

सिपेट : इंस्टिट्यूट ऑफ प्लास्टिक्स

हस्तधन एवं खनिज मंत्रालय, भारत सरकार

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CIPET लि.पे.सि.

परीक्षण रिपोर्ट
TEST REPORT

CIPET : INSTITUTE OF PLASTICS TECHNOLOGY

(Ministry of Chemicals & Fertilizers, Govt. of India)

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क्र.सं / Sl. No. 23705

रिपोर्ट सं / REPORT NO. : 60811

Pages.....Nos. Part A,B,C & D.

दिनांक / Date :

11.02.2020

संदर्भ / Ref. : Dated: 31.05.2019

परीक्षण मानक स्तर के अनुसार परीक्षण रिपोर्ट / TEST REPORT AS PER TEST STANDARD : Refer Part C

भाग :- क / PART - A

प्रस्तुत सैपिल का विवरण / PARTICULARS OF SAMPLE SUBMITTED

| | |
|--|---|
| अ) सैपिल का नाम / a) Name of the Sample | : GRV's Compostable Bags -as stated by the party |
| आ) सैपिल प्राप्त होने की तारीख / b) Date of Receipt of sample | : 14.06.2019 |
| इ) ग्रेड/प्रकार/आकार/वर्ग / c) Grade / variety / type / size / class | : Compostable Grade |
| ई) घोषित मूल्य / d) Declared value, If any | : Not applicable |
| उ) कोड सं. / e) Code No. | : GRV Product Code: GRV-CMP |
| ऊ) बैच सं. एवं निर्माण तारीख / f) Batch No. and Date of Manufacture: | : GRV-CMP |
| ऋ) मात्रा / g) Quantity | : 02 Kg |
| ए) पैकिंग की रीति / h) Mode of Packing | : Packed in cloth line cover |
| ऐ) मोहर बंद या नहीं / i) Sealed or not | : Not Sealed |
| ओ) कोई अन्य सूचना / j) Any other information | : -- |

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| | |
|---|----------------------------------|
| अ) सैपिलिंग कार्यवाहियां हनु संदर्भ / a) Reference to sampling procedure | : Sampling not done by this lab |
| आ) माप करने हेतु लिए गए सहायक दस्तावेज एवं प्राप्त परिणाम | |
| ब) Supporting documents for the measurement taken and result derived | : As given in Part C |
| इ) संबंधित कार्य अनुदेशों में निर्धारित के अनुसार परीक्षण रीति से कोई परिवर्तन | |
| क) Deviation from the test method as prescribed in relevant work instructions, if any | : No deviation from the standard |

रिपोर्ट सं / REPORT NO. : 60811

**परीक्षण रिपोर्ट
TEST REPORT**

क्र.सं / Sl. No. 23705

दिनांक / Date : 11.02.2020

भाग - ग / PART - C

परीक्षण परिणाम / TEST RESULTS

Test Duration: 17.06.2019 to 11.02.2020 .

| Sl. No. | Property | Standard | Unit | Results obtained | Specified Requirements |
|---------|--|-----------------------|--------|---|------------------------------------|
| 1. | Material Identification by FTIR | -- | -- | Blend of Poly Lactic Acid (PLA) and Poly Butylene Adipate co-terephthalate (PBAT) | -- |
| 2. | Disintegration (Dry mass passing through 2mm sieve after 84 days) | ISO-17088 / IS-17088 | % | 92.9 | Greater than 90 |
| 3. | Ultimate Aerobic Biodegradation (with reference to 100% degradation of positive reference) | ISO-17088 / IS-17088 | % | 90.69 (At the end of 120 days) | Greater than 90 |
| 4. | Plant Growth study a) Rice % Seed emergence b) Tomato % Seed Emergence | ISO-17088 IS-17088 | % % | 92 92 | Greater than 90 Greater than 90 |

(Contd...)

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TR. NO. 60811

BIODEGRADABILITY TEST AS PER IS/ISO 17088

1. **Sample detail:** (as declared by the party): GRV's Compostable carry bags
2. **Material Identification by FTIR:** Blend of Poly Lactic Acid (PLA) & Poly Butylene Adipate Co Terephthalate (PBAT)
3. **Observation**

(1) Conditions of reaction mixtures

Origin of compost: Livestock excrement, municipal and vegetable waste
Reaction Temperature : 58⁰C (± 2⁰C)
Dry Solid (%) : 53.1
Volatile content (%) : 13.4
CO₂ evolved during first 10 days in blank vessels: 71.3 mg/g of volatile content of compost
Test duration (day) : 120 days
Reference material : Cellulose
Volume of reaction vessel : 3000 ml

(2) pH of test medium

| S.No. | Composting Vessel (Material with test medium) | pH (before) | pH (after) |
|-------|--|-------------|------------|
| 1 | Sample 1 | 7.6 | 7.4 |
| 2 | Sample 2 | 7.8 | 7.3 |
| 3 | Sample 3 | 7.9 | 7.4 |
| 4 | Blank | 7.6 | 7.3 |
| 5 | Cellulose 1 | 7.8 | 7.2 |
| 6 | Cellulose 2 | 7.9 | 7.3 |
| 7 | Cellulose 3 | 7.8 | 7.2 |
| 8 | Negative | 7.9 | 7.1 |

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Report No:

60811

TEST RESULTS

Date: **11.02.2020**

| Sl. No. | Property | Standard | Unit | Results obtained | Specified Requirements (In India Maximum)* |
|---------|-----------------------------------|----------------------|------|------------------|--|
| 5. | Heavy metals concentration | ISO-17088 / IS-17088 | ppm | | |
| | Arsenic (As) | | | 0.024 | 20 |
| | Copper (Cu) | | | 0.938 | 500 |
| | Nickel (Ni) | | | 0.641 | 100 |
| | Zinc (Zn) | | | 1.269 | 2500 |
| | Cobalt (Co) | | | 2.948 | -- |
| | Chromium (Cr) | | | 0.632 | 300 |
| | Molybdenum (Mo) | | | 1.943 | -- |
| | Mercury (Hg) | | | 0.038 | 10 |
| | Cadmium (Cd) | | | 0.049 | 20 |
| | Lead (Pb) | | | 1.028 | 500 |
| | Selenium (Se) | | | 0.387 | -- |

*-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. The results related only to the items tested as supplied by the party.
2. The test certificate shall not be reproduced in full except without the written approval of the laboratory.

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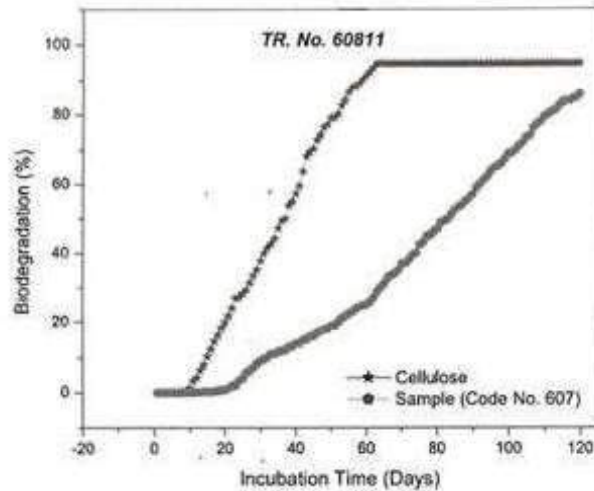
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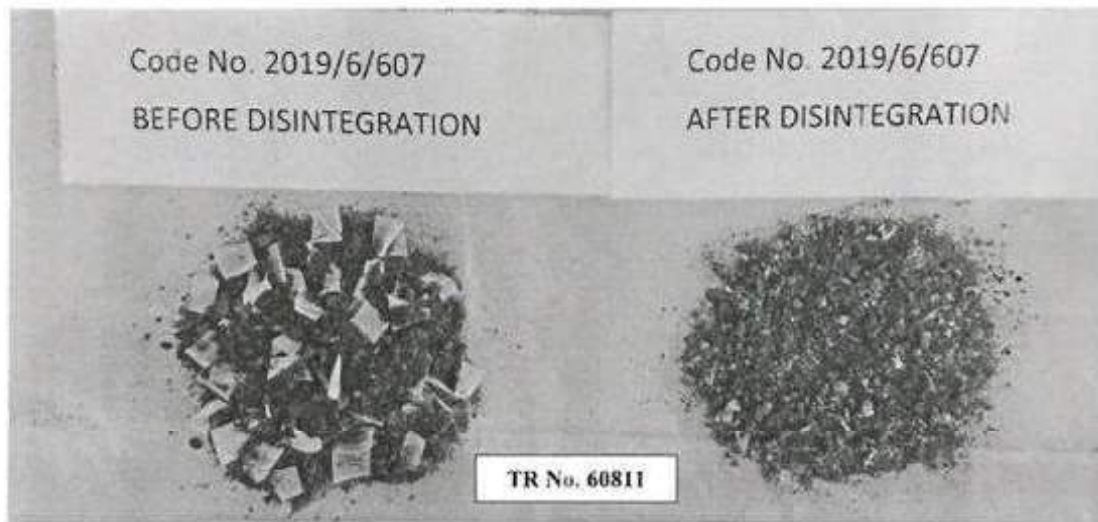
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4. Result: Percentage biodegradation relative to positive reference
Sample : 90.69% at the end of 120 days
Positive reference cellulose : ~ 100 %



5. Disintegration- After 12 weeks



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6. Visual Observation

| Description | Week 1/2 | Week 3/4 | Week 5/6 | Week 7/8 |
|--------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Structure | Fine Particles | Fine Particles | Fine Particles | Fine Particles |
| Moisture | Adequate moisture Level | Adequate moisture Level | Adequate moisture Level | Adequate moisture Level |
| Colour | Dark brown | Dark brown | Dark brown | Dark brown |
| Fungal Development | Nil | Nil | Nil | Nil |
| Smell | Organic/dirt like | Organic/dirt like | Organic/dirt like | Organic/dirt like |

| Description | Week 9/10 | Week 11/12 | Week 13/14 | Week 15/16/17 |
|--------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Structure | Fine Particles | Fine Particles | Fine Particles | Fine Particles |
| Moisture | Adequate moisture Level | Adequate moisture Level | Adequate moisture Level | Adequate moisture Level |
| Colour | Dark brown | Dark brown | Dark brown | Dark brown |
| Fungal Development | Nil | Nil | Nil | Nil |
| Smell | Organic/dirt like | Organic/dirt like | Organic/dirt like | Organic/dirt like |

7. Plant Growth Study

| | |
|---|---|
| <p>Paddy growth in sample degraded compost</p> | <p>Paddy growth in control compost</p> |
| <p>Tomato growth in sample degraded compost</p> | <p>Tomato growth in control compost</p> |

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[Handwritten Signature]
 Authorized Signatory

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