



CIPET सिपेट
probe perform practice Plastics

परीक्षण रिपोर्ट

TEST REPORT

क्र.सं. / SI.No. 3900

ANALYSIS REPORT

Issued to :

M/s. Hi- Tech International

Plot No.18 , Sector -6

IMT Manesar, Gurugram.

Page 1 of 4

Test Report No : 22899

Date: 23.02.2023

Customer Ref. No. & date : Letter dt 29.07.2022

Work order Ref.No. : 293/22-23

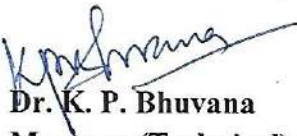
As per Standard: : As per part C

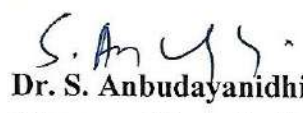
PART A : PARTICULARS OF SAMPLE SUBMITTED

a)Name of the sample	: Compostable Straws made out of 'Dr. Bio' polymer material as stated by the party
b)Grade / Variety / type / Size / Class etc.	: Nil
c)Code No.	: Nil
d)Quantity (pcs/mtr/gm/nos)	: 2 Kg
e)Mode of Packing	: Sealed carton
(Sealed cartoon/polypouch/container or not)	
f)Date of receipt of sample	: 11.08.2022
g)Date of Performance of test	: 05.09.2022 - 18.02.2023
h)Any other information	: Interim Report No. 22700 dt. 19.12.2022

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	: ---


Dr. K. P. Bhuvana
Manager (Technical)
Authorized Signatory


Dr. S. Anbudayanidhi
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TEST REPORT

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ANALYSIS REPORT

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PART C: TEST RESULTS

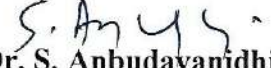
Report No.: 22899

Date: 23.02.2023

Sl. No	Name of the test	Test Method/ Standard	Unit	Results Obtained	Specified Requirement
Sample details: Compostable Straws made out of Dr. Bio polymer material as stated by the party					
1.	Material Identification	FTIR/DSC	--	Poly(lactic acid)(PLA)	--
2.	Disintegration (Dry mass remains in 2mm sieve after 84 days)	Cl. 6.2 of ISO 17088-2021	%	8.01	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	%	90.53 (at the end of 102 days)	> 90% (At the end of the test period not more than 180 days)
4.	Plant Growth study Monocotyledon(Paddy) % Seed emergence	Cl. 6.4.3 of ISO 17088:2021 (Annex C)	%	93	> 90% of those from the corresponding blank compost
	Dicotyledon(Tomato) % Seed emergence		%	92	

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


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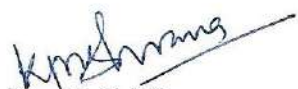
ANALYSIS REPORT

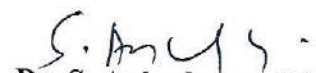
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PART C: TEST RESULTS

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Sl. No	Name of the test	Test Method/ Standard	Unit	Results Obtained	Specified Requirement
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		%	93.70	
6	Chronic Ecotoxic Effects to earthworm				
a.	Survival of adults 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.	Survival of adults earthworm at the end of 56 days		%	100	
c.	Offspring at the end of 56 days		%	94	
d.	Biomass at the end of 56 days		%	94.51	


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PART C: TEST RESULTS

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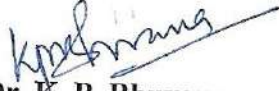
Date: 23.02.2023


Sl. No.	Property	Test method / Standard	Unit	Results obtained	Specified Requirements (Max)
7.	<u>Heavy Metal Analysis</u> (on dry mass basis) Arsenic (As) Copper (Cu) Nickel (Ni) Zinc (Zn) Chromium (Cr) Mercury (Hg) Cadmium(Cd) Lead (Pb)	Cl. 6.5.2 of ISO 17088:2021/Cl.4.3 of IS 17899 T:2022	mg / kg	0.1217 0.7555 0.0249 1.2803 0.0101 0.0049 0.0057 1.2003	10.00 300.00 50.00 1000.00 50.00 0.15 5.00 100.00

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): S.No.1.


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ANNEXURE-I

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TR. NO.: 22899

ANALYSIS RESULT

Date: 23.02.2023

OBSERVATION FOR BIODEGRADABILITY TEST AS PER ISO 17088:2021

Name of the Customer :

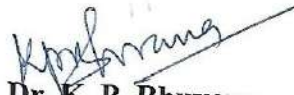
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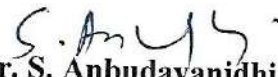
- 1. Sample Detail:** Compostable Straws made out of 'Dr. Bio' polymer material as stated by the party
- 2. Material Identification by FTIR & DSC:** Poly (lactic acid) (PLA)

3. Observations:

a. Conditions of reaction Mixture

Origin of Compost	: Livestock excrement, municipal and vegetable waste
Reaction Temperature	: 58°C (±2°C)
Dry Solid (%)	: 55.18 %
Volatile content (%)	: 35.36%
CO ₂ evolved during 1 st 10 days in blank vessels	: 66.64 mg/g of volatile solids of compost
Test Duration (Days)	: 102 Days
Reference material	: Cellulose
Volume of reaction Vessel	: 3000ml


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ANALYSIS RESULT

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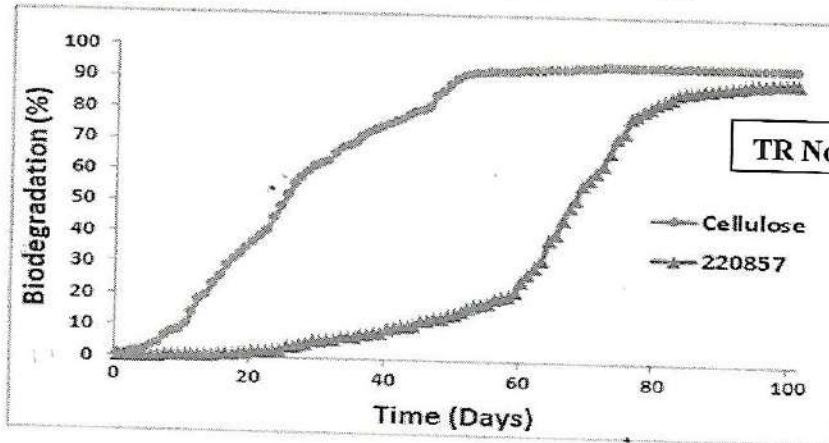
b. pH of test medium


Sl. No	Composting Vessel (Material with test medium)	pH (Before)	pH (After)
1	Sample 1	7.5	7.2
2	Sample 2	7.5	7.3
3	Sample 3	7.5	7.2
4	Blank	7.5	7.1
5	Positive 1	7.5	7.2
6	Positive 2	7.5	7.2
7	Positive 3	7.5	7.2
8	Negative	7.5	7.1

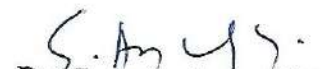
4. Result: Percentage biodegradation relative to positive reference

Mean (%) : 90.53%

The reference material- cellulose (%) : ~100%




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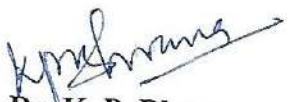
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5. Visual observation of Sample

Description	Week 1	Week 5	Week 9	Week 11	Week 14
Structure	Straw Sample	Disintegrated straw	Disintegrated straw	--	--
Moisture	Adequate moisture level	Adequate moisture level	Adequate moisture level	Adequate moisture level	Adequate moisture level
Colour	Green	Green	Green	--	--
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 9	Week 11	Week 14
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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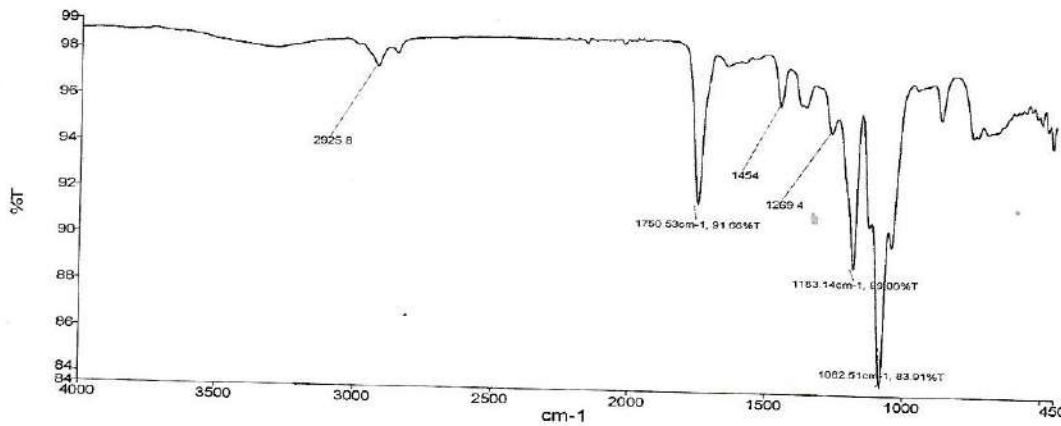


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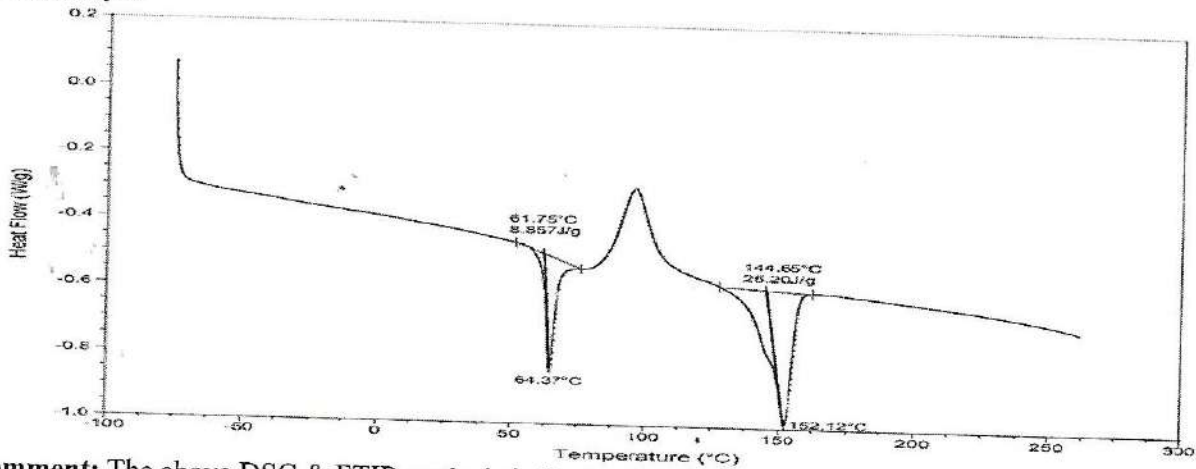
Sample Details: Compostable Straws made out of 'Dr. Bio' polymer material as stated by the party

7. FTIR Analysis



Wave number(cm ⁻¹)	Nature of Bond
2925.8	C-H stretching vibration
1750.53	C=O stretching vibration
1454	C-H bending vibration
1183.14	C-O stretching vibration
1082.51	C-O stretching vibration

8. DSC Analysis



Comment: The above DSC & FTIR analysis indicates the above sample is Poly (lactic acid) (PLA).

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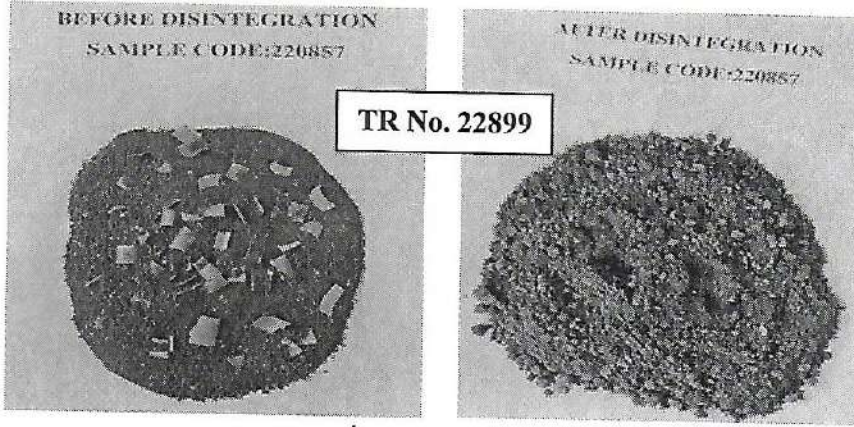
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ANALYSIS RESULT

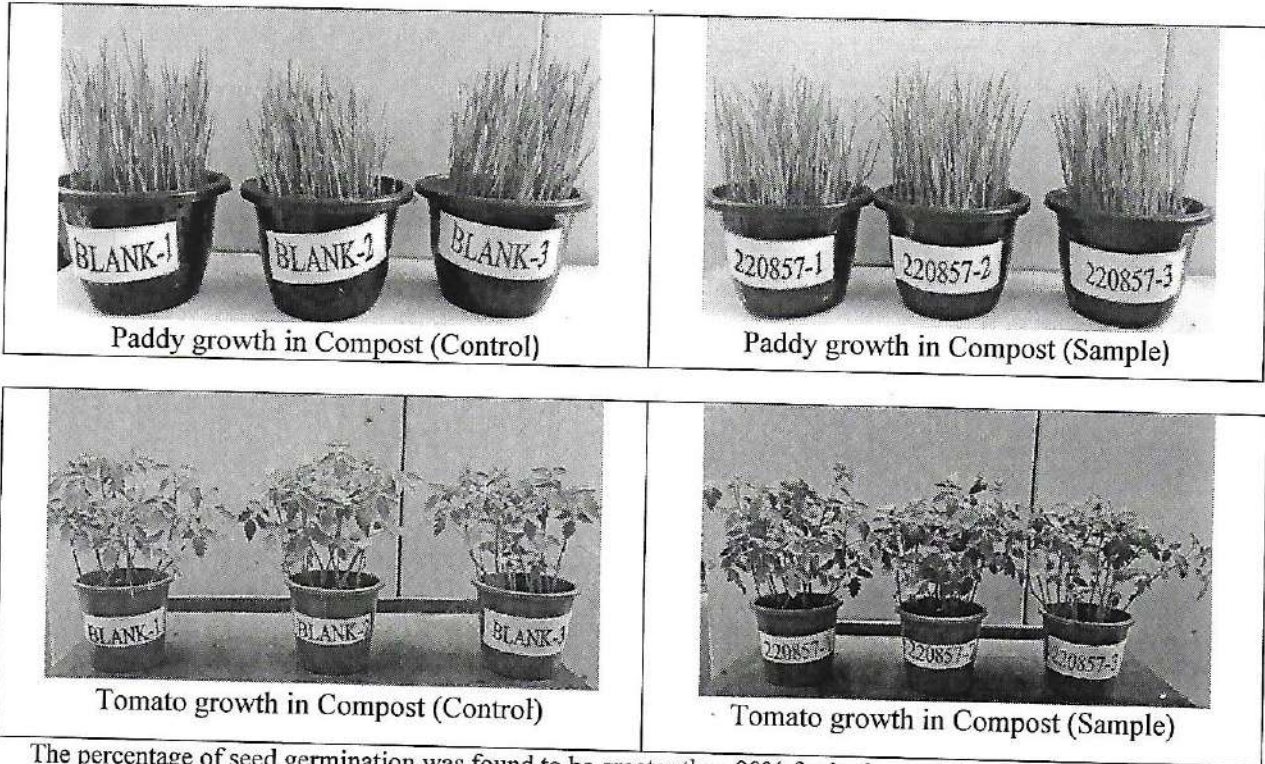
Date: 23.02.2023

9. DISINTEGRATION- AFTER 12 WEEK



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.

10. SEED GERMINATION AND PLANT GROWTH STUDY



The percentage of seed germination was found to be greater than 90% for both control and sample.

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Continuation Sheet

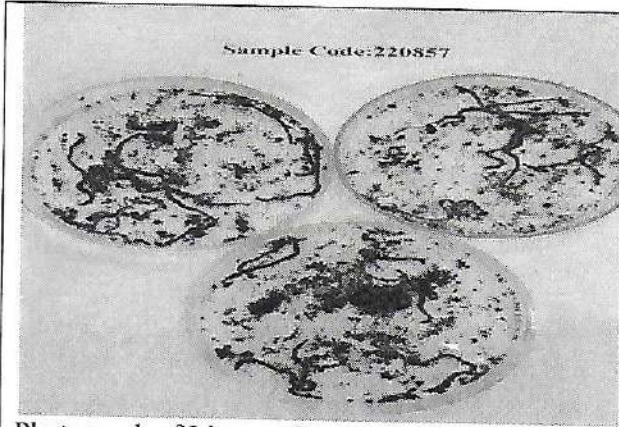
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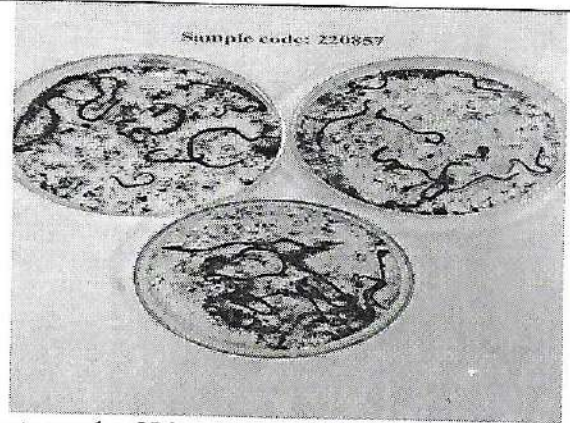
ANALYSIS RESULT

Date: 23.02.2023

11. Acute & Chronic Ecotoxicity effects to Earthworm

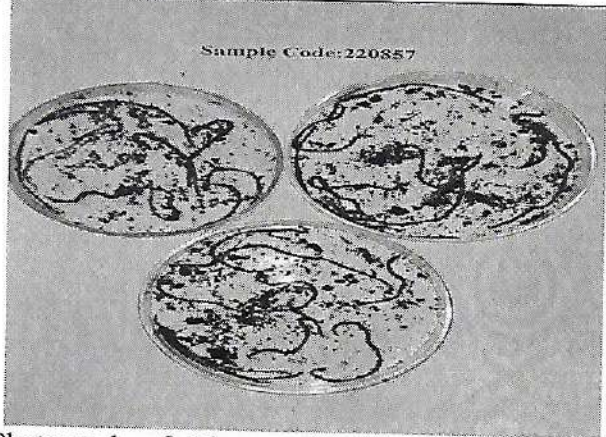


Photograph of Live earthworm in the sample compost at the end of 7 days

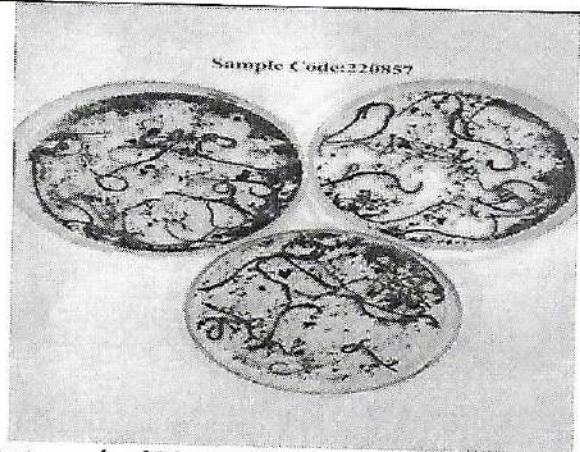


Photograph of Live earthworm in the sample compost at the end of 14 days

The surviving adult earthworms grown in the sample compost exposed to the test material after an incubation period of 14 days is more than 90 % of those from the corresponding blank compost not exposed to any material.





Photograph of Live earthworms in the sample compost at the end of 28 days



Photograph of Live earthworm in the sample compost at the end of 56 days

The surviving adult earthworms grown in the sample compost exposed to the test material after an incubation period of 28 days and the counted number of offspring after an incubation period of 56 days is more than 90 % of those from the corresponding blank compost.


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