

सिपेट : पेट्रोकेमिकल्स तकनीकी
संस्थान (आई.पी.टी.)

(पूर्व में केंद्रीय प्लास्टिक्स इंजीनियरिंग एवं तकनीकी संस्थान)

रसायन एवं पेट्रो-रसायन विभाग
रसायन एवं उर्वरक मंत्रालय, भारत सरकार
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प्लास्टिक परीक्षण केंद्र / PLASTIC TESTING CENTRE

ANALYSIS REPORT

श्रृंखला:बी / Series :B

परीक्षण रिपोर्ट / TEST REPORT

क्र.सं / S.L. No. **18953**

को जारी / Issued to : **KARAN STAMPINGS Pvt. Ltd**
29-B, Maharajpura Industrial Area,
Maharajpura, Gwalior- 474020(M.P.)

रिपोर्ट सं / Test Report No : **693**
दिनांक / Dated : **17.11.2023**
संदर्भ / Your Ref. No. : **NILL**
दिनांक / Dated : **10.05.2023**

मानक के अनुसार टेस्ट रिपोर्ट
Test Report as per Standard : **As per part C**

PART A

ULR No. TC81642300003891P

PARTICULARS OF SAMPLE SUBMITTED

- a) Name of the sample(as stated by the party) : **Compostable Film**
b) Grade/Variety/Type/Size/Class etc. : ---
c) Code No. : ---
d) Quantity (pcs/mtr/gm/nos) : **1.6 kg.**
e) Mode of packing : **In Sealed Carton**
(Sealed carton/poly pouch/container or not)
f) Date of receipt of sample : **10.05.2023**
g) Date of Performance of test : **12.05.2023**
h) Any other information : ---

PART B

SUPPLEMENTARY INFORMATION

- a) Reference to sampling procedure : **Drawn & supplied by the party**
b) Supporting documents for Measurements : **As per Part C**
Taken and results derived like graphs,
Tables, sketches and/or Photographs as
appropriate to test report if any (to be attached)
c) Deviation from the test methods as : **Not Applicable**
Prescribed in relevant ASTM/ISO/BIS/
Work instructions, if any


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PART C
TEST RESULTS

Sr. No.	Name of the Test	Test Method/Standard	Unit	Results obtained	Specified Requirements	
Sample Details : Compostable Film (As stated by the party)						
1.	Material Identification	FTIR/DSC	--	Blends of PLA/PBAT	-----	
2.	Disintegration(Dry mass passing through 2 mm sieve after 84 days)	ISO 17088:2021 Cl.6.2.1	%	8.8	Not more than 10%	
3.	Ultimate aerobic Biodegradation (with reference to 100% degradation of positive reference	ISO 17088:2021 Cl.6.3.1	%	92.55	>90 (At the end of the test period not more than 180 days)	
4.	Plant growth study- Monocotyledon(Sorghum) % Seed emergence	ISO 17088:2021 Cl.6.4.3	%	93	>90	
				92	>90	
5.	Acute Ecotoxic effects to earthworm a. Survival adult earthworm at the end of 7 days	ISO 17088:2021 Cl.6.4.4	%	100	>90	
				b. Survival adult earthworm at the end of 14 days	97	>90
				c. Biomass at the end of 14 days	94	>90
6.	Chronic Ecotoxic effects to earthworm a. Survival adult earthworm at the end of 28 days	ISO 17088:2021 Cl.6.4.5	%	95	>90	
				b. Survival adult earthworm at the end of 56 days	93.5	>90
				c. Biomass at the end of 56 days	92.15	>90
				d. Offspring at the end of 56 days	92	>90

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


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PART C
TEST RESULTS

Sr. no.	Name of the Test	Test Method/Standard	Unit	Results obtained	Specified requirements
7.	Heavy metals concentrations # Arsenic (As) Copper (Cu) Nickel (Ni) Zinc (Zn) Cobalt (Co) Chromium (Cr) Molybdenum (Mo) Mercury (Hg) Cadmium (Cd) Lead (Pb) Selenium (Se)	ISO 17088:2021	Mg/l	B.L.Q.(Q.L.=0.05) 3.46 2.31 16.06 B.L.Q(Q.L.=0.05) 2.34 0.17 B.L.Q(Q.L.=0.05) B.L.Q(Q.L.=0.05) 0.36 0.055	20 500 100 2500 ---- 300 ---- 10 20 500 -----

*Based on Municipal waste (Management and Handling) Rules, 1999 notified on 27th September, 1999 by Ministry of Environment and Forests, Government of India. Note that Concentration of Metals like Cobalt, Molybdenum, and Selenium is not mentioned in the notification.

PART D

REMARKS : Nil

Note :

1. This Test Report / Certificate is issued only for the samples submitted to the laboratory.
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 the laboratory within 30 days from the date of issue.
6. Subcontracted Tests (if any): # Gujarat Laboratory


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Annexure-I

OBSERVATION FOR BIODEGRADABILITY TEST AS PER IS /ISO 17088:2008

Customers Details:

Name of the Party :- KARAN STAMPINGS Pvt. Ltd

1. Sample Details : Compostable Film (As declared by the party)

2. Material Identification by FTIR & DSC : Blends of poly lactic Acid (PLA)/ Poly Butylene Adipate Co-Terephthalate (PBAT)

3. Observation:-


a) Conditions of reaction mixtures

Origin of Compost	: Livestock excreta, municipal and vegetable waste
Reaction Temperature	: 58° (±2°C)
Dry Solid	: 51.9 %
Volatile Solid	: 37.8 %
Co ₂ evolved during 1 st 10 days in blank vessels	: 50.06 mg/g of volatile solids of compost
Test Duration	: 130 Days.
Reference Material	: Cellulose.
Volume of reaction vessel	: 3000ml.

b) pH of Test medium

Sl. No.	Composting Vessel	pH (before test)	pH (after test)
1	Blank 1	7.6	7.6
2	Blank 2	8.1	8.3
3	Blank 3	7.9	8.5
4	Cellulose 1	7.4	8.1
5	Cellulose 2	7.5	8.0
6	Cellulose 3	8.5	7.8
7	Negative 1	7.1	7.6
8	Negative 2	8.2	7.4
9	Negative 3	7.5	7.5
10	Sample 1	8.2	7.7
11	Sample 2	8.0	7.3
12	Sample 3	7.9	7.1


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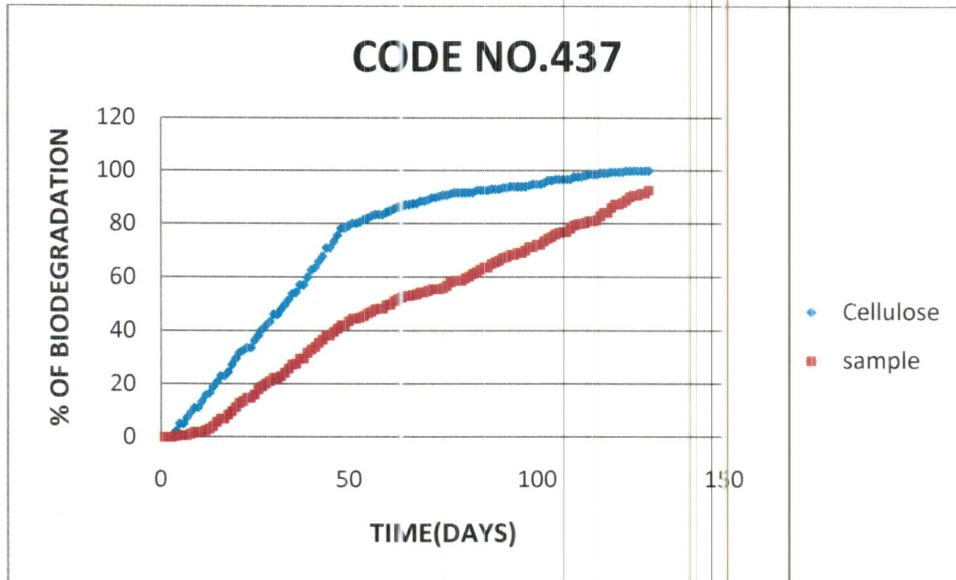
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4. Result : Percentage biodegradation relative to positive reference

MEAN (%) : 92.55 %

The reference material- Cellulose (%) : 100%




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5. Visual Observation of Sample

Description	Week 1	Week 5	Week 10	Week 15	Week 18
Structure	Film sample	Film sample	Film sample	Film sample	Film sample
Moisture	Adequate Moisture level	Adequate Moisture level	Adequate Moisture level	Adequate Moisture level	Adequate Moisture level
Colour	Milky white	Milky white	Milky white	Faded white	---
Fungal Development	Nil	Nil	Nil	Nil	Nil
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like

6. Visual Observation of Compost

Description	Week 1	Week 5	Week 10	Week 15	Week 18
Structure	Fine Particles	Fine Particles	Fine Particles	Fine Particles	Fine Particles
Moisture	Adequate moisture level	Adequate moisture level	Adequate moisture level	Adequate moisture level	Adequate moisture level
Colour	Dark Brown	Dark Brown	Dark Brown	Dark Brown	Dark Brown
Fungal Development	Nil	Nil	Nil	Nil	Nil
Smell	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like	Organic/dirt like


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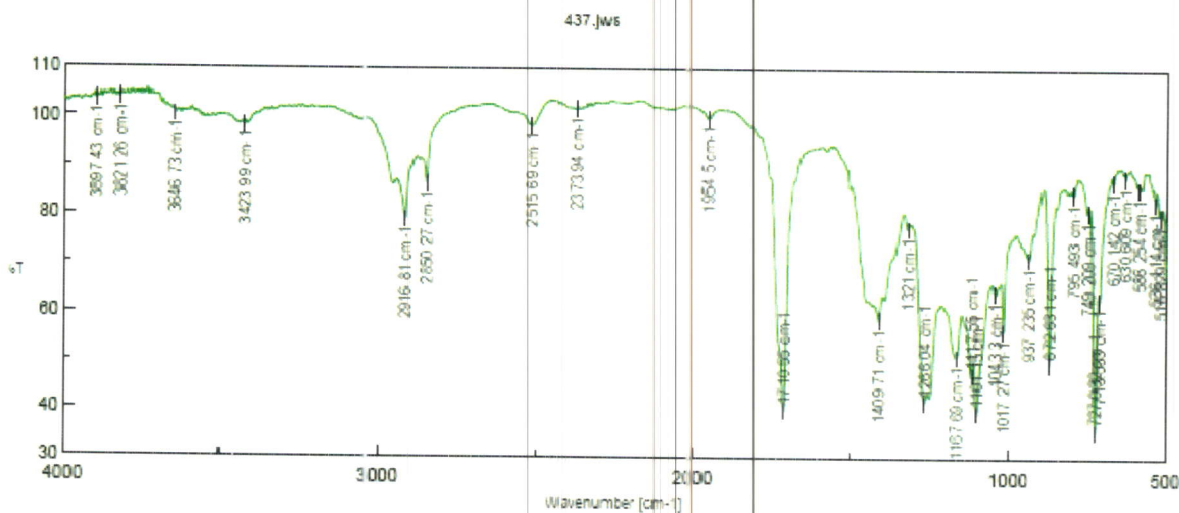
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7. FTIR Analysis

Sample Details : **Compostable Film** (As declared by the party)



Wave number (cm ⁻¹)	Nature of Bond
1)2916.81	C-H Stretching vibrations
2)1710.66	C=O Stretching vibrations
3) 1266.04	O-H Bending vibrations
4) 1017.27	C-N Stretching vibrations
5) 872.631	C=C Bending vibrations


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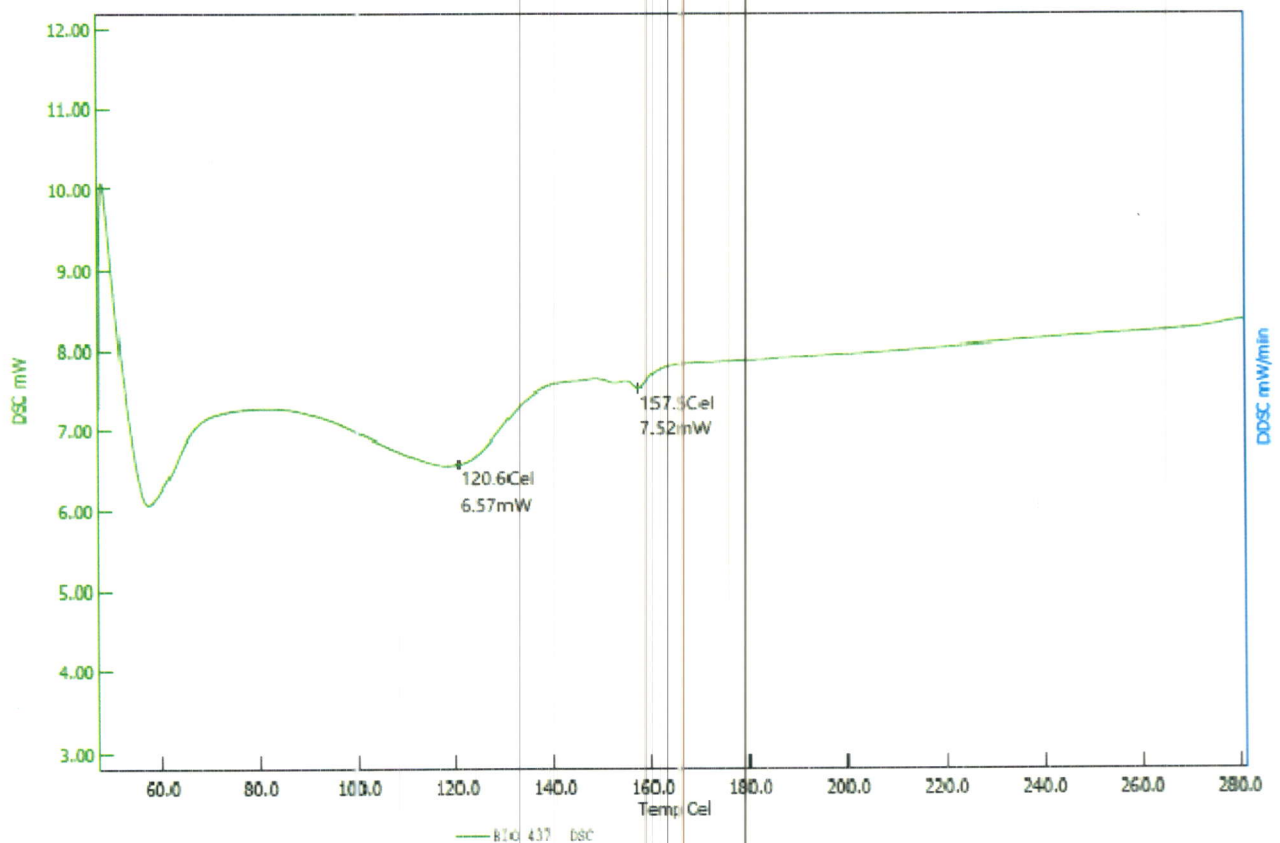
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8. DSC Analysis



Comment: The above FTIR & DSC analysis indicates the above sample is Blends of poly lactic Acid
(PLA)/ Poly Butylene Adipate Co- Terephthalate (PBAT) Compostable Film .


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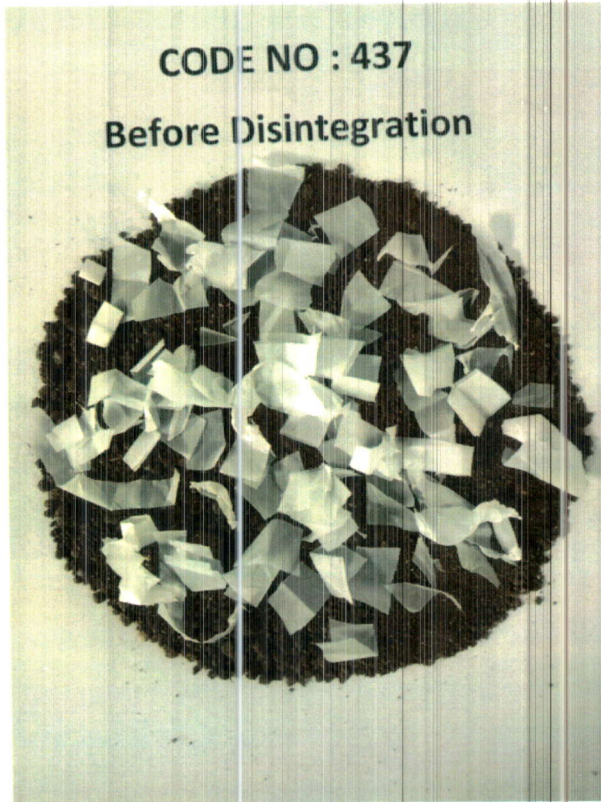
Department of Chemicals & Petrochemicals
Ministry of Chemicals & Fertilizers, Govt. of India
Plot No. 630, Phase-IV, G.I.D.C., Vatva, Ahmedabad-382445
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प्लास्टिक परीक्षण केंद्र / PLASTIC TESTING CENTRE

ANALYSIS REPORT

Report No.:693
Date : 17.11.2023

9. DISINTEGRATION - AFTER 12 WEEKS



BEFORE DISINTEGRATION



AFTER DISINTEGRATION

The disintegration of the sample by passing through 2 mm sieve after 12 week in composting condition as per ISO 17088-2021/ISO 17088: 2012 was found not more than 10% of original dry mass remain.


AUTHORISED SIGNATORY


AUTHORISED SIGNATORY
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सिपेट : पेट्रोकेमिकल्स तकनीकी
संस्थान (आई.पी.टी.)

(पूर्व में केंद्रीय प्लास्टिक्स इंजीनियरिंग एवं तकनीकी संस्थान)
रसायन एवं पेट्रो-रसायन विभाग
रसायन एवं उर्वरक मंत्रालय, भारत सरकार
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CIPET : INSTITUTE OF PETROCHEMICALS
TECHNOLOGY (IPT)

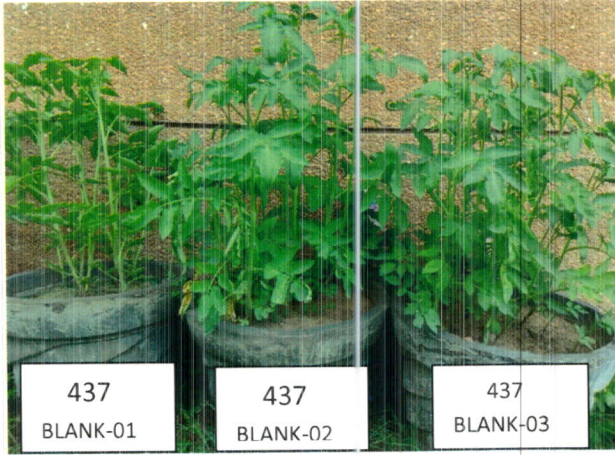
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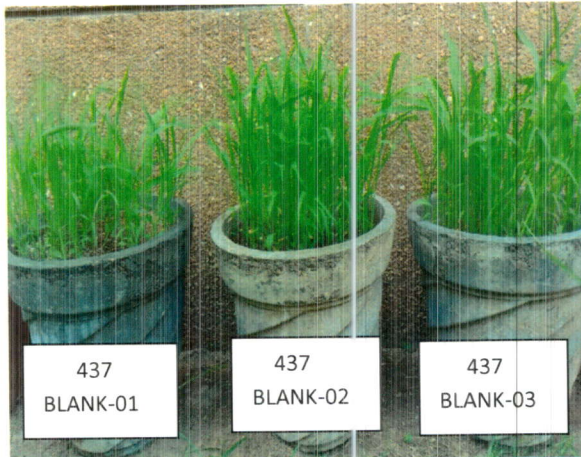
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10. GERMINATION AND PLANT GROWTH STUDY



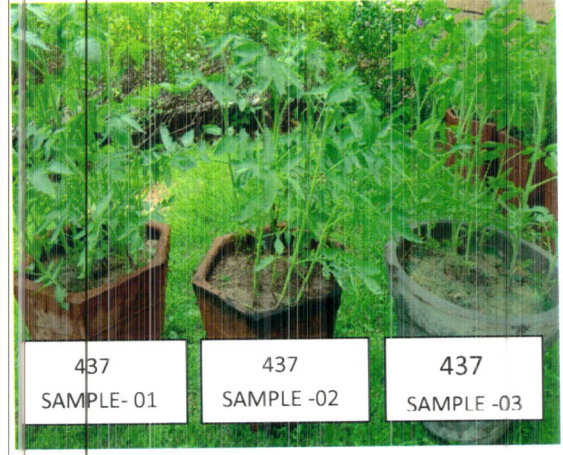
437 Compost (Control)



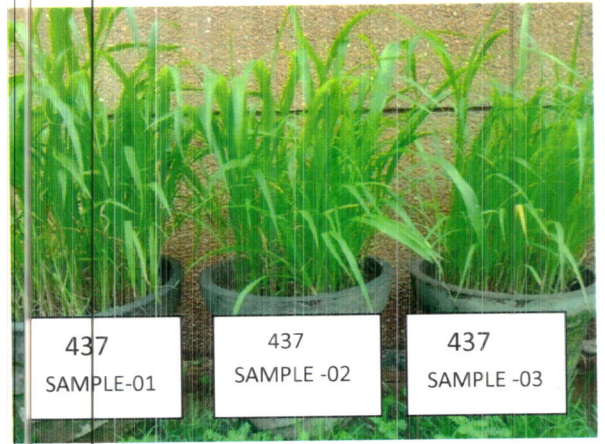
437 Compost (Control)

The percentage of seed germination rate if found to be greater than 90% for both Monocotyledon and Dicotyledon.


AUTHORISED SIGNATORY



437 Compost (Sample)



437 Compost (Sample)


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