

|                           |                        |                       |
|---------------------------|------------------------|-----------------------|
| <b>Prüfbericht - Nr.:</b> | <b>0154160471a 001</b> | <b>Seite 1 von 17</b> |
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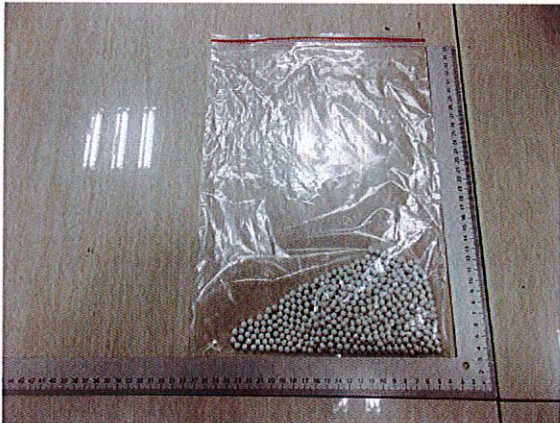
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
| <b>Auftraggeber:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Client:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | NO.55 LINE 33 EAST NANHUAN ROAD XINPU CIXI ZHEJIANG CHINA 315322                           |                                  |                                                                                                                                     |                                                                                            |
| <b>Gegenstand der Prüfung:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Test Item:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Bio airsoft bbs                                                                            |                                  |                                                                                                                                     |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Item No.: YJ020BIO 6MM AIRSOFT BB                                                          |                                  |                                                                                                                                     |                                                                                            |
| <b>Bezeichnung:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Identification:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | N/A                                                                                        |                                  |                                                                                                                                     |                                                                                            |
| <b>Anlieferungszustand:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Delivery condition:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Good                                                                                       | <b>Eingangsdatum:</b> 2016-04-15 |                                                                                                                                     |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            | Date of Receipt:                 |                                                                                                                                     |                                                                                            |
| <b>Prüfort:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Testing location:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Tested at TÜV Rheinland Shanghai                                                           |                                  |                                                                                                                                     |                                                                                            |
| <b>Prüfgrundlage:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Test specification:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ISO 14855-1 in connection with DIN EN 13432                                                |                                  |                                                                                                                                     |                                                                                            |
| <b>Prüfergebnis:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Test result:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The sample fulfills the requirements.                                                      |                                  |                                                                                                                                     |                                                                                            |
| <b>geprüft: tested by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| 2016-09-06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sven Posselt                                                                               | Department Manager               |                                                                                                                                     |                                                                                            |
| <b>Datum</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Name/Stellung</b>                                                                       | <b>Unterschrift</b>              |                                                                                                                                     |                                                                                            |
| Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Name/Position                                                                              | Signature                        |                                                                                                                                     |                                                                                            |
| <b>Sonstiges / Other Aspects:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| Test period:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| 2016-04-27 to 2016-08-29                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                            |                                  |                                                                                                                                     |                                                                                            |
| <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <b>Abkürzungen:</b><br/> ok / P = entspricht Prüfgrundlage<br/> fail / F = entspricht nicht Prüfgrundlage<br/> n.a. / N = nicht anwendbar </td> <td style="width: 50%; vertical-align: top;"> <b>Abbreviations:</b><br/> ok / P = passed<br/> fail / F = failed<br/> n.a. / N = not applicable </td> </tr> </table>                                                                                              |                                                                                            |                                  | <b>Abkürzungen:</b><br>ok / P = entspricht Prüfgrundlage<br>fail / F = entspricht nicht Prüfgrundlage<br>n.a. / N = nicht anwendbar | <b>Abbreviations:</b><br>ok / P = passed<br>fail / F = failed<br>n.a. / N = not applicable |
| <b>Abkürzungen:</b><br>ok / P = entspricht Prüfgrundlage<br>fail / F = entspricht nicht Prüfgrundlage<br>n.a. / N = nicht anwendbar                                                                                                                                                                                                                                                                                                                                                                            | <b>Abbreviations:</b><br>ok / P = passed<br>fail / F = failed<br>n.a. / N = not applicable |                                  |                                                                                                                                     |                                                                                            |
| <p><small>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</small></p> <p><small>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</small></p> |                                                                                            |                                  |                                                                                                                                     |                                                                                            |

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## 1 Picture and detailed description of the test sample



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## 2 Biodegradation

### 2.1 General test information

Reference material : Cellulose, particle size <20µm

Test vessels : 2000ml, the vessel used for biodegradation test is a high pressure conical flask, volume: 2000 ml. It was provided by Pyrex Co. Ltd.

CO<sub>2</sub>-determination : Determination of the amount of carbon dioxide evolved by weighing the carbon dioxide absorbing system. The amount of carbon dioxide is calculated via the difference in the weight of the carbon dioxide absorbing trap in the beginning and in the end of the test.

Thermostat controlled oven : The biodegradation test is proceeded in a temperature controlled oven for maintaining the temperature needed.

### 2.2 Summary of test results

|                             | Test material        | Reference material   |
|-----------------------------|----------------------|----------------------|
| 45 days biodegradation rate | 57.9%                | 87.4%                |
| Overall biodegradation rate | 92.4%                | 93.3%                |
| Test duration [days]        | 124                  | 124                  |
| Observation                 | No abnormal findings | No abnormal findings |

### Validity Criteria

#### Validity Criteria :

Degree of biodegradation of reference material after 45 days > 70%? ☒ Yes ☐ No

Difference between percentage biodegradation of reference material in the different vessels at the end of test <20%? ☒ Yes ☐ No

Average CO<sub>2</sub> production in the blank vessels after 10 days in the range 50 mg to 150 mg CO<sub>2</sub>/g volatile solids? ☒ Yes ☐ No

As the three criteria above have been fulfilled, the test is considered to be valid

For detailed information, please see the following pages

### 2.3 Flow chart of experiment

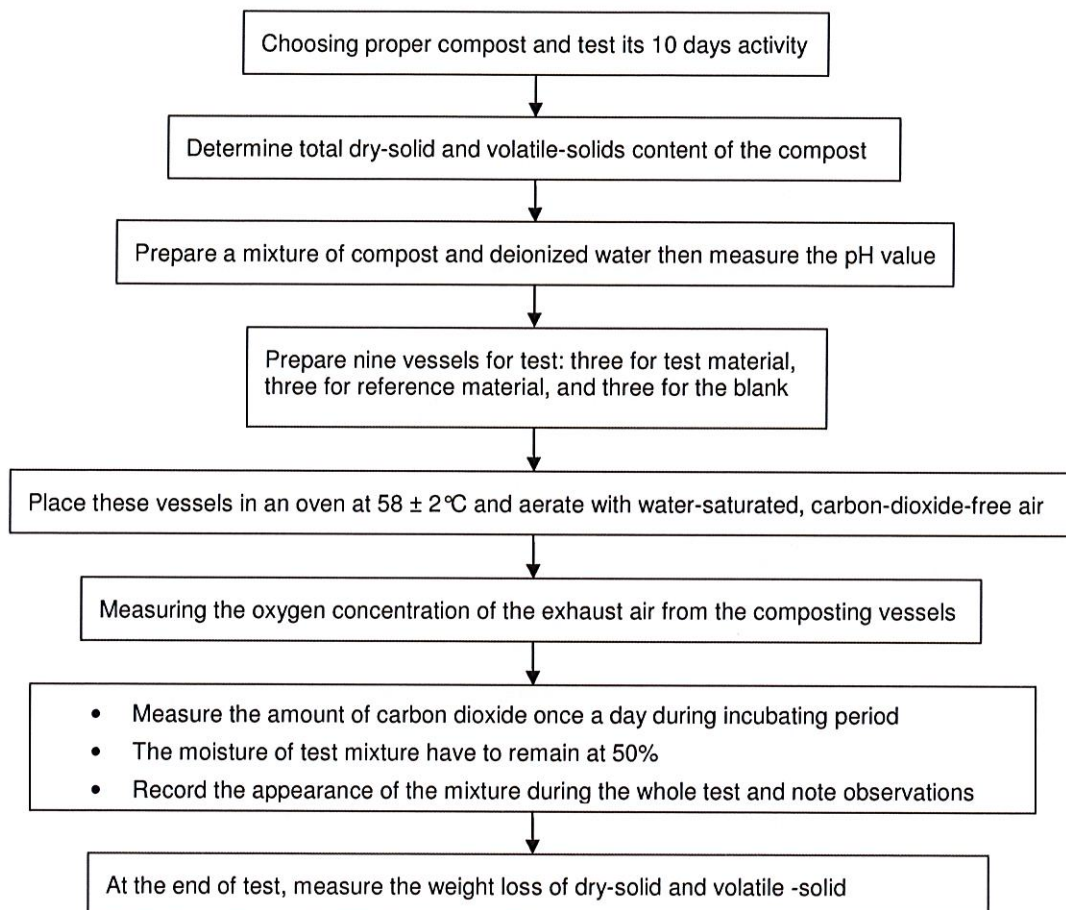


Fig 2 : Flow chart of experiment

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## 2.4 RESULTS

### 2.4.1 Appearance of compost and sample



Before test



After test

Compost without any material before and after test



Before test



After test

Compost with reference material before and after test



Before test



After test

Compost with test material before and after test

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#### 2.4.2 Properties of compost

**Table 1 - Properties of compost**

| Total dry solids (%) | Moisture content (%) | Volatile solids (%) | Ash (%) | Compost Activity Test (mg CO <sub>2</sub> /g – volatile solid) | Carbon/ Nitrogen ratio (%) |
|----------------------|----------------------|---------------------|---------|----------------------------------------------------------------|----------------------------|
| 37                   | 63                   | 46                  | 54      | 130                                                            | 21                         |

#### 2.4.3 Activity of the compost

**Table 2 - The amount of CO<sub>2</sub> for the first 10 days**

| Days  | Amount of carbon dioxide (mg) |
|-------|-------------------------------|
| 1     | 2697                          |
| 2     | 2367                          |
| 3     | 2100                          |
| 6     | 1100                          |
| 7     | 1767                          |
| 8     | 1607                          |
| 9     | 1603                          |
| Total | 13240                         |

**130= mg CO<sub>2</sub> /g – volatile solid**

Calculation:

Amount of CO<sub>2</sub> absorbed during the first 10 days [g] / (600g \*total dry solids \* volatile solids) = mg CO<sub>2</sub> / g volatile solids

= 600g is the amount of compost used for each vessel.

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#### 2.4.4 Total Amount of Organic Carbon for Test and Reference Samples

The content of organic carbon in sample and reference material (cellulose) is determined. Results are used for calculation of amount of test material necessary to have an amount of 20g organic carbon in each vessel.

For reference material:  $m = \text{amount of organic carbon each vessel} / \text{TOC} = 20\text{g} / 0,43\text{g/g} = 46\text{g}$

TOC of cellulose = 0.43g/g

20g of organic carbon lead to a theoretical amount of 73,3g CO<sub>2</sub> evolved by microorganisms when the rate of biodegradation reaches 100%.

**Table 3 - Total amount of organic carbon**

| Parameter                                     | Unit                      | Reference material | Test material |
|-----------------------------------------------|---------------------------|--------------------|---------------|
| Total organic carbon (TOC)                    | (%)                       | 43                 | 11.5          |
| Amount of organic carbon (TOC) in test vessel | (g)                       | 20                 | 20            |
| Theoretical amount of evolved carbon dioxide  | (ThCO <sub>2</sub> ), (g) | 73.3               | 73.3          |
| Size                                          | (cm × cm)                 | -                  | -             |
| Thickness                                     | (mm)                      | -                  | -             |
| Shape                                         |                           | powder             | powder        |
| Total dry solids                              | (%)                       | 97                 | 100           |
| Moisture content                              | (%)                       | 3                  | 0             |

#### 2.4.5 The amount of sample and compost in the test vessel

**Table 4 - The amount of sample and compost in the test vessel**

|           | Compost    |                      | Sample     |                      |
|-----------|------------|----------------------|------------|----------------------|
|           | Weight (g) | Total dry solids (g) | Weight (g) | Total dry solids (g) |
| Blank     | 600        | 222.6                | None       | None                 |
| Reference | 600        | 328.8                | 46.1       | 44.7                 |
| Sample    | 600        | 199.5                | 174        | 174                  |

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## 2.5 pH Value

The pH value of the compost is checked at the beginning and at the end of the test. It is determined by diluting compost with distilled water by 1:5 and measuring the value with an electrical pH-meter.

**Table 5 - The pH values before and after test**

|             | Blank 1 | Blank 2 | Blank 3 |
|-------------|---------|---------|---------|
| Before Test | 8.8     | 8.4     | 7.9     |
|             | 7.4     | 7.1     | 6.8     |

**Table 6 - The pH values before and after test**

|               | Reference material 1 | Reference material 2 | Reference material 3 |
|---------------|----------------------|----------------------|----------------------|
| Before Test   | 8.8                  | 8.2                  | 8.7                  |
| After 4 weeks | 6.7                  | 7.0                  | 7.6                  |

**Table 7 - The pH values before and after test**

|               | Test material 1 | Test material 2 | Test material 3 |
|---------------|-----------------|-----------------|-----------------|
| Before Test   | 8.76            | 8.5             | 8.2             |
| After 4 weeks | 6.9             | 6.6             | 6.0             |

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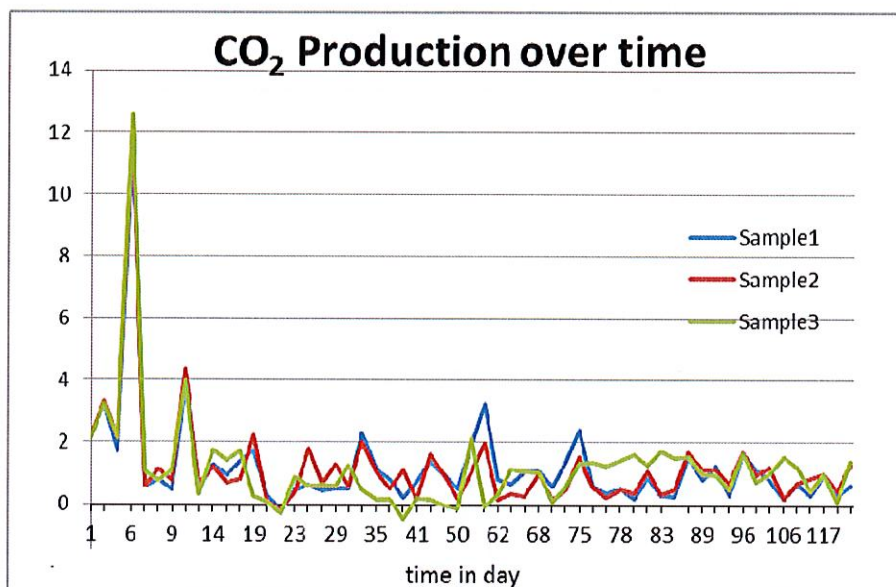
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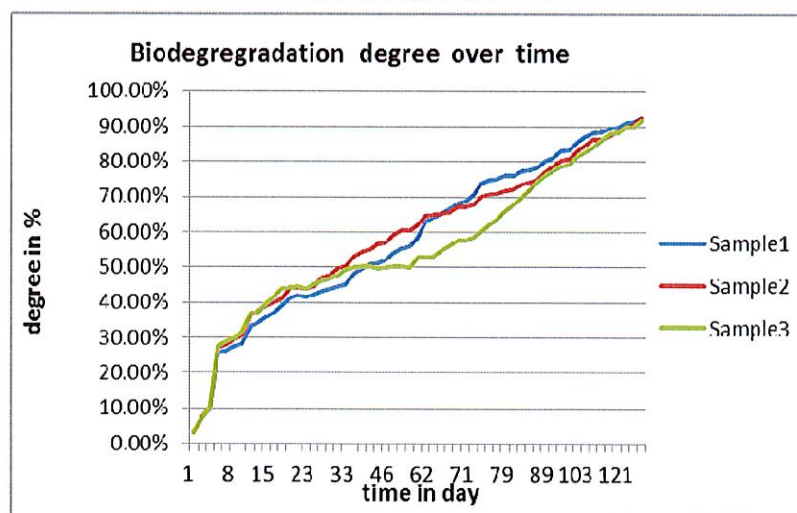
## 2.6 Controlled Aerobic Composting Test (Mass of Organic Matter)

### 2.6.1 Test Material

|                                                                                                                                       |        |
|---------------------------------------------------------------------------------------------------------------------------------------|--------|
| Amount of total organic carbon (TOC) of the test material placed in each vessel                                                       | 20 g   |
| This TOC leads to a theoretical amount of evolved carbon dioxide (ThCO <sub>2</sub> ), caused by the degradation of the test material | 73.3 g |



CO<sub>2</sub>:Evolution curve of test material  
Production of CO<sub>2</sub> over time



Biodegradation curve of test material  
Degree of degradation over time

**Table 8 - Controlled aerobic composting test data of test material**

| Day | CO <sub>2</sub> (g/vessel) |      |      |                   |       |      |       |                   | D (%)  |        |        |                   |
|-----|----------------------------|------|------|-------------------|-------|------|-------|-------------------|--------|--------|--------|-------------------|
|     | B1                         | B2   | B3   | B <sub>mean</sub> | t1    | t2   | t3    | t <sub>mean</sub> | t1 (%) | t2     | t3     | t <sub>mean</sub> |
| 1   | 2.93                       | 2.55 | 2.61 | 2.70              | 4.91  | 4.88 | 4.86  | 4.88              | 3.02%  | 2.98%  | 2.95%  | 2.98%             |
| 2   | 2.52                       | 2.56 | 2.02 | 2.37              | 5.61  | 5.68 | 5.61  | 5.63              | 4.42%  | 4.52%  | 4.42%  | 4.46%             |
| 3   | 2.09                       | 2.03 | 2.18 | 2.10              | 3.81  | 4.23 | 4.25  | 4.10              | 2.33%  | 2.91%  | 2.93%  | 2.72%             |
| 6   | 1.07                       | 1.08 | 1.15 | 1.10              | 12.74 | 13.4 | 13.69 | 13.28             | 15.88% | 16.78% | 17.18% | 16.61%            |
| 7   | 1.7                        | 1.79 | 1.81 | 1.77              | 2.35  | 2.37 | 2.83  | 2.52              | 0.80%  | 0.82%  | 1.45%  | 1.02%             |
| 8   | 1.81                       | 1.75 | 1.26 | 1.61              | 2.41  | 2.73 | 2.37  | 2.50              | 1.10%  | 1.53%  | 1.04%  | 1.22%             |
| 9   | 1.84                       | 1.46 | 1.51 | 1.60              | 2.07  | 2.37 | 2.7   | 2.38              | 0.64%  | 1.05%  | 1.50%  | 1.06%             |
| 12  | 1.74                       | 1.83 | 2.87 | 2.15              | 6     | 6.5  | 6.11  | 6.20              | 5.26%  | 5.94%  | 5.41%  | 5.53%             |
| 13  | 0.79                       | 1.09 | 1.56 | 1.15              | 1.7   | 1.79 | 1.47  | 1.65              | 0.75%  | 0.88%  | 0.44%  | 0.69%             |
| 14  | 0.48                       | 0.73 | 0.57 | 0.59              | 1.87  | 1.8  | 2.34  | 2.00              | 1.74%  | 1.65%  | 2.38%  | 1.92%             |
| 15  | 0.58                       | 0.94 | 0.83 | 0.78              | 1.72  | 1.48 | 2.22  | 1.81              | 1.28%  | 0.95%  | 1.96%  | 1.40%             |
| 16  | 0.28                       | 0.48 | 0.88 | 0.55              | 1.94  | 1.33 | 2.24  | 1.84              | 1.90%  | 1.07%  | 2.31%  | 1.76%             |
| 19  | 2.48                       | 0.18 | 0.4  | 1.02              | 2.75  | 3.24 | 1.28  | 2.42              | 2.36%  | 3.03%  | 0.35%  | 1.91%             |
| 21  | 1.11                       | 0.38 | 0.85 | 0.78              | 1.09  | 0.86 | 0.84  | 0.93              | 0.42%  | 0.11%  | 0.08%  | 0.20%             |
| 22  | 0.79                       | 0.37 | 2.06 | 1.07              | 0.89  | 0.89 | 0.79  | 0.86              | -0.25% | -0.25% | -0.39% | -0.30%            |
| 23  | 0.8                        | 0.3  | 0.39 | 0.50              | 0.96  | 0.9  | 1.38  | 1.08              | 0.63%  | 0.55%  | 1.21%  | 0.80%             |
| 26  | 2.57                       | 1.71 | 1    | 1.76              | 2.38  | 3.55 | 2.35  | 2.76              | 0.85%  | 2.44%  | 0.80%  | 1.36%             |
| 27  | 0.31                       | 0.39 | 0.2  | 0.30              | 0.74  | 0.95 | 0.92  | 0.87              | 0.60%  | 0.89%  | 0.85%  | 0.78%             |
| 29  | 0.44                       | 0.69 | 0.47 | 0.53              | 1.04  | 1.81 | 1.13  | 1.33              | 0.69%  | 1.74%  | 0.81%  | 1.08%             |
| 30  | 0.05                       | 0.51 | 0.21 | 0.26              | 0.76  | 0.84 | 1.49  | 1.03              | 0.69%  | 0.80%  | 1.68%  | 1.06%             |

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| Day | CO <sub>2</sub> (g/vessel) |      |      |                   |      |      |      |                   | D (%)  |       |        |                   |
|-----|----------------------------|------|------|-------------------|------|------|------|-------------------|--------|-------|--------|-------------------|
|     | B1                         | B2   | B3   | B <sub>mean</sub> | t1   | t2   | t3   | t <sub>mean</sub> | t1 (%) | t2    | t3     | t <sub>mean</sub> |
| 33  | 0.16                       | 0.29 | 0.41 | 0.29              | 2.57 | 2.28 | 0.78 | 1.88              | 3.12%  | 2.72% | 0.67%  | 2.17%             |
| 35  | 0.08                       | 0.69 | 0.31 | 0.36              | 1.48 | 1.38 | 0.5  | 1.12              | 1.53%  | 1.39% | 0.19%  | 1.04%             |
| 37  | 0.07                       | 0.66 | 0.23 | 0.32              | 1.13 | 0.82 | 0.47 | 0.81              | 1.11%  | 0.68% | 0.20%  | 0.66%             |
| 40  | 0.13                       | 1.34 | 0.49 | 0.65              | 0.86 | 1.73 | 0.18 | 0.92              | 0.28%  | 1.47% | -0.65% | 0.37%             |
| 41  | 0.06                       | 0.4  | 0.12 | 0.19              | 0.94 | 0.33 | 0.36 | 0.54              | 1.02%  | 0.19% | 0.23%  | 0.48%             |
| 46  | 0.36                       | 0.74 | 0.56 | 0.55              | 1.93 | 2.16 | 0.69 | 1.59              | 1.88%  | 2.19% | 0.19%  | 1.42%             |
| 49  | 0.06                       | 0.66 | 0.07 | 0.26              | 1.25 | 1.23 | 0.25 | 0.91              | 1.35%  | 1.32% | -0.02% | 0.88%             |
| 50  | 0.06                       | 0.18 | 0.48 | 0.24              | 0.75 | 0.44 | 0.11 | 0.43              | 0.70%  | 0.27% | -0.18% | 0.26%             |
| 56  | 0.14                       | 0.47 | 0.25 | 0.29              | 2.17 | 1.32 | 2.43 | 1.97              | 2.57%  | 1.41% | 2.92%  | 2.30%             |
| 61  | 0.22                       | 0.41 | 0.3  | 0.31              | 3.56 | 2.26 | 0.24 | 2.02              | 4.43%  | 2.66% | -0.10% | 2.33%             |
| 62  | 0.06                       | 0.09 | 0.07 | 0.07              | 0.87 | 0.23 | 0.35 | 0.48              | 1.09%  | 0.21% | 0.38%  | 0.56%             |
| 63  | 0.1                        | 0.07 | 0.06 | 0.08              | 0.75 | 0.4  | 1.19 | 0.78              | 0.92%  | 0.44% | 1.52%  | 0.96%             |
| 65  | 0.01                       | 0.21 | 0.22 | 0.15              | 1.19 | 0.42 | 1.19 | 0.93              | 1.42%  | 0.37% | 1.42%  | 1.07%             |
| 68  | 0.05                       | 0.25 | 0.18 | 0.16              | 1.22 | 1.13 | 1.19 | 1.18              | 1.45%  | 1.32% | 1.41%  | 1.39%             |
| 69  | 0.05                       | 0.06 | 0.18 | 0.10              | 0.69 | 0.25 | 0.18 | 0.37              | 0.81%  | 0.21% | 0.11%  | 0.38%             |
| 71  | 0.11                       | 0.32 | 0.26 | 0.23              | 1.62 | 0.7  | 0.83 | 1.05              | 1.90%  | 0.64% | 0.82%  | 1.12%             |
| 75  | 0.16                       | 0.53 | 0.4  | 0.36              | 2.75 | 1.88 | 1.69 | 2.11              | 3.26%  | 2.07% | 1.81%  | 2.38%             |
| 76  | 0                          | 0.01 | 0.07 | 0.03              | 0.6  | 0.58 | 1.36 | 0.85              | 0.78%  | 0.75% | 1.82%  | 1.12%             |
| 77  | 0.05                       | 0.1  | 0.13 | 0.09              | 0.47 | 0.33 | 1.34 | 0.71              | 0.51%  | 0.32% | 1.70%  | 0.85%             |
| 78  | 0.16                       | 0.29 | 0.34 | 0.26              | 0.79 | 0.73 | 1.68 | 1.07              | 0.72%  | 0.64% | 1.93%  | 1.10%             |
| 79  | 0.04                       | 0.2  | 0.32 | 0.19              | 0.36 | 0.55 | 1.8  | 0.90              | 0.24%  | 0.50% | 2.20%  | 0.98%             |
| 82  | 0.54                       | 0.44 | 0.82 | 0.60              | 1.47 | 1.67 | 1.88 | 1.67              | 1.19%  | 1.46% | 1.75%  | 1.46%             |

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| Day   | CO <sub>2</sub> (g/vessel) |       |      |                   |        |        |        |                   | D (%)  |        |        |                   |
|-------|----------------------------|-------|------|-------------------|--------|--------|--------|-------------------|--------|--------|--------|-------------------|
|       | B1                         | B2    | B3   | B <sub>mean</sub> | t1     | t2     | t3     | t <sub>mean</sub> | t1 (%) | t2     | t3     | t <sub>mean</sub> |
| 83    | 0.23                       | 0.17  | 0.38 | 0.26              | 0.57   | 0.59   | 1.98   | 1.05              | 0.42%  | 0.45%  | 2.35%  | 1.07%             |
| 84    | 0.13                       | 0.08  | 0.17 | 0.13              | 0.4    | 0.61   | 1.63   | 0.88              | 0.37%  | 0.66%  | 2.05%  | 1.03%             |
| 86    | 0.23                       | 0.08  | 0.3  | 0.20              | 1.71   | 1.87   | 1.71   | 1.76              | 2.06%  | 2.27%  | 2.06%  | 2.13%             |
| 89    | 0.24                       | 0.18  | 0.5  | 0.31              | 1.11   | 1.44   | 1.29   | 1.28              | 1.10%  | 1.55%  | 1.34%  | 1.33%             |
| 91    | 0.35                       | 0.24  | 0.37 | 0.32              | 1.57   | 1.44   | 1.27   | 1.43              | 1.71%  | 1.53%  | 1.30%  | 1.51%             |
| 93    | 0.28                       | 0.1   | 0.31 | 0.23              | 0.51   | 0.9    | 0.7    | 0.70              | 0.38%  | 0.91%  | 0.64%  | 0.65%             |
| 96    | 0.35                       | 0.06  | 0.14 | 0.18              | 1.8    | 1.84   | 1.82   | 1.82              | 2.21%  | 2.26%  | 2.23%  | 2.23%             |
| 99    | 0.33                       | 0.27  | 0.23 | 0.28              | 1.41   | 1.22   | 1.02   | 1.22              | 1.55%  | 1.29%  | 1.01%  | 1.28%             |
| 103   | 0.27                       | 0.11  | 0.01 | 0.13              | 0.94   | 1.32   | 1.12   | 1.13              | 1.11%  | 1.62%  | 1.35%  | 1.36%             |
| 106   | 0.41                       | 0.26  | 0.32 | 0.33              | 0.51   | 0.51   | 1.87   | 0.96              | 0.25%  | 0.25%  | 2.10%  | 0.86%             |
| 112   | 0.5                        | 0.45  | 0.59 | 0.51              | 1.19   | 1.22   | 1.71   | 1.37              | 0.92%  | 0.96%  | 1.63%  | 1.17%             |
| 114   | 0.05                       | 0.12  | 0.26 | 0.14              | 0.43   | 0.99   | 0.59   | 0.67              | 0.39%  | 1.16%  | 0.61%  | 0.72%             |
| 117   | 0.08                       | 0.43  | 0.03 | 0.18              | 1.15   | 1.16   | 1.15   | 1.15              | 1.32%  | 1.34%  | 1.32%  | 1.33%             |
| 121   | 0.47                       | 0.88  | 0.67 | 0.67              | 0.92   | 1.12   | 0.74   | 0.93              | 0.34%  | 0.61%  | 0.09%  | 0.35%             |
| 124   | 0.59                       | 0.76  | 0.72 | 0.69              | 1.31   | 1.97   | 2.07   | 1.78              | 0.85%  | 1.75%  | 1.88%  | 1.49%             |
| total | 33.56                      | 35.42 | 36.1 | 35.03             | 102.69 | 102.62 | 102.23 | 102.51            | 92.31% | 92.21% | 91.68% | 92.07%            |

The rate of biodegradation reached 90% for each vessel

(CO<sub>2</sub>)<sub>B</sub> = Measured cumulative CO<sub>2</sub> production by blank

(CO<sub>2</sub>)<sub>t</sub> = Measured cumulative CO<sub>2</sub> production by test or reference material

(CO<sub>2</sub>)<sub>Bmean</sub> = [(CO<sub>2</sub>)<sub>B1</sub> + (CO<sub>2</sub>)<sub>B2</sub> + (CO<sub>2</sub>)<sub>B3</sub>] / 3

D = [(CO<sub>2</sub>)<sub>t</sub> - (CO<sub>2</sub>)<sub>Bmean</sub>] / ThCO<sub>2</sub>

D<sub>mean</sub> = (D<sub>t1</sub> + D<sub>t2</sub> + D<sub>t3</sub>) / 3

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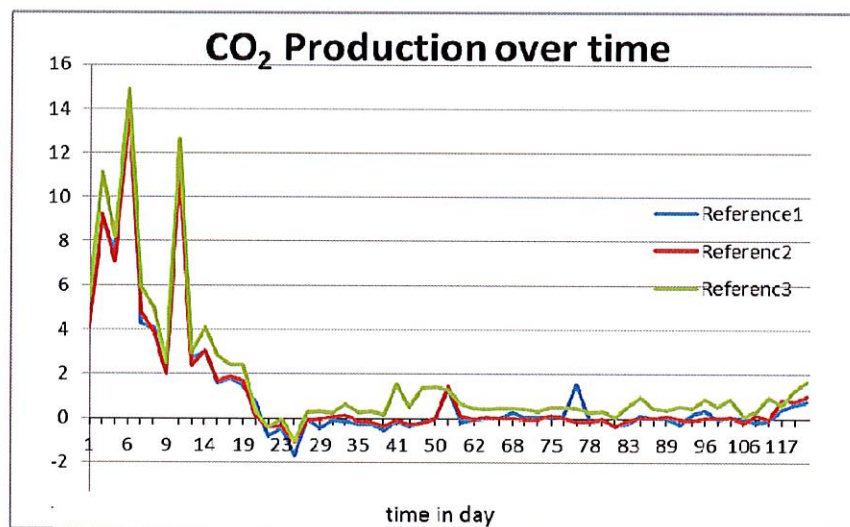
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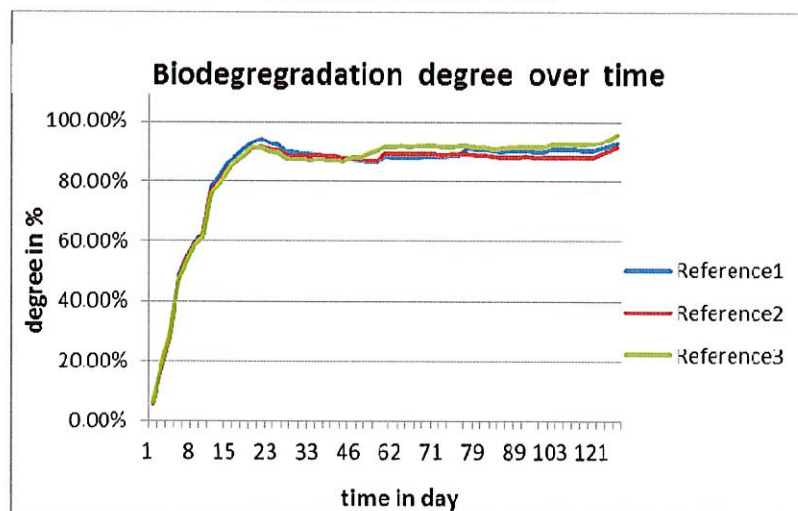
#### Reference Material

|                                                                                                                                       |       |
|---------------------------------------------------------------------------------------------------------------------------------------|-------|
| Amount of total organic carbon (TOC) of the reference material placed in each vessel                                                  | 20 g  |
| This TOC leads to a theoretical amount of evolved carbon dioxide (ThCO <sub>2</sub> ), caused by the degradation of the test material | 73.3g |



CO<sub>2</sub> Evolution Curve of Reference Material

*Production of CO<sub>2</sub> over time*



Biodegradation Curve of Reference Material

CO<sub>2</sub> Evolution Curve of Reference Material

*Degree of degradation over time*

**Table 9 - Controlled aerobic composting test data of reference material**

| Day | CO <sub>2</sub> (g/vessel) |      |      |                   |       |       |       |                   | D (%)  |        |        |                   |
|-----|----------------------------|------|------|-------------------|-------|-------|-------|-------------------|--------|--------|--------|-------------------|
|     | B1                         | B2   | B3   | B <sub>mean</sub> | R1    | R2    | R3    | R <sub>mean</sub> | R1 (%) | R2     | R3     | R <sub>mean</sub> |
| 1   | 2.93                       | 2.55 | 2.61 | 2.70              | 7     | 6.8   | 7.06  | 6.95              | 5.87%  | 5.59%  | 5.95%  | 5.80%             |
| 2   | 2.52                       | 2.56 | 2.02 | 2.37              | 11.3  | 11.57 | 11.96 | 11.61             | 12.18% | 12.55% | 13.08% | 12.61%            |
| 3   | 2.09                       | 2.03 | 2.18 | 2.10              | 9.69  | 9.16  | 9.08  | 9.31              | 10.35% | 9.63%  | 9.52%  | 9.84%             |
| 6   | 1.07                       | 1.08 | 1.15 | 1.10              | 15.75 | 15.16 | 14.11 | 15.01             | 19.99% | 19.18% | 17.75% | 18.98%            |
| 7   | 1.7                        | 1.79 | 1.81 | 1.77              | 6.04  | 6.54  | 6.68  | 6.42              | 5.83%  | 6.51%  | 6.70%  | 6.34%             |
| 8   | 1.81                       | 1.75 | 1.26 | 1.61              | 5.67  | 5.49  | 5.69  | 5.62              | 5.54%  | 5.29%  | 5.57%  | 5.47%             |
| 9   | 1.84                       | 1.46 | 1.51 | 1.60              | 3.58  | 3.6   | 3.47  | 3.55              | 2.70%  | 2.73%  | 2.55%  | 2.66%             |
| 12  | 1.74                       | 1.83 | 2.87 | 2.15              | 13.84 | 13.3  | 13.1  | 13.41             | 15.95% | 15.21% | 14.94% | 15.36%            |
| 13  | 0.79                       | 1.09 | 1.56 | 1.15              | 3.89  | 3.5   | 3.41  | 3.60              | 3.74%  | 3.21%  | 3.08%  | 3.34%             |
| 14  | 0.48                       | 0.73 | 0.57 | 0.59              | 3.6   | 3.63  | 3.86  | 3.70              | 4.11%  | 4.15%  | 4.46%  | 4.24%             |
| 15  | 0.58                       | 0.94 | 0.83 | 0.78              | 2.39  | 2.47  | 2.91  | 2.59              | 2.20%  | 2.31%  | 2.91%  | 2.47%             |
| 16  | 0.28                       | 0.48 | 0.88 | 0.55              | 2.38  | 2.39  | 2.33  | 2.37              | 2.50%  | 2.51%  | 2.43%  | 2.48%             |
| 19  | 2.48                       | 0.18 | 0.4  | 1.02              | 2.49  | 2.7   | 2.79  | 2.66              | 2.01%  | 2.29%  | 2.41%  | 2.24%             |
| 21  | 1.11                       | 0.38 | 0.85 | 0.78              | 1.49  | 0.87  | 0.66  | 1.01              | 0.97%  | 0.12%  | -0.16% | 0.31%             |
| 22  | 0.79                       | 0.37 | 2.06 | 1.07              | 0.26  | 0.67  | 0.3   | 0.41              | -1.11% | -0.55% | -1.05% | -0.90%            |
| 23  | 0.8                        | 0.3  | 0.39 | 0.50              | 0.03  | 0.14  | 0.06  | 0.08              | -0.64% | -0.49% | -0.60% | -0.57%            |
| 26  | 2.57                       | 1.71 | 1    | 1.76              | 0.1   | 0.69  | 0.42  | 0.40              | -2.26% | -1.46% | -1.83% | -1.86%            |
| 27  | 0.31                       | 0.39 | 0.2  | 0.30              | 0.25  | 0.2   | 0.14  | 0.20              | -0.07% | -0.14% | -0.22% | -0.14%            |
| 29  | 0.44                       | 0.69 | 0.47 | 0.53              | 0.1   | 0.49  | 0.42  | 0.34              | -0.59% | -0.05% | -0.15% | -0.26%            |
| 30  | 0.05                       | 0.51 | 0.21 | 0.26              | 0.18  | 0.3   | 0.08  | 0.19              | -0.11% | 0.05%  | -0.25% | -0.10%            |

| Day | CO <sub>2</sub> (g/vessel) |      |      |                   |      |       |      |                   | D (%)  |        |        |                   |
|-----|----------------------------|------|------|-------------------|------|-------|------|-------------------|--------|--------|--------|-------------------|
|     | B1                         | B2   | B3   | B <sub>mean</sub> | R1   | R2    | R3   | R <sub>mean</sub> | R1 (%) | R2     | R3     | R <sub>mean</sub> |
| 33  | 0.16                       | 0.29 | 0.41 | 0.29              | 0.17 | 0.41  | 0.45 | 0.34              | -0.16% | 0.16%  | 0.22%  | 0.07%             |
| 35  | 0.08                       | 0.69 | 0.31 | 0.36              | 0.09 | 0.22  | 0.2  | 0.17              | -0.37% | -0.19% | -0.22% | -0.26%            |
| 37  | 0.07                       | 0.66 | 0.23 | 0.32              | 0.06 | 0.12  | 0.2  | 0.13              | -0.35% | -0.27% | -0.16% | -0.26%            |
| 40  | 0.13                       | 1.34 | 0.49 | 0.65              | 0.09 | 0.31  | 0.36 | 0.25              | -0.76% | -0.46% | -0.40% | -0.55%            |
| 41  | 0.06                       | 0.4  | 0.12 | 0.19              | 0.07 | 0.12  | 1.2  | 0.46              | -0.16% | -0.10% | 1.38%  | 0.37%             |
| 46  | 0.36                       | 0.74 | 0.56 | 0.55              | 0.18 | 0.29  | 0.62 | 0.36              | -0.50% | -0.35% | 0.10%  | -0.26%            |
| 49  | 0.06                       | 0.66 | 0.07 | 0.26              | 0.1  | 0.05  | 1.11 | 0.42              | -0.22% | -0.29% | 1.16%  | 0.22%             |
| 50  | 0.06                       | 0.18 | 0.48 | 0.24              | 0.25 | 0.22  | 1.11 | 0.53              | 0.01%  | -0.03% | 1.19%  | 0.40%             |
| 56  | 0.14                       | 0.47 | 0.25 | 0.29              | 1.66 | 1.76  | 1.06 | 1.49              | 1.87%  | 2.01%  | 1.05%  | 1.64%             |
| 61  | 0.22                       | 0.41 | 0.3  | 0.31              | 0.14 | 0.41  | 0.49 | 0.35              | -0.23% | 0.14%  | 0.25%  | 0.05%             |
| 62  | 0.06                       | 0.09 | 0.07 | 0.07              | 0.03 | 0.02  | 0.1  | 0.05              | -0.05% | -0.07% | 0.04%  | -0.03%            |
| 63  | 0.1                        | 0.07 | 0.06 | 0.08              | 0.09 | 0.11  | 0.05 | 0.08              | 0.01%  | 0.04%  | -0.04% | 0.00%             |
| 65  | 0.01                       | 0.21 | 0.22 | 0.15              | 0.14 | 0.13  | 0.16 | 0.14              | -0.01% | -0.03% | 0.01%  | -0.01%            |
| 68  | 0.05                       | 0.25 | 0.18 | 0.16              | 0.42 | 0.14  | 0.19 | 0.25              | 0.35%  | -0.03% | 0.04%  | 0.12%             |
| 69  | 0.05                       | 0.06 | 0.18 | 0.10              | 0.13 | 0.04  | 0.08 | 0.08              | 0.04%  | -0.08% | -0.03% | -0.03%            |
| 71  | 0.11                       | 0.32 | 0.26 | 0.23              | 0.27 | 0.17  | 0.12 | 0.19              | 0.05%  | -0.08% | -0.15% | -0.05%            |
| 75  | 0.16                       | 0.53 | 0.4  | 0.36              | 0.43 | 0.52  | 0.42 | 0.46              | 0.10%  | 0.22%  | 0.08%  | 0.14%             |
| 76  | 0                          | 0.01 | 0.07 | 0.03              | 0.15 | 0.01  | 0.07 | 0.08              | 0.16%  | -0.03% | 0.05%  | 0.07%             |
| 77  | 0.05                       | 0.1  | 0.13 | 0.09              | 1.64 | -0.03 | 0.11 | 0.57              | 2.11%  | -0.16% | 0.03%  | 0.65%             |
| 78  | 0.16                       | 0.29 | 0.34 | 0.26              | 0.14 | 0.15  | 0.11 | 0.13              | -0.16% | -0.15% | -0.20% | -0.18%            |
| 79  | 0.04                       | 0.2  | 0.32 | 0.19              | 0.13 | 0.16  | 0.09 | 0.13              | -0.08% | -0.04% | -0.14% | -0.08%            |

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| Day   | CO <sub>2</sub> (g/vessel) |       |      |                   |       |        |        |                   | D (%)  |        |        |                   |
|-------|----------------------------|-------|------|-------------------|-------|--------|--------|-------------------|--------|--------|--------|-------------------|
|       | B1                         | B2    | B3   | B <sub>mean</sub> | R1    | R2     | R3     | R <sub>mean</sub> | R1 (%) | R2     | R3     | R <sub>mean</sub> |
| 82    | 0.54                       | 0.44  | 0.82 | 0.60              | 0.3   | 0.25   | 0.25   | 0.27              | -0.41% | -0.48% | -0.48% | -0.45%            |
| 83    | 0.23                       | 0.17  | 0.38 | 0.26              | 0.05  | 0.15   | 0.34   | 0.18              | -0.29% | -0.15% | 0.11%  | -0.11%            |
| 84    | 0.13                       | 0.08  | 0.17 | 0.13              | 0.26  | 0.12   | 0.58   | 0.32              | 0.18%  | -0.01% | 0.61%  | 0.26%             |
| 86    | 0.23                       | 0.08  | 0.3  | 0.20              | 0.19  | 0.22   | 0.2    | 0.20              | -0.01% | 0.03%  | 0.00%  | 0.00%             |
| 89    | 0.24                       | 0.18  | 0.5  | 0.31              | 0.31  | 0.39   | 0.23   | 0.31              | 0.00%  | 0.11%  | -0.11% | 0.00%             |
| 91    | 0.35                       | 0.24  | 0.37 | 0.32              | 0.03  | 0.26   | 0.42   | 0.24              | -0.40% | -0.08% | 0.14%  | -0.11%            |
| 93    | 0.28                       | 0.1   | 0.31 | 0.23              | 0.43  | 0.14   | 0.23   | 0.27              | 0.27%  | -0.12% | 0.00%  | 0.05%             |
| 96    | 0.35                       | 0.06  | 0.14 | 0.18              | 0.56  | 0.17   | 0.55   | 0.43              | 0.52%  | -0.01% | 0.50%  | 0.34%             |
| 99    | 0.33                       | 0.27  | 0.23 | 0.28              | 0.24  | 0.3    | 0.37   | 0.30              | -0.05% | 0.03%  | 0.12%  | 0.03%             |
| 103   | 0.27                       | 0.11  | 0.01 | 0.13              | 0.19  | 0.19   | 0.5    | 0.29              | 0.08%  | 0.08%  | 0.50%  | 0.22%             |
| 106   | 0.41                       | 0.26  | 0.32 | 0.33              | 0.35  | 0.13   | 0      | 0.16              | 0.03%  | -0.27% | -0.45% | -0.23%            |
| 112   | 0.5                        | 0.45  | 0.59 | 0.51              | 0.34  | 0.63   | 0.4    | 0.46              | -0.23% | 0.16%  | -0.15% | -0.07%            |
| 114   | 0.05                       | 0.12  | 0.26 | 0.14              | 0.07  | 0.1    | 0.6    | 0.26              | -0.10% | -0.05% | 0.63%  | 0.16%             |
| 117   | 0.08                       | 0.43  | 0.03 | 0.18              | 0.61  | 1      | 0.3    | 0.64              | 0.59%  | 1.12%  | 0.16%  | 0.63%             |
| 121   | 0.47                       | 0.88  | 0.67 | 0.67              | 1.3   | 1.43   | 1.4    | 1.38              | 0.86%  | 1.04%  | 1.00%  | 0.97%             |
| 124   | 0.59                       | 0.76  | 0.72 | 0.69              | 1.46  | 1.67   | 1.81   | 1.65              | 1.05%  | 1.34%  | 1.53%  | 1.31%             |
| total | 33.56                      | 35.42 | 36.1 | 35.03             | 103.1 | 102.15 | 105.01 | 103.42            | 92.86% | 91.57% | 95.47% | 93.30%            |

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$$\begin{aligned}(\text{CO}_2)_B &= \text{Measured cumulative CO}_2 \text{ production by blank} \\(\text{CO}_2)_t &= \text{Measured cumulative CO}_2 \text{ production by test or reference material} \\(\text{CO}_2)_{B\text{mean}} &= [(\text{CO}_2)_{B1} + (\text{CO}_2)_{B2} + (\text{CO}_2)_{B3}] / 3 \\D &= [(\text{CO}_2)_t - (\text{CO}_2)_{B\text{mean}}] / \text{ThCO}_2 \\D_{\text{mean}} &= (D_{t1} + D_{t2} + D_{t3}) / 3\end{aligned}$$

The rate of biodegradation of the reference material is 93% after 124days.

The rate of biodegradation of the test material, compared to the reference material (reference is set to 100%) is 98.6%

## 2.7 Additional information *(observations, reasons for rejection of test results and others)*

The peaks in the diagrams "CO<sub>2</sub> production over time" are caused by not measuring the amount of CO<sub>2</sub> on weekends, therefore the amount on Mondays also contains the amount absorbed during the weekend and is higher than on other weekdays.

For adjusting humidity in the composting vessels water was carefully added to the vessel once a week.

The concentration of oxygen was checked every day during the first week of the test and once a week afterwards. For aerobic conditions the concentration of oxygen shall be higher than 6%. The concentration did not fall below 18% during the test.

-End-