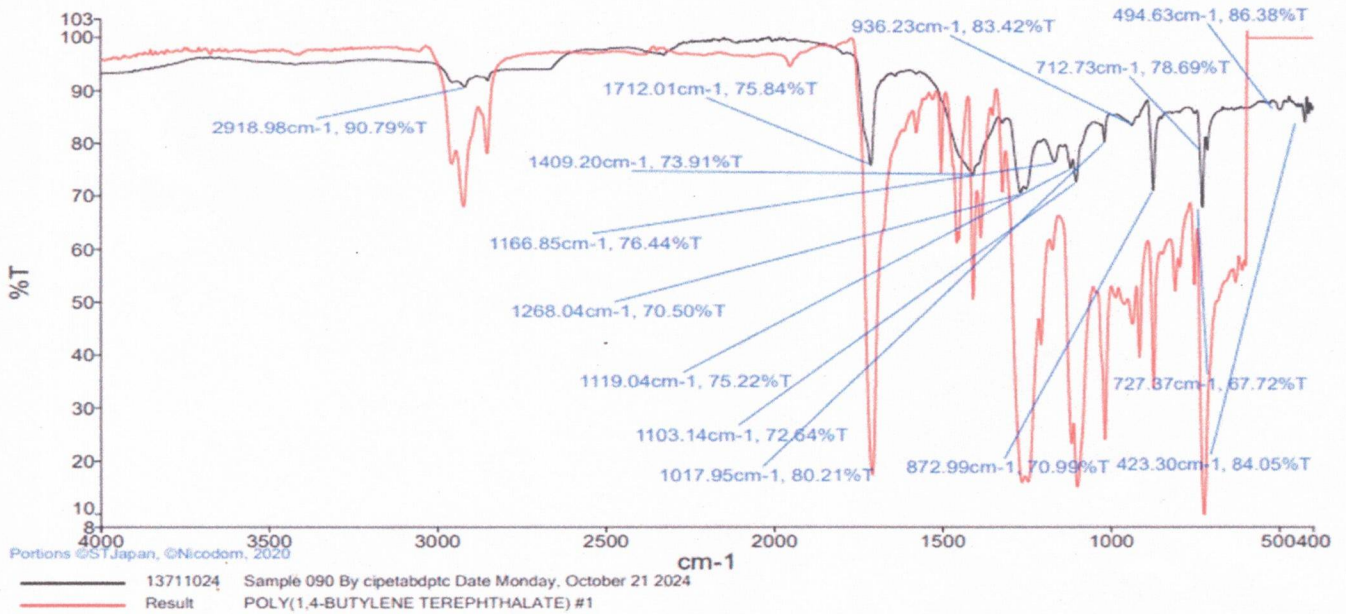
Description	Week 1/2	Week 3/4	Week 5/6	Week 7/8
Structure	Fine Particles	Fine Particles	Fine Particles	Fine Particles
Moisture	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level
Colour	Dark brown	Dark brown	Dark brown	Dark brown
Fungal Development	None	None	None	None
Smell	No smell	No smell	Organic/Dirt like	Organic/Dirt like
Description	Week 9/10	Week 11/12	Week 13/14	Week 15
Structure	Fine Particles	Fine Particles	Fine Particles	Fine Particles
Moisture	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level	Appropriate Moisture level
Colour	Dark brown	Dark brown	Dark brown	Dark brown
Fungal Development	None	None	None	None
Smell	Organic/Dirt like	Organic/Dirt like	Organic/Dirt like	Organic/Dirt like

Manish
25/4/25
Authorized Signatory

Manish
25-04-2025
Authorized Signatory

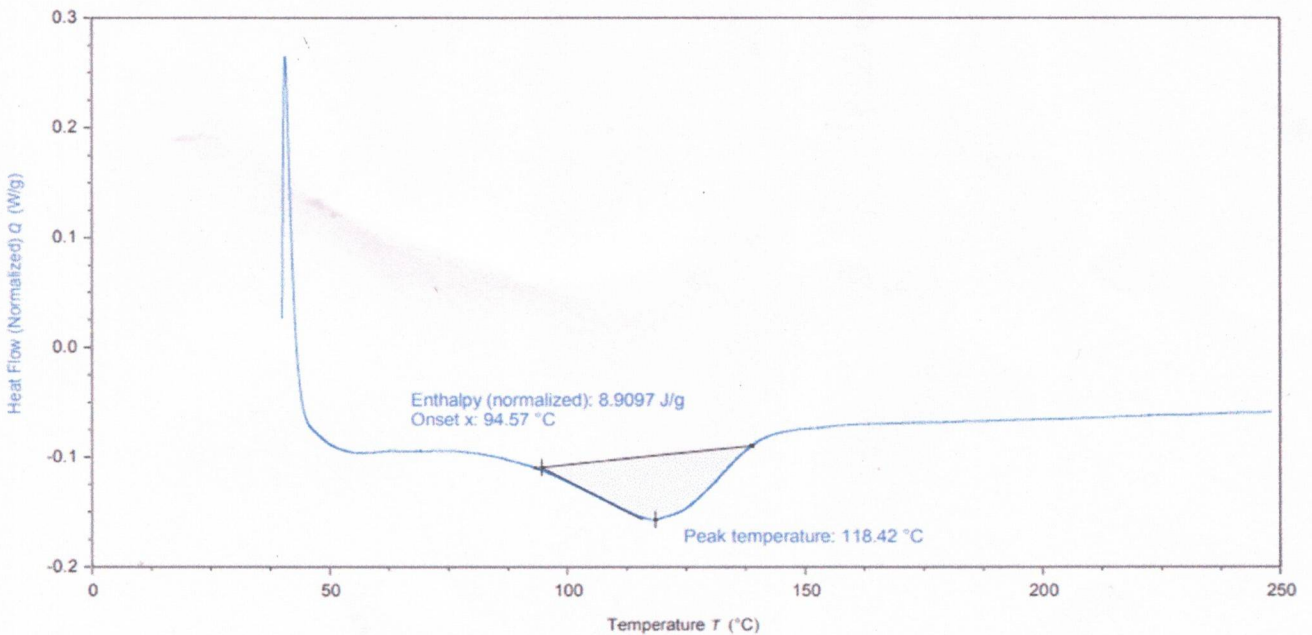
6. FTIR Analysis: Polybutylene Adipate co Terephthalate Based Polymer

Sample Details: "Bio Compostable Product Samples Compostable blow film samples used to produce carry bags, grocery bags, integral packaging bags, retail"-as stated by the party



7. DSC Analysis:

13711024(4)

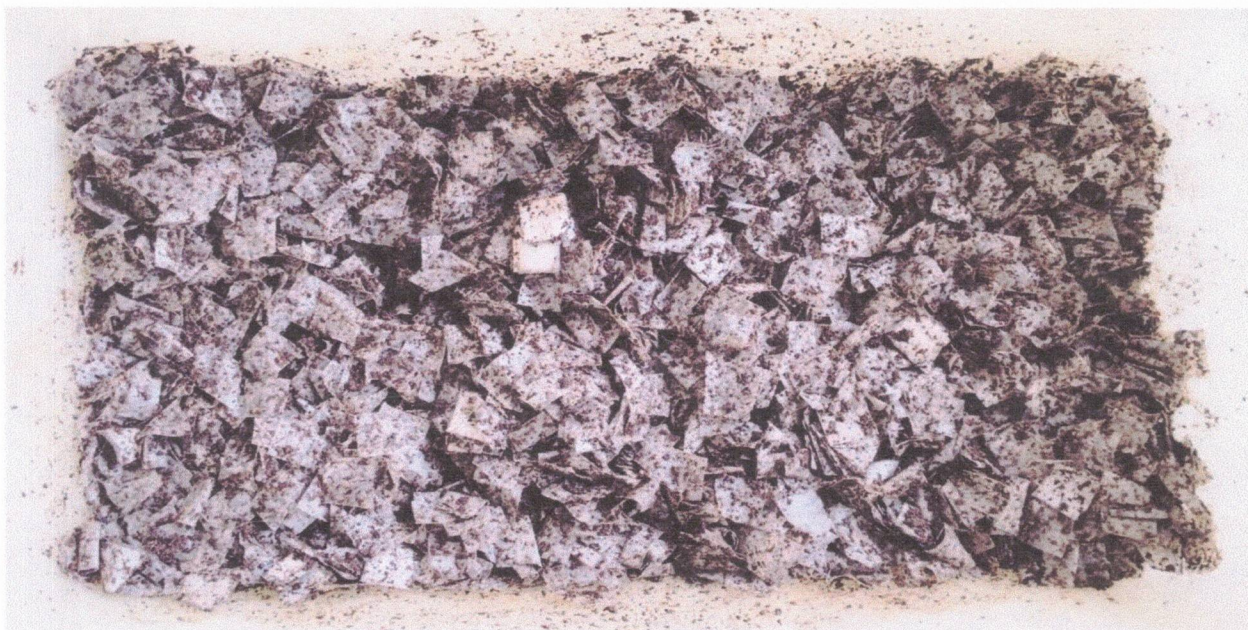


Comments: The above DSC & FTIR analysis indicates the submitted sample is Polybutylene Adipate co Terephthalate Based Polymer

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8. DISINTEGRATION – AFTER 15 WEEKS



BEFORE DISINTEGRATION



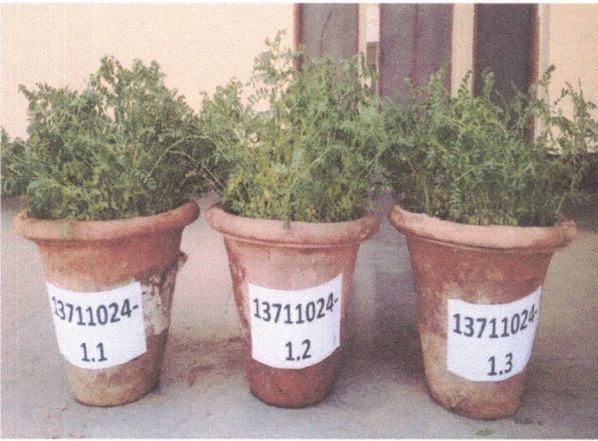

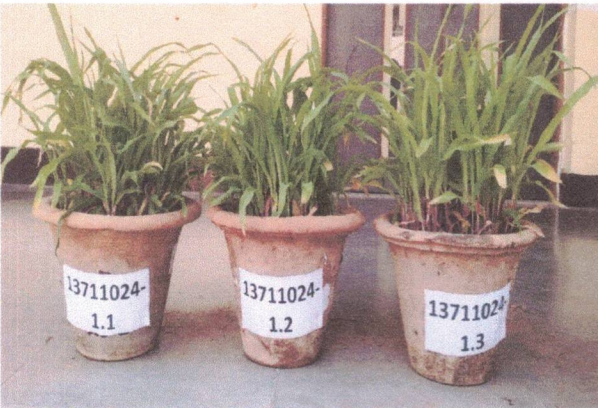

AFTER DISINTEGRATION

The disintegration of the supplied sample by passing through 2mm sieve after 15 week in composting condition as per - IS/ISO 17088: 2021 was found not more than 10% of original dry mass remain.

10/04/25
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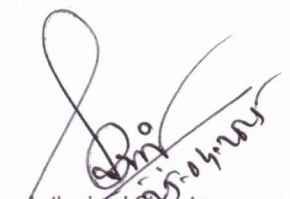
25-04-2025
Authorized Signatory

9. GERMINATION AND PLANT GROWTH STUDY

 <p>COMPOST + SAMPLE (DICOT)</p>	 <p>COMPOST (DICOT)</p>
 <p>COMPOST + SAMPLE (MONOCOT)</p>	 <p>COMPOST (MONOCOT)</p>

The Percentage of Seed Germination rate is found to be greater than 90% for both **Compost** and **Sample**.


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