

सिपेट : स्कूल फार एडवांस्ड  
रिसर्च इन पेट्रोकेमिकल्स (एस. ए. आर. पी)  
एडवांस्ड पॉलीमर डिसेन रिसर्च & डेवेलपमेन्ट  
रिसर्च लॉबोरेटोरी, (ए.पी.डी.डी.आर.एल)  
रसायन एवं पेट्रोसायन विभाग  
रसायन एवं उर्वरक मंत्रालय, भारत सरकार  
प्लॉट नंबर : ७ पि, हार्ट टेक रक्ष और एयरोस्पेस पार्क  
(आईटी सेक्टर), जलाहोवली, बेंगलुरु - 562149  
ई-मेल : apddrl@cipet.gov.in  
मुख्यालय : सिपेट, गिंडी, चेन्नै - 600032



CIPET : SCHOOL FOR ADVANCED  
RESEARCH IN PETROCHEMICALS (SARP)-  
ADVANCED POLYMER DESIGN & DEVELOPMENT  
RESEARCH LABORATORY (APDDRL)

Dept. of Chemicals & Petrochemicals,  
Ministry of Chemicals & Fertilizers, Govt. of India  
Plot No. 7P. Hi Tech Defence and Aerospace Park  
(IT Sector), Jala Hobli, Bengaluru - 562 149  
E-mail : apddrl@cipet.gov.in

Head Office : CIPET, Guindy, Chennai - 600032

CIPET/SARP-APDDRL/Testing/2024-25/ 7821

Date:-08-11-2024

To,

M/s Evergreen Sustainable Solution Private Limited,  
Plot No.15,HSIIDC Industrial Estate Manakpur,  
Dist- Yamunanagar,Haryana -135003

Sub: Test Report-Reg.

Ref. No: 1) Letter dtd 28.02.2024  
2) Interim report no: 24408 dated 22 .08.2024

Dear Sir,

We are enclosing herewith Test Report No. 24408 (Final) dtd. 08.11.2024 pertaining to testing of your submitted sample.

Customer Feedback form is enclosed herewith, which you are requested to fill-up and send us back.

Kindly acknowledge the receipt of the same.

Thanks & Regards,

  
AUTHORISED SIGNATORY

Encl: As above

केन्द्र : अहमदाबाद, अमृतसर, औरंगाबाद, अगरतला, बद्दी, बालासोर, बेंगलुरु, भोपाल, भुवनेश्वर, चन्द्रपुर, चेन्नै, देहरादून, गुरुग्राम, गुवाहाटी, ग्वालियर, हैदराबाद, हाजीपुर, हल्दिया, इम्फाल, जयपुर, कोच्चि, कोरबा, लखनऊ, मदुरै, मुखल, मैसूर, रायपुर, राँची, बलसाड एवं विजयवाडा  
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Head Office : CIPET, Guindy, Chennai - 600032

**CERTIFICATE OF ANALYSIS AS PER ISO 17088:2021**

CIPET/SARP-APDDRL/Testing/2024-25/

Date:- 08-11-2024

To,

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Plot No.15,HSI IDC Industrial Estate Manakpur,  
Dist- Yamunanagar,Haryana -135003

Sub: Test Report- Reg.

Ref. No: 1) Letter dtd 28.02.2024  
2) Interim report no:24408 dated 22.08.2024

Dear Sir,

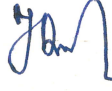
With reference to the above, the submitted sample was analyzed as per ISO 17088:2021. The summary detail of testing & analysis is given below:

Company Name & Address	: M/s Evergreen Sustainable Solution Private Limited, Plot No.15,HSI IDC Industrial Estate Manakpur, Dist- Yamunanagar,Haryana -135003
Test Standard	: ISO 17088:2021
Sample Details	: "ESS01"(Water based barrier coated paper) - As stated by the party
Test Report No	: 24408 (Final) & dated 08.11.2024
Date of Receipt of sample	: 28.02.2024
Date of Initiation	: 18.03.2024
Date of Completion	: 05.11.2024
Percentage of compostability	: 92.74% in 142 days
Requirement of Compostability in 180 days as ISO 17088:2021	: 90 %

The sample submitted by M/s Evergreen Sustainable Solution Private Limited, is compostable and the percentage of compostability in 142 days reported vide test report No.24408 is 92.74%

The submitted sample also complies with the terms of Compostability, Seed germination and Disintegration as per ISO 17088:2021

Thanks & Regards,

  
Authorized Signatory  
Encl : Analysis Report

केन्द्र : अहमदाबाद, अमृतसर, औरंगाबाद, अगस्तला, बदी, बालासोर, बेंगलुरु, भोपाल, भुवनेश्वर, चन्दपुर, चेन्नै, देहरादून, गुरुग्राम, गुवाहाटी, ग्वालियर, हैदराबाद, हाजीपुर, हल्दिया, इम्फाल, जयपुर, कोच्चि, कोरबा, लखनऊ, मद्रास, मुम्बई, मुरथल, मैसूर, रायपुर, राँची, बलसाड एवं विजयवाडा  
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**ANALYSIS REPORT**



Page: 01 of 03  
Report No: 24408 (Final)  
Date: 08-11-2024

Issued to

M/s Evergreen Sustainable Solution Private Limited,  
Plot No.15,HSIIDC Industrial Estate Manakpur,  
Dist- Yamunanagar,Haryana -135003

Ref. No 1) Letter dtd 28.02.2024  
2) Interim report no:24408 dtd 22.08.2024

**PART A: PARTICULARS OF SAMPLE SUBMITTED**

- |                                                                   |                                                                        |
|-------------------------------------------------------------------|------------------------------------------------------------------------|
| a) Name of the Sample                                             | : "ESS01"(Water based barrier coated paper)<br>-As stated by the party |
| b) Grade/variety/Type/Size/Class etc.                             | : Coated paper – as supplied by the party                              |
| c) Code No.                                                       | : NA                                                                   |
| d) Quantity (pcs./mtr/gm/nos)                                     | : 1.35 kg.                                                             |
| e) Mode of packing<br>(Sealed carton/Polypouch/Container or not): | Polypouch                                                              |
| f) Date of receipt of sample                                      | : 28.02.2024                                                           |
| g) Date of Performance of test                                    | : 18.03.2024 to 05.11.2024                                             |
| h) Any other information                                          | : NIL                                                                  |

**PART B: SUPPLEMENTARY INFORMATION**

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

*[Signature]* 08.11.2024

*[Signature]* 08.11.2024

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सिपेट CIPET



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## ANALYSIS REPORT



Page: 02 of 03  
Report no: 24408 (Final)  
Date: 08-11-2024

PART-C					
Test Result					
Sl. No.	Name of test	Test Method	Unit	Test Result	Specified requirements
01	Material Identification	FTIR / DSC	--	Acrylic based one side coated paper	--
02	Disintegration (Dry mass remains in 2mm sieve after 84 days)	Cl. 6.2 of ISO 17088 : 2021	%	7.95	Not more than 10
03	Ultimate aerobic Biodegradation (with reference to 100% degradation of positive reference)	Cl. 6.3 of ISO 17088 : 2021	%	92.74 (At the end of 142 days)	>90% (At the end of the test period not more than 180 days)
04	Plant Growth study <b>Monocotyledon</b> % Seed emergence	Cl 6.4.3 ISO 17088 : 2021	%	93.33	>90
	<b>Dicotyledon</b> % Seed emergence		%	92.51	>90
05	<b>Acute Ecotoxic Effects of Earthworm</b>				
a	Survival of adult earthworm at the end of 7 days	Cl.No.6.4.4 of ISO 17088 : 2021	%	100	Shall be more than 90
b	Survival of adult earthworm at the end of 14 days		%	99	Shall be more than 90
c	Biomass end of the 14 days		%	99	Shall be more than 90
06	<b>Chronic ecotoxic effects to earthworm</b>				
a	Survival of adult earthworm at the end of 28 days	Cl.No.6.4.5 of ISO 17088 : 2021	%	98	Shall be more than 90
b	Offspring at the end of 56 days		%	97	Shall be more than 90
c	Biomass end of the 56 days		%	98	Shall be more than 90

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

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**ANALYSIS REPORT**

Head Office : CIPET, Guindy, Chennai - 600032  
Page: 03 of 03  
Report No: 24408(Final)  
Date: 08-11-2024

Sl. No	Name of the Test	Test Method/Standard	Unit	Specified Requirements	Results Obtained
07.	Heavy metals concentration				
	Arsenic (As)	CI. No. 6.5.2 of ISO 17088:2021 AAS	ppm	-	0.0014
	Copper (Cu)			-	0.1421
	Nickel (Ni)			-	0.2056
	Zinc (Zn)			-	0.0092
	Chromium (Cr)			-	0.0101
	Molybdenum (Mo)			-	0.0004
	Mercury (Hg)			-	BDL
	Cadmium (Cd)			-	0.0017
	Lead (Pb)			-	0.0390
	Selenium (Se)			-	0.0018

\*BDL-Below Detection Limit

Based on solid waste management Rules, 2016 notified on 8<sup>th</sup> April 2016 by Ministry of Environment and Forests, Government of India.

**PART D: REMARKS: NIL**

**Note:**

1. This Test Report / Certificate is issued only for the samples submitted to CIPET: SARP-APDDRL.
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-APDDRL within 30 days from the date of issue.
6. Sub contracted Tests (if any): NIL

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

Reviewed By  
Dr. V H Sangeetha  
Scientist

Authorized By  
Dr. Manoranjan Biswal  
Sr. Scientist

केन्द्र : अहमदाबाद, अमृतसर, औरंगाबाद, अगस्तला, बद्दी, बालासोर, बेंगलुरु, भोपाल, भुवनेश्वर, चन्द्रपुर, चेन्नै, देहरादून, गुरुग्राम, गुवाहाटी, ग्वालियर, हैदराबाद, हाजीपुर, हल्दिया, इम्फाल, जयपुर, कोच्चि, कोरबा, लखनऊ, मदुरै, मुखल, मैसूर, रायपुर, राँची, बलसाड एवं विजयवाडा  
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**OBSERVATION FOR BIODEGRADABILITY TEST AS PER ISO 17088:2021**

To,

M/s Evergreen Sustainable Solution Private Limited,  
Plot No.15,HSIIDC Industrial Estate Manakpur,  
Dist- Yamunanagar,Haryana -135003

Date of Initiation : 18.03.2024

Date of Completion : 05.11.2024

1. Sample detail : "ESS01"(Water based barrier coated paper)

-As stated by the party

2. Material Identification by DSC &amp; FTIR : DSC &amp; FTIR graph indicates that the supplied material is Acrylic based one side coated paper

## 3. Observation: -

## a. Conditions of reaction mixtures

Origin of compost: : Livestock excreta, municipality waste and vegetable waste  
Reaction Temperature : 58 °C (± 2°C)  
Dry Solid : 52.08(%)  
Volatile Solid : 30.17 (%)  
Test duration : 142 days (Under compost condition)  
Reference material : Cellulose  
Volume of reaction vessel : 3000 ml

## b. pH of test medium:-

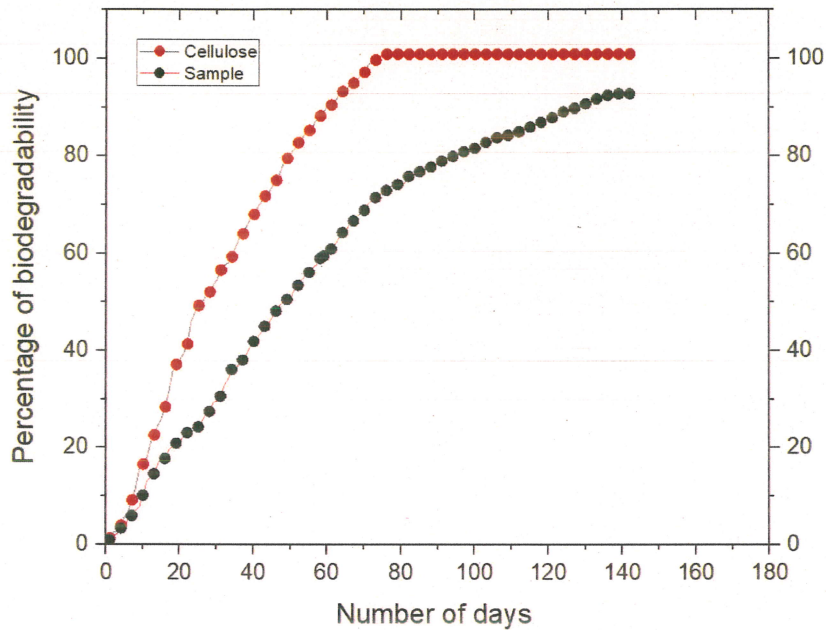
Composting Vessel	pH (Before Test)	pH (After Test)
Blank 1	7.1	7.2
Blank 2	7.2	7.3
Blank 3	7.2	7.3
Cellulose1	7.3	7.4
Cellulose2	7.4	7.5
Cellulose3	7.4	7.5
Negative 1	7.3	7.4
Negative 2	7.4	7.5
Negative3	7.2	7.3
Sample 1	7.5	7.6
Sample 2	7.4	7.5
Sample 3	7.5	7.6

Reviewed By  
Dr. V H Sangeetha  
Scientist

Authorized By  
Dr. Manoranjan Biswal  
Sr. Scientist



4. Result: Percentage biodegradation relative to positive reference  
 MEAN (%) : 92.74  
 The reference material-cellulose (%) : 100



## 5. Visual Observation:-

	Week 1	Week 2	Week 3	Week 4	Week 5
Structure	Paper sample	Paper sample	Paper sample	Paper sample	Paper sample
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

Reviewed By  
 Dr. V H Sangeetha  
 Scientist

Authorized By  
 Dr. Manoranjan Biswal  
 Sr. Scientist

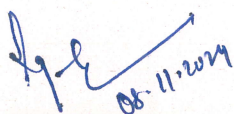


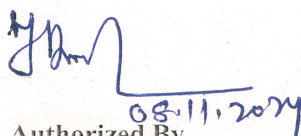
	Week 6	Week 7	Week 8	Week 9	Week 10
Structure	Paper sample	Paper sample	Disintegration initiated	Disintegration Observed	Disintegration Observed
Moisture	Appropriate moisture level	Appropriate moisture level	Appropriate moisture level	Appropriate moisture level	Appropriate moisture level
Color	White	----	-----	-----	-----
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	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

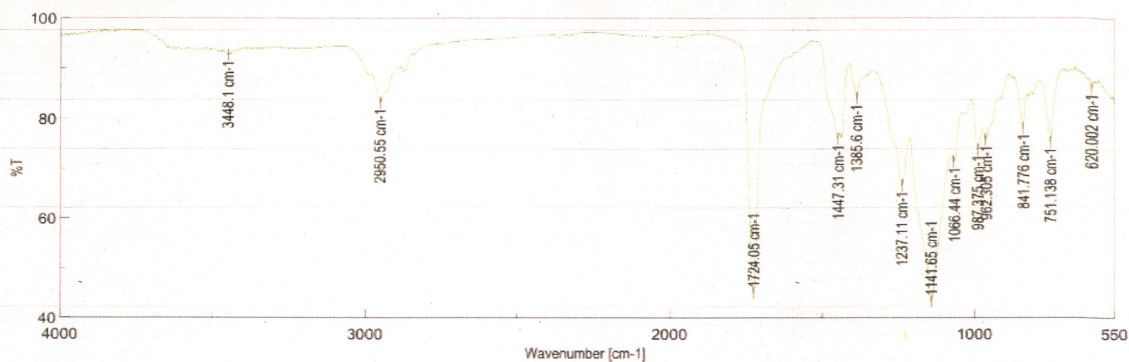
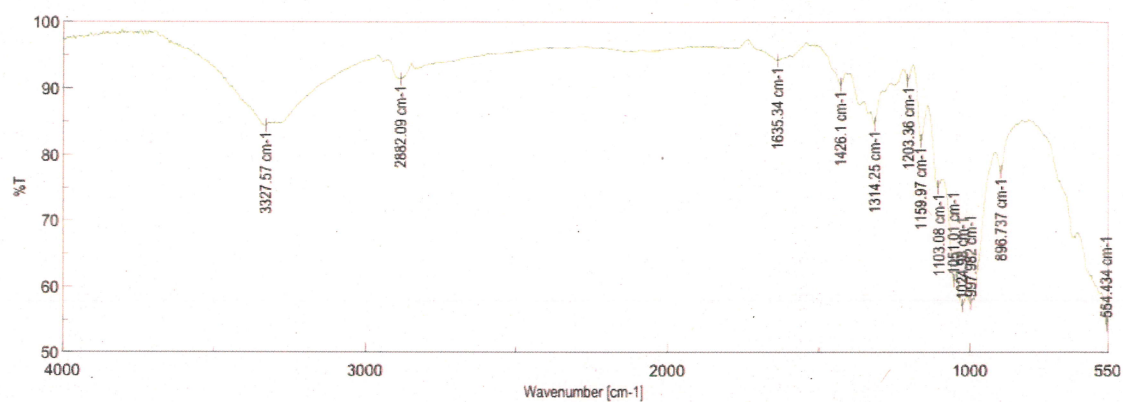
	Week 21
Structure	Disintegration Observed
Moisture	Appropriate moisture level
Color	-----
Fungal Development	None
Smell	Organic/dirt like

  
 Reviewed By  
 Dr. V H Sangeetha  
 Scientist

  
 Authorized By  
 Dr. Manoranjan Biswal  
 Sr. Scientist



## 6. FTIR Analysis:

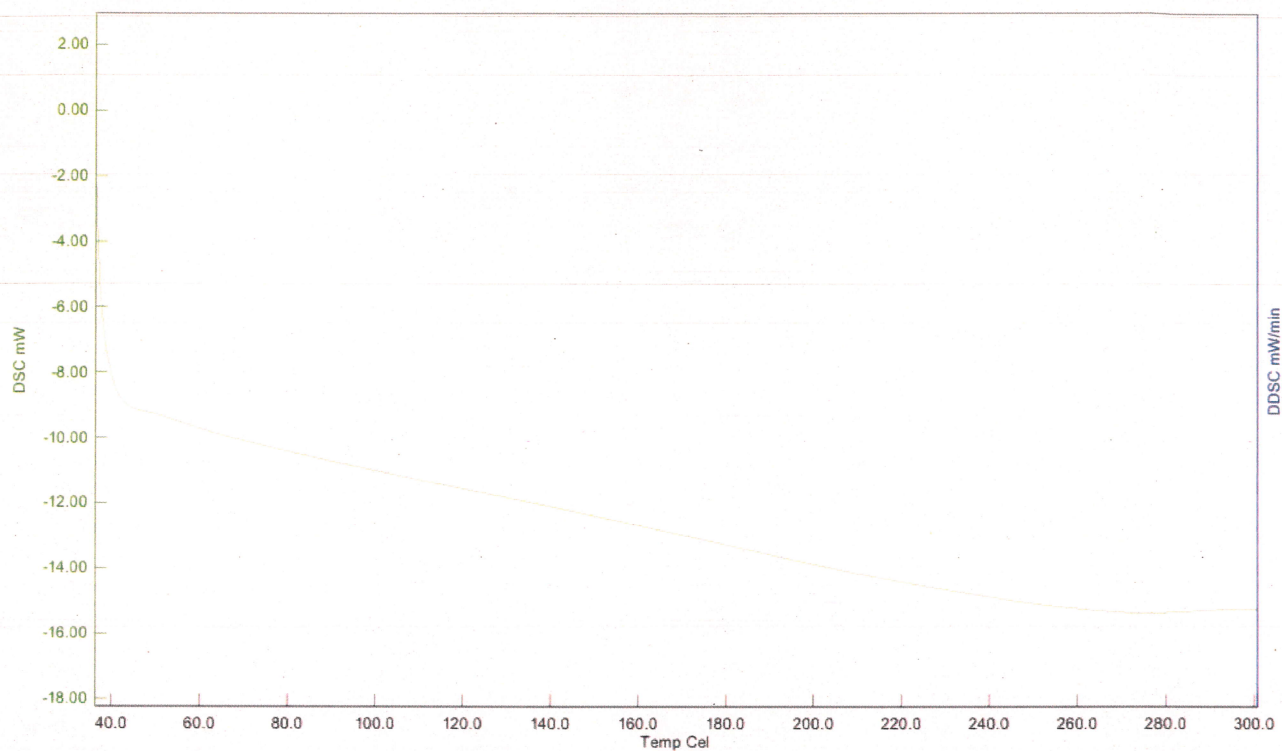
Coated partNon-coated part

Wave number (cm <sup>-1</sup> )	Possible Nature of Bond
2950.55	-CH <sub>3</sub> symmetric/ antisymmetric stretching
1724.05	-C=O stretching
1447.31	-CH bending
962.305	-C= C bending
751.138	-CH bending
620.002	-C= C bending
3327.57	O-H Stretching
2882.09	-CH Bending
1024.98	C-O Stretching

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7. DSC Analysis:-

**Comment:** DSC & FTIR graph indicates that the supplied material is Acrylic based one side coated paper.

*[Signature]*  
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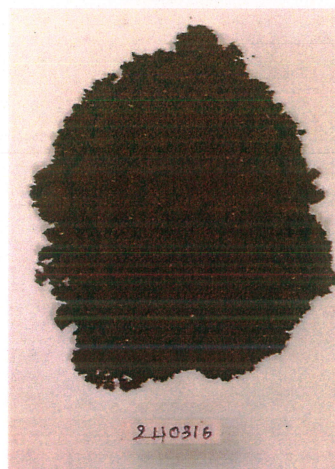
08-11-2024

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## 8. Disintegration- After 12 Weeks

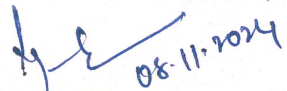
BEFORE DISINTEGRATION  
240316AFTER DISINTEGRATION  
240316

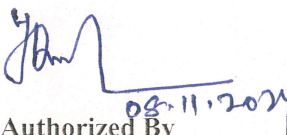
BEFORE DISINTEGRATION

AFTER DISINTEGRATION

Comments:-

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

  
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## 9. Germination and Plant Growth Study(240316)



Wheat Compost (Control)



Wheat Compost (Sample)

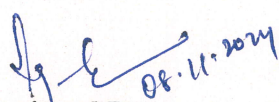


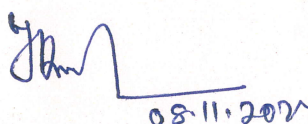
Mung Bean Compost (Control)



Mung Bean Compost (Sample)

The percentage of seedling germination rate was found to be greater than 90% for both Wheat and Mung Bean.

  
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