



测试报告



报告编号: ZX220525-010401

Report ID: ZX220525-010401

样品名称: PE 生物降解塑料粒子

Sample name: PE biodegradable plastic particles

委托单位: 格域新材料科技 (江苏) 有限公司

Client: GREEN PACKAGING TECHNOLOGY (JIANG SU) CO., LTD.

测试类型: 委托测试

Test type: Commissioned inspection

测试要求: 按照委托方要求测试

Test requirement: Test according to client's requirement

分析结果: 见后页

Test result: See the back page

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研究测试报告
(Research Test Report)

研究测试结果(Research test result):

科研测试专用章

一、测试样品: PE 生物降解塑料粒子

I. Test sample: PE biodegradable plastic particles

二、测试周期: 2022.06.08-2021.10.08

II. Test period: 2022.06.08-2021.10.08

三、测试方法: ASTM D5511-12 塑料材料在高固体厌氧消化条件下厌氧生物降解测定标准试验方法

III. Test Methods: ASTM D5511-12 Standard Test Method for Determination of Anaerobic Biodegradation of Plastic Materials under High Solid Anaerobic Digestion Conditions

四、接种物的准备: 接种物以经过厌氧消化处理的家庭垃圾作为单一原料, 相应的有机碎片粒径小于 60mm, 接种物来自于干燥条件下的厌氧消化处理。准备好的接种物在同样的操作温度下进行大约 7d 的短期发酵, 以确保在大型易分解样品分解期间, 降低接种物自身生物分解的总体水平。

IV. Preparation of inoculum: The inoculum is made of household garbage treated by anaerobic digestion as a single raw material, and the particle size of the corresponding organic debris is less than 60mm. The inoculum comes from anaerobic digestion treatment under dry conditions. The prepared inoculum is fermented for about 7d at the same operating temperature, so as to ensure that the overall level of biodegradation of inoculum itself is reduced during the decomposition of large easily decomposed samples.

五、试验材料和参比材料的准备: 测定试验材料和参比材料的总有机碳含量, 每个容器内 20g 总干固体至少含有 8g 总有机碳。试验材料为 PE 生物降解塑料粒子, 粒径小于 250 μ m。

V. Preparation of test materials and reference materials: Measure the total organic carbon content of test materials and reference materials. 20g of total dry solids in each container contains at least 8g of total organic carbon. The material is PE biodegradable plastic particles, the particle size of which is less than 250 μ m.



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六、试验过程: 把足够的接种物 (约 10kg) 从发酵容器中取出, 手工混合均匀。各容器每加入湿重 1kg 的接种物, 加入含有 15~20g 挥发性固体的试验材料或参比材料。每个容器最少加入 500g 湿重的接种物, 搅拌 2~3min。3 个空白容器中仅装入接种物, 使用与试验材料和参比材料相同的力度, 手工搅拌 2~3min。将混合物导入消化容器, 分散并轻轻按压, 使其各处密度一致。将容器放入水浴或培养箱中并与气体检测或气体收集系统相连接, 搅拌与连接的总时长不超过 2h, 打开水浴加热装置。

消化容器在温度 $52 \pm 2^\circ\text{C}$ 黑暗或弱光条件下培养 15d。测量不同时间间隔的生物气体产生量, 试验前期需要频繁观察测定, 随时间变化可减少观察次数。

VI. Test process: Take enough inoculum (about 10kg) out of the fermentation container and mix it evenly by hand. Each container is filled with 1kg inoculum with wet weight, and the test material or reference material containing 15~20g volatile solids is added. Add at least 500g of inoculum in each container, and stir for 2~3min. Only the inoculum was filled in three blank containers, and the mixture was stirred manually for 2~3min with the same strength as that of the test material and the reference material. Introduce the mixture into a digestion container, disperse and gently press it to make its density uniform everywhere. Put the container into a water bath or incubator and connect it with a gas detection or gas collection system. The total time of stirring and connection should not exceed 2h. Turn on the water bath heating device.

The digestion vessel was incubated at $52 \pm 2^\circ\text{C}$ in dark or low light for 15d. To measure the biogas production at different time intervals, frequent observation and determination are required in the early stage of the experiment, and the observation times can be reduced with the change of time.



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研究测试结果(Research test result):



试验结束时将消化容器冷却至室温，确定试验的总产气量，记录室温和气压。开始 15 天内，每 3 天测定一次气体产生量，之后每 5 天测一次。

At the end of the test, cool the digestion vessel to room temperature, determine the total gas production of the test, and record the room temperature and air pressure. Within the first 15d, the gas production should be measured every 3d, and then every 5d.

七、试验结果有效性确认

VII. Validation of test results

1、试验 30d 后参比材料的生物分解率超过 70%；

1. The biodegradation rate of reference materials exceeded 70% after 30d of experiment;

2、试验结束后，每个参比材料消化容器的生物分解率与平均值之间的偏差不得超过 20%。

2. After the test, the deviation between the biodegradation rate of each reference material digestion container and the average value is less than 20%.



中析研究所

ZHONGXI RESEARCH INSTITUTE

北京中科光析化工技术研究所 (材料实验室)

Beijing ZKGX Research Institute of Chemical Technology (Material Lab)

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研究测试结果(Research Test Result):



八、试验结论

VIII. Test conclusion

项目 Project	根据释放出的碳量计算平均生物分解率 (120d), % Calculate the average biodegradation rate (120d) according to the released carbon amount, %	观测 Observe
试验样品 Pilot sample	98.5	极少部分未分解 Very few parts are not decomposed.
参比材料 Reference material	99.3	几乎全部分解 Almost completely decomposed

项目 Project	试验材料降解率/参比材料降解率 (120d), % Experimental material degradation rate/reference material degradation rate (120d), %
相对降解率 Relative degradation rate	99.2



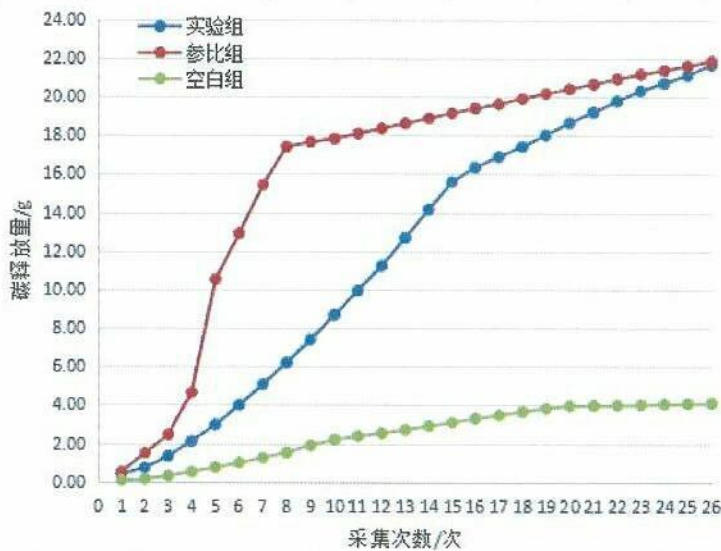
研究测试报告
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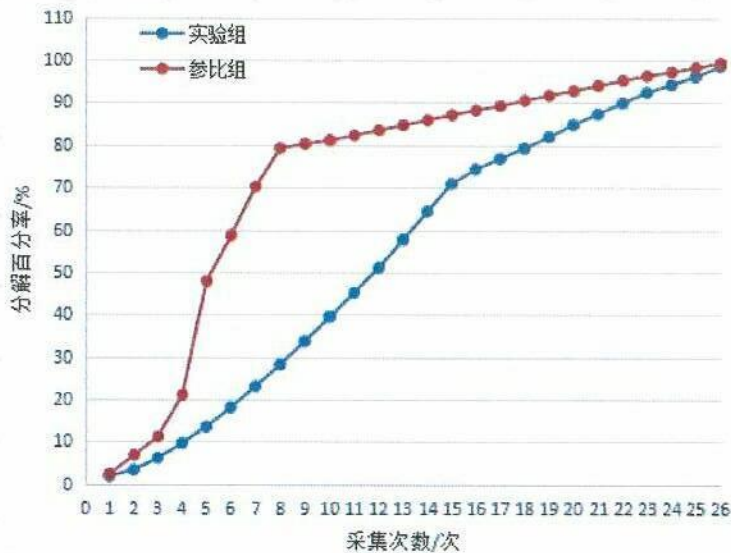
九、试验数据

IX. Test data

1、气体(碳)释放量曲线 Gas (C) release curve



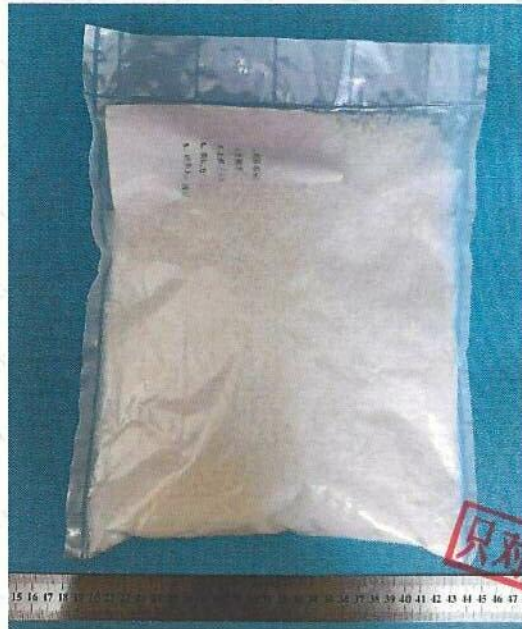
2、生物分解率曲线 Biodegradation rate curve





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样品图片 (Sample picture) :



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Scan the query report for authenticity

*****报告结束*****

(End)



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注意事项

ANNOUNCEMENTS

1. 服务双方必须遵守分析委托登记表/服务合同中服务通用条款的规定;

Both parties must comply with the provisions of the general service terms in the analysis of entrusted registration form/service contract;

2. 本报告无服务方签字人签名无效; 未加盖“北京中科光析化工技术研究所”科研测试专用章一律无效;

The report is invalid without the signature of the responsible person of the service party; The report is invalid without the special seal for scientific research and test of “Beijing ZKGX Research Institute of Chemical Technology”;

3. 由此测试申请所发出的任何结果, 服务方会严格地为委托方保密。除非相关政府部门、法律或法院要求, 否则未经委托方同意, 服务方不得就结果内容向第三方讨论或披露;

Any result of the test application will be strictly confidential to the client. Unless required by relevant government departments, laws or courts, the service party shall not discuss or disclose the results to any third party without the consent of the principal;

4. 本报告全部或部分复制、私自转让、盗用、冒用、涂改或以其它任何形式篡改的均属无效, 本单位将对上述行为追究其相应法律责任。

Any copy, transfer, misappropriation, false use, alteration or any other form of tampering of the report in whole or in part is invalid. The service party shall strictly investigate the corresponding legal liability for the above-mentioned acts

5. 测试结果得出的数据或结论是基于特定的时间、特定的方法以及特定的适用标准对测试样品特征、成份、性能或质量进行的描述, 采用不同的方法和标准、在不同的环境条件下对样品进行测试有可能得出不同的结论;

The data or conclusions derived from the test results are descriptions of the characteristics, components, performance or quality of the test samples based on the specific time, method and applicable standards, using different methods and standards, in different environmental conditions to detect samples may lead to different conclusions;

6. 服务方接受样品进行测试的前提是, 委托方不能将该测试报告做为进行法律行动的依据;

The premise that the service party accepts the sample for testing is that the client cannot use the test report as a basis for legal action;

7. 检测结果仅代表送检样品, 不对送检样品所代表的批量负责; 样品来源信息由委托方提供, 并保证来源信息的真实性, 服务方不负责其真实性, 本报告有效期 12 个月。

The test result only represents the sample sent for inspection, and shall not be responsible for the batch represented by the sample sent for inspection; The sample source information shall be provided by the client and the authenticity of the source information shall be guaranteed. The service party shall not be responsible for its authenticity; The present report is valid for 12 months.

8. 本报告仅对所测样品的测试结果负责, 测试数据仅反映对该样品的评价且仅用于委托方科研、教学或内部质量控制、企业产品研发等目的; 出具的检测数据结果仅限定为特定委托方内部使用, 不对社会具有证明作用, 不得用于维权、纠纷、司法等法律用途, 对于测试数据的使用、使用所产生的直接或间接损失及一切法律后果, 服务方不承担任何经济和法律后果。

This report is only responsible for the test results of the tested samples, and the test data only reflect the evaluation of the samples and are only used for the purposes of scientific research, teaching or internal quality control, enterprise product development, etc. The test results issued are limited to the internal use of specific clients, and have no proof role for the society, can't be used for legal purposes such as safeguarding rights, disputes, judicature, etc. The service party shall not assume any economic and legal liability for the use of test data, direct or indirect losses caused by the use and all legal consequences.

9. 由于服务方的原因导致需要对测试结果内容进行更改的, 服务方应当重新为委托方出具测试结果, 并承担更改测试结果产生的费用, 委托方向服务方交还原测试结果。由于委托方自身的原因导致需要对测试结果内容进行更改的, 委托方应当向服务方提出修改申请。经服务方审核同意予以重新出具测试结果的, 相关费用由委托方承担, 委托方向服务方交还原测试结果。

If the content of the test results needs to be changed due to the reasons of the service party, the service party shall issue the test results for the applicant again, and bear the cost of changing the test results, and entrust the service party to submit the restore test results. If the content of the test results needs to be changed due to the reasons of the applicant, the applicant shall submit an application for modification to the service party. If the test result is re-issued after the examination and approval of the service party, the related expenses shall be borne by the applicant, and the applicant shall submit the test result to the service party for restoration.

