

最新環保塑膠國際測試、環保標籤、
環保法規及對行業的影響

**BIOPLASTICS: INTERNATIONAL TEST STANDARDS,
MARKINGS, REGULATIONS AND FUTURE TRENDS**

22 July 2022

Sammiel Li

Senior Manager, Central Chemical Laboratory

Intertek Testing Services Hong Kong Limited

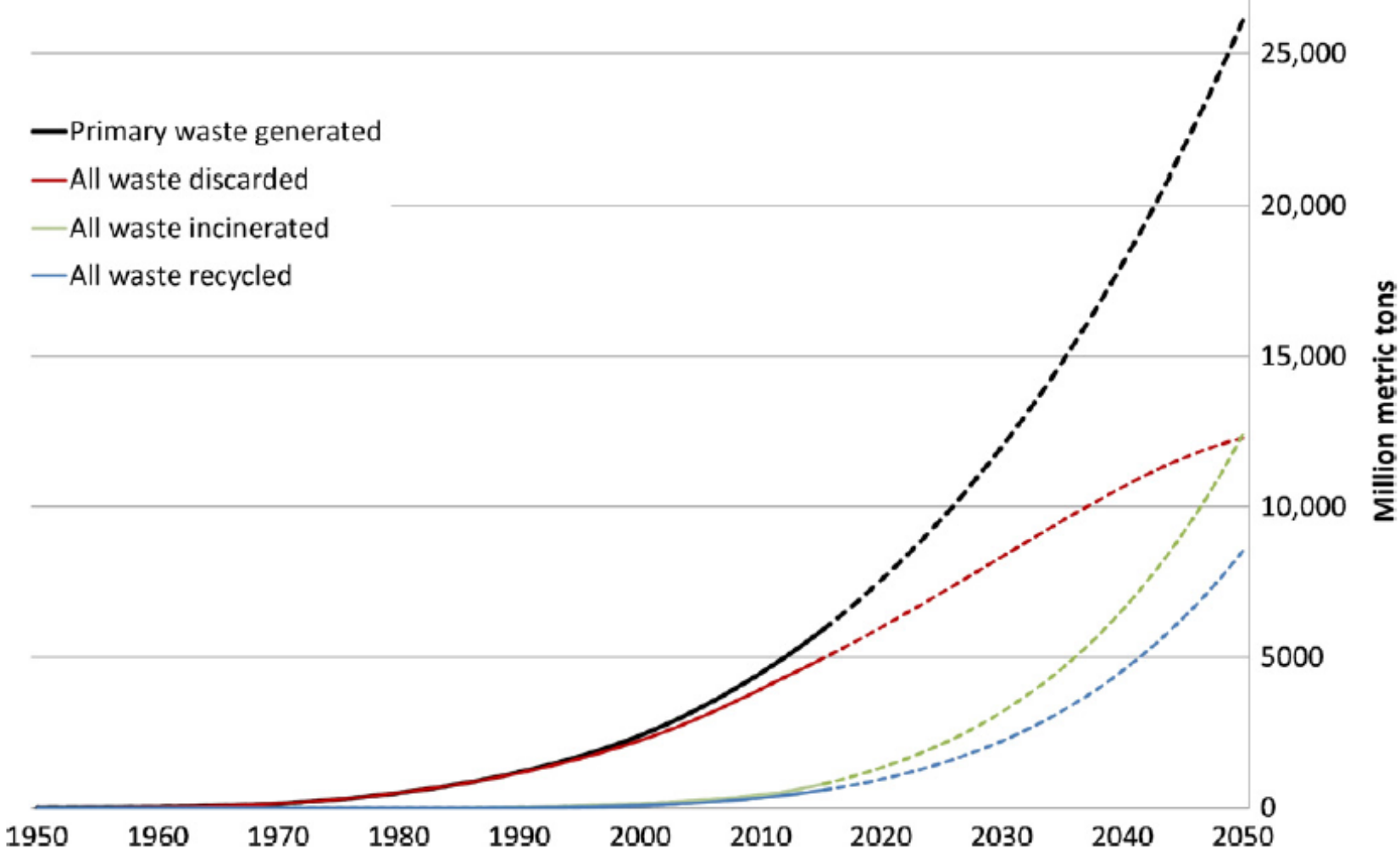


AGENDA

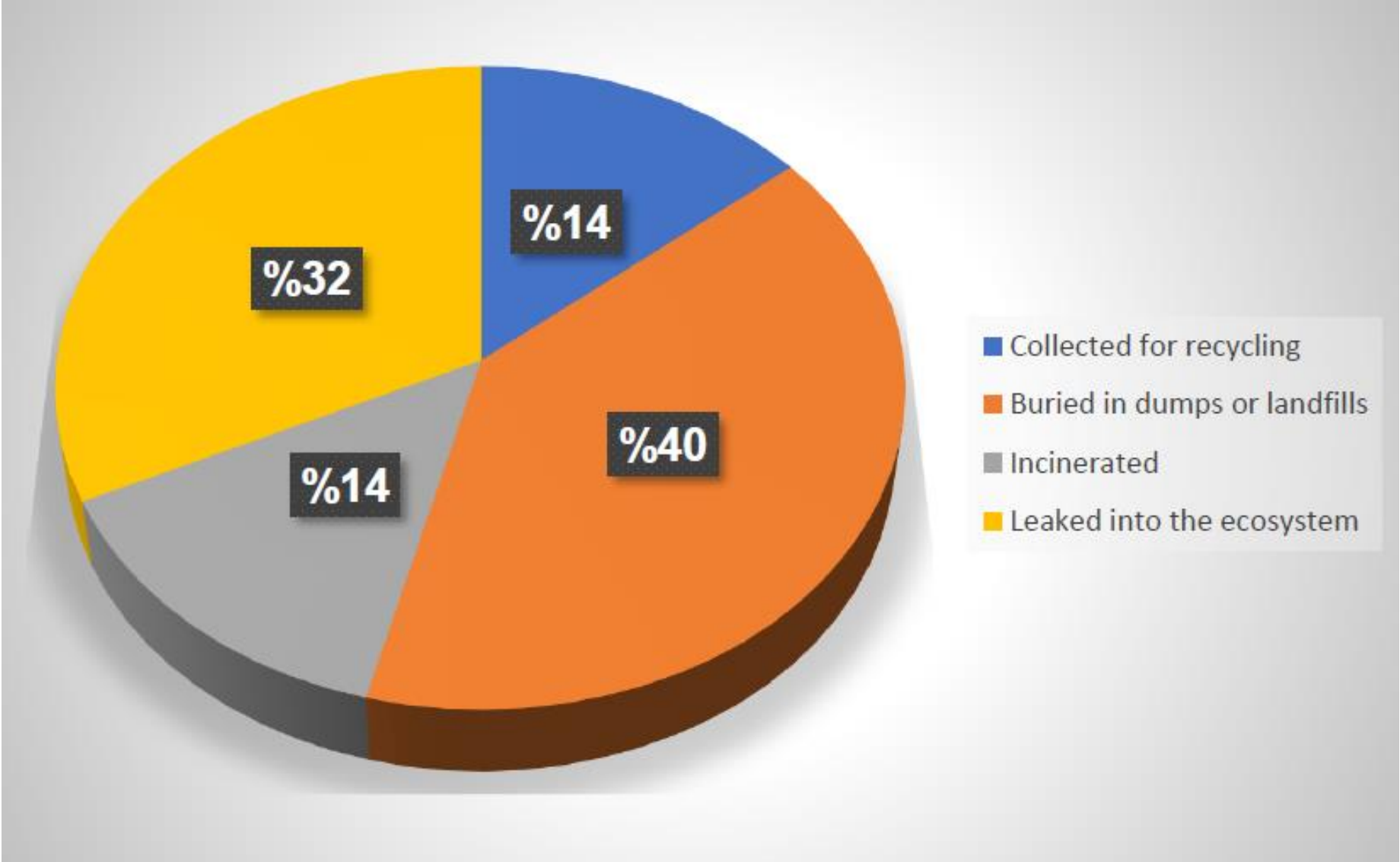
1. Global concern in plastic materials
2. EU plastic regulations & standards and future trends
3. China plastic regulations & standards and future trends
4. US plastic regulations & standards and future trends
5. Testing and certification of bioplastics



GENERATION AND DISCARDING OF PLASTIC WASTE



FATE OF PLASTIC PACKAGING MATERIALS



AGENDA

1. Global concern in plastic materials
2. EU plastic regulations & standards and future trends
3. China plastic regulations & standards and future trends
4. US plastic regulations & standards and future trends
5. Testing and certification of bioplastics



EU PLASTIC POLICY



Almost **26 million tonnes** of plastic waste is generated in Europe every year

Around **80%** of marine litter is plastic

87% of Europeans are worried about the impact of plastic products on the environment

Plastics are an important material in our economy and daily lives. However, they can **have serious negative effects on the environment and human health.**

The EU is taking action on plastics to **tackle plastic pollution and marine litter**, and to accelerate the transition to a circular plastics economy.

The plastics strategy aims to protect our environment and **reduce marine litter, greenhouse gas emissions and our dependence on imported fossil fuels.**

It will support more sustainable and safer consumption and production patterns for plastics. The plastics strategy also aims to transform the way plastic products are **designed, produced, used and recycled in the EU.**



EU FIVE-STEP WASTE HIERARCHY



The EU Waste Framework Directive (2008/98/EC) defines a **five-step waste hierarchy**, ranking the treatments of waste based on their ability to conserve resources.

Follow the waste hierarchy:

First consider how to **reduce** packaging, then design for **reuse**, next for **recycling** and then, where appropriate, for **composting** before considering **recovery** and **disposal**.

EU PLASTIC POLICY



The EU is taking action to tackle plastic pollution and marine litter to accelerate the transition to a circular and resource-efficient plastics economy.

Specific rules and targets apply to certain areas, including:

- **Single-use plastics,**
- **Plastic packaging,**
- **Microplastics,**
- **Bio-based, biodegradable and compostable plastics.**



DIRECTIVE (EU) 2019/904 —SINGLE-USE PLASTIC (SUP) REGULATION



Scope

Single-use plastics are made wholly or partly of plastic and are typically intended to be used just once or for a short period of time before they are thrown away.

Market restrictions (bans)

The plastic products to be banned under the directive include:

- cutlery (forks, knives, spoons, chopsticks); plates; straws; cotton bud sticks; beverage stirrers; sticks to be attached to and to support balloons; food containers made of expanded polystyrene; products made from oxo-degradable plastic.

Consumption reductions

- In line with the EU's waste policy, EU countries are required to:
 - take measures to reduce the consumption of certain single-use plastics for which there is no alternative
 - monitor consumption of these single-use products as well as the measures taken and report the progress made to the European Commission.
- The directive requires an ambitious and sustained quantitative reduction in consumption of these products by 2026 (compared to a 2022 baseline).

PLASTIC PACKAGING

The Packaging Directive aims to harmonise national measures on packaging and the management of packaging waste; provide a high level of environmental protection; ensure the good functioning of the internal market.

The latest amendment to the Directive contains updated measures to:

- prevent the production of packaging waste, and
- promote the reuse, recycling and other forms of recovering of packaging waste, instead of its final disposal

Among other rules, by end of 2024, EU countries should ensure that producer responsibility schemes are established for all packaging. The Directive also sets the following **specific targets for recycling**.

	Current targets (%)	By 2025 (%)	By 2030 (%)
All packaging	55	65	70
Plastic	25	50	55
Wood	15	25	30
Ferrous metals	50 (incl. Al)	70	80
Aluminium	-	50	60
Glass	60	70	75
Paper and cardboard	60	75	85



MICROPLASTICS

- Microplastics are small pieces of plastics, usually smaller than 5mm. A growing volume of microplastics is found in the environment, including the sea, and in food and drinking water.
- Once in the environment, microplastics do not biodegrade and tend to accumulate - unless they are specifically designed to biodegrade in the open environment. Biodegradability is a complex phenomenon, especially in the marine environment.
- There are increasing concerns about the presence of microplastics in different environment compartments (such as water), their impact on the environment and potentially human health.
- The risks posed by microplastics and their presence in the environment, drinking water and food must be explored further.
- There is currently no single European law that covers microplastics in a comprehensive manner.



MICROPLASTICS

As a first step, the European Commission requested the European Chemicals Agency (ECHA) **to prepare a restriction dossier concerning the use of intentionally added microplastics to consumer or professional use products.** The Commission will soon assess ECHA's submission and reflect on the most appropriate measures.

In parallel, the European Commission announced a new **initiative to address the unintentional release of microplastics in the environment.**

It aims to:

- **develop labelling, standardisation, certification and regulatory measures on unintentional release of microplastics**, including measures to increase the capture of microplastics at all relevant stages of products' lifecycle
- **further develop and harmonise methods for measuring unintentionally released microplastics, especially from tyres and textiles**, and delivering harmonised data on microplastics concentrations in seawater
- close the gaps in scientific knowledge related to the **risk and presence of microplastics in the environment, drinking water and food**



EU policy framework on bio-based, biodegradable and compostable plastics



18 January - 15 March 2022

Web-based public consultation on a "Policy framework on biobased, biodegradable and compostable plastics"

September 2021

Commission publishes Roadmap for the policy framework on biobased, biodegradable and compostable plastics

11 March 2020

Publication of the new circular economy action plan
Including a policy framework for bio-based plastics and biodegradable or compostable plastics

11 December 2019

Publication of the European Green Deal
Announcing that a policy framework for bio-based plastics and biodegradable or compostable plastics would be introduced under the circular economy action plan

BIO-BASED, BIODEGRADABLE AND COMPOSTABLE PLASTICS



The EU will address the **sourcing, labelling and use of bio-based plastics, and the use of biodegradable and compostable plastics.**

Overview

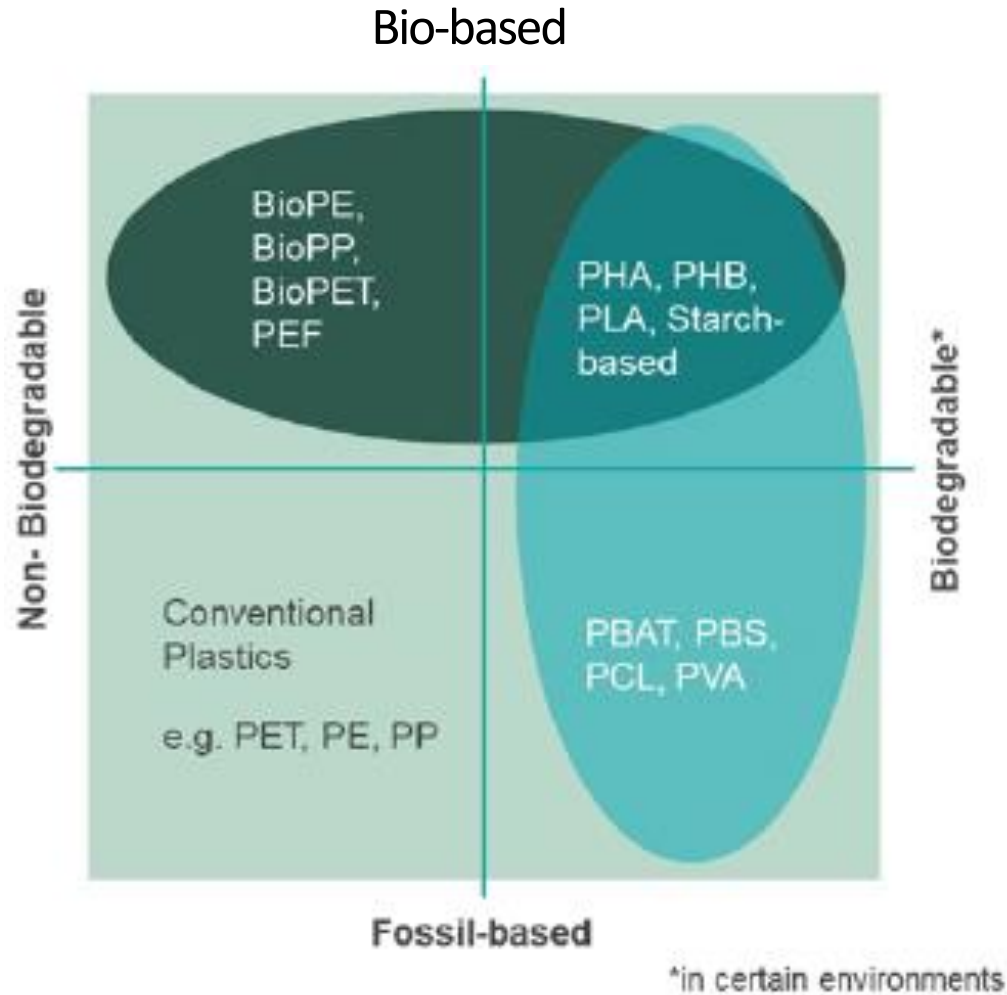
- Most plastics are **made from fossil fuels**, which contribute to increased **greenhouse gas emissions** and pollution.
- Alternative plastics, such as **bio-based, biodegradable and compostable plastics** may be a more sustainable **alternative to fossil-based, non-biodegradable plastics**. However, they present both new opportunities and risks that must be carefully assessed.

Background

- There is currently **no EU law in place applying to bio-based, biodegradable and compostable plastics in a comprehensive manner**. The European Commission announced a policy framework on the sourcing, labelling and use of bio-based plastics, and the use of biodegradable and compostable plastics.

The Commission **will assess where the use of bio-based feedstock leads to genuine environmental benefits, and not only reduces the use of fossil resources**. The Commission **will also assess where using biodegradable and compostable plastics can be beneficial to the environment, and the criteria for these uses**.

BIO-BASED AND BIODEGRADABLE PLASTICS



- **Bio-based** or partially bio-based **non-biodegradable plastics** such as bio-based PE or PP
- Plastics that are both **bio-based and biodegradable**, such as biodegradable PLA or PHA
- Plastics that are **fossil-based and biodegradable**, such as PBAT or PBS
- **Biodegradable** is to describe a property (the inherent **ability to degrade as a result of biological activity**) but not what it is made from.
- **Biodegradable** plastics can be made from **either bio-based or fossil-based** feedstock.
- **Some biodegradable plastics may biodegrade very quickly in one environment but over many years (or not at all) in a different environment.** Therefore, it is very important to define timeframe and environment when describing and defining biodegradation.

DEGRADATION TIME OF BIODEGRADABLE POLYMERS



Biodegradability in different environments	Approximated degradation time of various polymers					
	TPS	PHA	PCL	PLA	PBAT	PBS
Biodegradable under conditions of industrial composting (58 ± 2°C)	1-1.5 months	1-1.5 months	1-1.5 months	~2 months	~2 months	~5 months
Biodegradable in soil (20 - 28°C)	7-12 months	7-12 months	7-12 months	> 1 year	7-12 months	Not spec.
Biodegradable in fresh water (20 - 25°C)	< 2 months	< 2 months	< 2 months	> 1.5 years	> 1.5 years	3 months
Biodegradable in seawater (30°C)	< 6 months	< 6 months	< 6 months	> 1.5 years	> 1.5 years	Not spec.



FUTURE EU PLASTIC LEGISLATION

Though only covering biodegradability of plastics, a scientific advisory group to EU institutions (SAPEA 2020) suggests that the new legislation should contain the following recommendations:

- Adopt a **joint definition of biodegradability**;
- **Limit the use of biodegradable plastics to specific applications** for which reduction, reuse, and recycling are not feasible.
- **Do not consider biodegradable plastics as a solution for inappropriate waste management or littering**;
- Support the development of **coherent testing and certification for biodegradability**; and
- **Promote the supply of accurate information** on the properties, appropriate use and disposal, as well as on limitations of biodegradable plastics **to relevant user groups**.



AGENDA

1. Global concern in plastic materials
2. EU plastic regulations & standards and future trends
3. China plastic regulations & standards and future trends
4. US plastic regulations & standards and future trends
5. Testing and certification of bioplastics

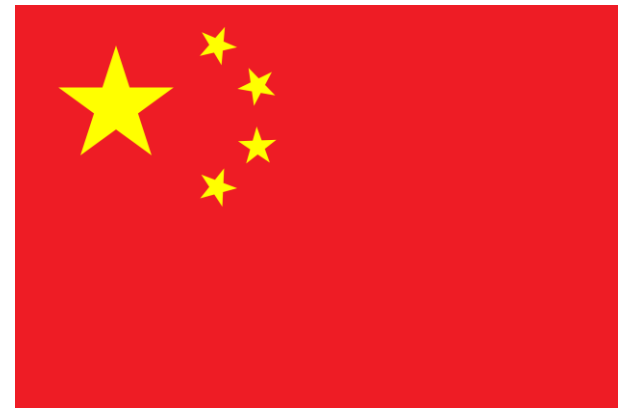




与可生物降解塑料相关的国家政策

为了推进可生物降解塑料市场的发展，我国陆续出台了支持可生物降解行业的政策。在过去几年大部分的政策是倾向于鼓励可生物降解塑料的应用，尤其是2020年1月禁塑令《关于进一步加强塑料污染治理的意见》的发布，由于强调禁用不可降解塑料的使用，变相地为包含可生物降解塑料在内的替代材料打开了市场空间。

但是2021年9月，在国家发改委和生态环境部最新发布的《“十四五”塑料污染治理行动方案》中，对包含可降解塑料在内的替代材料的应用有了更加审慎的态度，强调了要更科学稳妥地推广，并要充分考虑全生命周期的环境影响。





二、禁止、限制部分塑料制品的生产、销售和使用

（四）禁止生产、销售的塑料制品。禁止生产和销售厚度小于0.025毫米的超薄塑料购物袋、厚度小于0.01毫米的聚乙烯农用地膜。禁止以医疗废物为原料制造塑料制品。全面禁止废塑料进口。到**2020年底**，禁止生产和销售一次性发泡塑料餐具、一次性塑料棉签；禁止生产含塑料微珠的日化产品。到**2022年底**，禁止销售含塑料微珠的日化产品。

（五）禁止、限制使用的塑料制品。

1. 不可降解塑料袋。到**2020年底**，直辖市、省会城市、计划单列市城市建成区的商场、超市、药店、书店等场所以及餐饮打包外卖服务和各类展会活动，**禁止使用不可降解塑料袋**，集贸市场规范和限制使用不可降解塑料袋；到2022年底，实施范围扩大至全部地级以上城市建成区和沿海地区县城建成区。到2025年底，上述区域的集贸市场禁止使用不可降解塑料袋。鼓励有条件的地方，在城乡结合部、乡镇和农村地区集市等场所**停止使用不可降解塑料袋**。

2. 一次性塑料餐具。到**2020年底**，全国范围餐饮行业**禁止使用不可降解一次性塑料吸管**；地级以上城市建成区、景区景点的餐饮堂食服务，**禁止使用不可降解一次性塑料餐具**。到2022年底，县城建成区、景区景点餐饮堂食服务，**禁止使用不可降解一次性塑料餐具**。到2025年，地级以上城市餐饮外卖领域不可降解一次性塑料餐具消耗强度下降30%。

3. 宾馆、酒店一次性塑料用品。到**2022年底**，全国范围星级宾馆、酒店等场所**不再主动提供一次性塑料用品**，可通过设置自助购买机、提供续充型洗洁剂等方式提供相关服务；到**2025年底**，实施范围扩大至所有宾馆、酒店、民宿。

4. 快递塑料包装。到**2022年底**，北京、上海、江苏、浙江、福建、广东等省市的邮政快递网点，先行**禁止使用不可降解的塑料包装袋、一次性塑料编织袋等**，降低不可降解的塑料胶带使用量。到**2025年底**，全国范围邮政快递网点禁止使用不可降解的塑料包装袋、塑料胶带、一次性塑料编织袋等。



为进一步加强塑料污染全链条治理，推动“十四五”白色污染治理取得更大成效，我们制定了

《“十四五”塑料污染治理行动方案》。

三、主要任务

（一）积极推动塑料生产和使用源头减量。

1. 积极推行塑料制品绿色设计。以一次性塑料制品为重点，制定绿色设计相关标准，优化产品结构
设计，减少产品材料设计复杂度，增强塑料制品易回收利用性。
2. 持续推进一次性塑料制品使用减量。落实国家有关禁止、限制销售和使用部分塑料制品的规定。
3. 科学稳妥推广塑料替代产品。充分考虑竹木制品、纸制品、可降解塑料制品等全生命周期资源环
境影响，完善相关产品的质量和食品安全标准。



中国对生物可降解塑料的态度转向谨慎

中国“限塑令”已落地实施近两年。这份2020年1月发布的《关于进一步加强塑料污染治理的意见》（以下简称**限塑令**）禁止或限制了包括一次性塑料购物袋、餐具等产品的生产和销售，并且制定了退出时间线。

大量一次性不可降解塑料制品的快速淘汰导致了替代品产能在短时间内迅速增长。其中，生物可降解塑料格外引人注目。预测到2025年，中国两种主要的生物可降解塑料品种PBAT、PLA年产能将从2020年的约30万吨和10万吨，增长至700万吨左右和100万吨以上，达到全球产能三分之二以上。

但在国家发改委与生态环境部发布的《“十四五”塑料污染治理行动方案》中，**涉及生物可降解塑料的篇幅明显减少，政策中没有推广这类制品的要求，反而强调要研究可降解塑料的影响，规范应用领域，并且明确提出防止产能盲目扩张。**



与可生物降解塑料有关的术语的定义



术语	定义
可生物降解塑料	在满足特定条件下，可在特定环境与媒介中以不同的时长进行生物降解的塑料。
可工业堆肥塑料	在满足工业堆肥或者有进行后续堆肥步骤的工业厌氧消化的条件下进行生物降解的塑料。
可家庭堆肥塑料	可以在被良好管理的温度低于工业堆肥的家庭堆肥桶内进行生物降解的塑料，其大多也可被进行工业堆肥。
生物基塑料	全部或者部分由生物原材料所制成的塑料，不同于由化石基材料（石油）的传统塑料。



部分可生物降解塑料的英语简称及其中英文全称

缩写简称	英语全称	中文
PBAT	Poly (butyleneadipato-co-terephthalate)	聚己二酸/对苯二甲酸丁二酯
PBS	Poly (butylene succinate)	聚丁二酸丁二醇酯
PCL	Polycaprolactone	聚己内酯
PVA	Polyvinyl alcohol	聚乙烯醇
PHA	Polyhydroxylalkanoates	聚羟基脂肪酸酯
PHB	Poly-hydroxybutrate	聚(3-羟基丁酸酯)
PHBV	Poly (3-hydroxybutyrate-co-3-hydroxyvalerate)	聚(3-羟基丁酸酯共-3-羟基戊酸酯)
PGA	Polyglycolide acid	聚乙交酯/聚乙醇酸
PLA	Polylactic acid	聚乳酸
PPC	Polypropylene carbonate	聚碳酸亚丙酯
TPS	Thermoplastic starch	热塑性淀粉

针对可降解塑料制品的国家标准



标准号	标准名	发布日期	发布日期	发布单位
GB/T 41008-2021	生物降解饮用吸管	2021-11-26	2022-06-01	国家市场监督管理总局、中国 国家标准化管理委员会
GB/T 41010-2021	生物降解塑料与制品降解性能及标识要求	2021-11-26	2022-06-01	国家市场监督管理总局、中国 国家标准化管理委员会
GB/T 18006.3-2020	一次性可降解餐饮具通用技术要求	2021-11-09	2022-12-31	国家市场监督管理总局、中国 国家标准化管理委员会
GB/T 38727-2020	全生物降解物流快递运输与投递用包装塑料膜、袋	2020-03-24	2020-10-01	国家市场监督管理总局、中国 国家标准化管理委员会
GB/T 38082-2019	生物降解塑料购物袋	2019-10-18	2020-05-01	国家市场监督管理总局、中国 国家标准化管理委员会
GB/T 35795-2017	全生物降解农用地面覆盖薄膜	2017-12-29	2018-07-01	中华人民共和国国家质量监督 检验检疫总局、中国国家标准 化管理委员会
GB/T 32366-2015	生物降解聚对苯二甲酸-己二酸丁二酯 (PBAT)	2015-12-31	2017-01-01	中华人民共和国国家质量监督 检验检疫总局、中国国家标准 化管理委员会

AGENDA

1. Global concern in plastic materials
2. EU plastic regulations & standards and future trends
3. China plastic regulations & standards and future trends
4. US plastic regulations & standards and future trends
5. Testing and certification of bioplastics



US CALIFORNIA ASSEMBLY BILL NO. 1201 (AB 1201)



Products labeling: composability and biodegradability

The California law **prohibits** a person from selling a plastic product that is **labeled as “compostable”** or **“home compostable”** unless, at the time of sale, the plastic product meets a specified specification or has a specified certification, as provided.

The California law **prohibits** the sale of a plastic product that is **labeled as “biodegradable,”** **“degradable,”** or **“decomposable,”** and prohibits implying that a plastic product will break down, fragment, biodegrade, or decompose in a landfill or other environment, unless the plastic product meets one of several specified standards relating to environmental marketing claims.

The California law authorizes a person to sell commercial agricultural mulch film labeled with the term **“soil biodegradable”** only if the Department of Resources Recycling and Recovery has adopted a certain specification and the commercial agricultural mulch film is certified to meet both that specification and the ASTM standard specification for compostability.

US CALIFORNIA ASSEMBLY BILL NO. 1200 (AB 1200)



- AB 1200 bans the distribution and sale of **plant fiber-based food packaging** with intentionally added **PFAS** as of January 1, 2023.
- **PFAS** defined as “a class of fluorinated organic chemicals containing at least one fully fluorinated carbon atom.”
- Covers PFAS that are intentionally by the manufacturer to “**have a functional or technical effect in the product**” or that are present “**in a product or component at or above 100 ppm**” total organic fluorine.





US WASHINGTON STATE RCW 70A.455.030

PRODUCT DEGRADABILITY--LABELING

- (1) Except as provided in this chapter, **no** manufacturer or supplier may sell, offer for sale, or distribute for use in this state a plastic product that is **labeled** with the term "**biodegradable**," "**degradable**," "**decomposable**," "**oxo-degradable**," or any similar form of those terms, or in any way imply that the plastic product will break down, fragment, biodegrade, or decompose in a landfill or other environment.

- (2) This section does not apply to biodegradable mulch film that meets the required testing and has the appropriate third-party certifications.

- (3) A product labeled as "**compostable**" that is sold, offered for sale, or distributed for use in Washington by a supplier or manufacturer must:
 - (i) meet **ASTM** standard specification **D6400** or
 - (ii) meet **ASTM** standard specification **D6868**



US MARYLAND CODE ENVIRONMENT

§ 9-2102. STANDARDS FOR BIODEGRADABLE PLASTIC PRODUCTS

MD Env Code § 9-2102 (2018)

- On or after October 1, 2018, a person may not sell in the State a plastic product that is labeled as “biodegradable”, “degradable”, “decomposable”, or with any other term to imply that the product will break down, fragment, biodegrade, or decompose in a landfill or any other environment.
- Specifications - a person may not sell in the State a plastic product that is labeled as “compostable” or “home compostable” unless the plastic product meets the following standards:
 - For a plastic product labeled as “compostable”, the plastic product shall meet:
 - (i) ASTM D6400 standard specification; or ASTM D6868 standard specification; and
 - (ii) Any applicable labeling guidelines in the federal Guides for the Use of Environmental Marketing Claims.
 - For a plastic product labeled as “home compostable”, the plastic product shall meet:
 - (i) The “OK Compost Home certification” scheme adopted by Vincotte; and
 - (ii) Any applicable labeling guidelines in the federal Guides for the Use of Environmental Marketing Claims.

AGENDA

1. Global concern in plastic materials
2. EU plastic regulations & standards and future trends
3. China plastic regulations & standards and future trends
4. US plastic regulations & standards and future trends
5. Testing and certification of bioplastics



STANDARDS AND CERTIFICATION FOR BIOBASED RAW MATERIALS



Biobased does not always mean that 100 % of the raw materials are renewable. Biobased plastics can also be used in a mixture with petroleum-based plastics.

Two different certifications:

(a) the certification of the usage of renewable raw materials in the **biobased polymer according to CEN/TS 16137, ISO 16620, and EN 16785-1**, and companies can verify **minimum shares of biobased material e.g. 20 %, 50 % or 85 %**.

(b) another comparable certification scheme, the **BioPreferred Program** initiated by the US Department of Agriculture is applied in the USA. The Program uses **ASTM D6866** to **quantify the biobased content of a product** during the certification process.

ENVIRONMENTS FOR BIODEGRADATION



		Environment	Conditions
More Aggressive Environment	Managed	Industrial Composting	High temperature (~58°C) Fungi and bacteria
		Anaerobic Digestion Plant	Elevated temperature (20-45°C) Bacteria only
		Home Composting	Ambient temperature (20-30°C) Fungi and bacteria
	Un - Managed	Soil	Ambient temperature Fungi and bacteria
		Fresh Water	Ambient temperature Bacteria only
		Marine Water	Ambient temperature (<5 - >20°C) Diluted bacteria
Landfill*		Ambient to elevated temperature Bacteria only	

* landfill may be more or less aggressive throughout its life depending upon how it is managed. As it transitions from aerobic to anaerobic, material that need aerobic conditions may not biodegrade. As biodegradation takes place, the biological activity will raise the temperature.



STANDARDS FOR BIODEGRADABLE PLASTICS

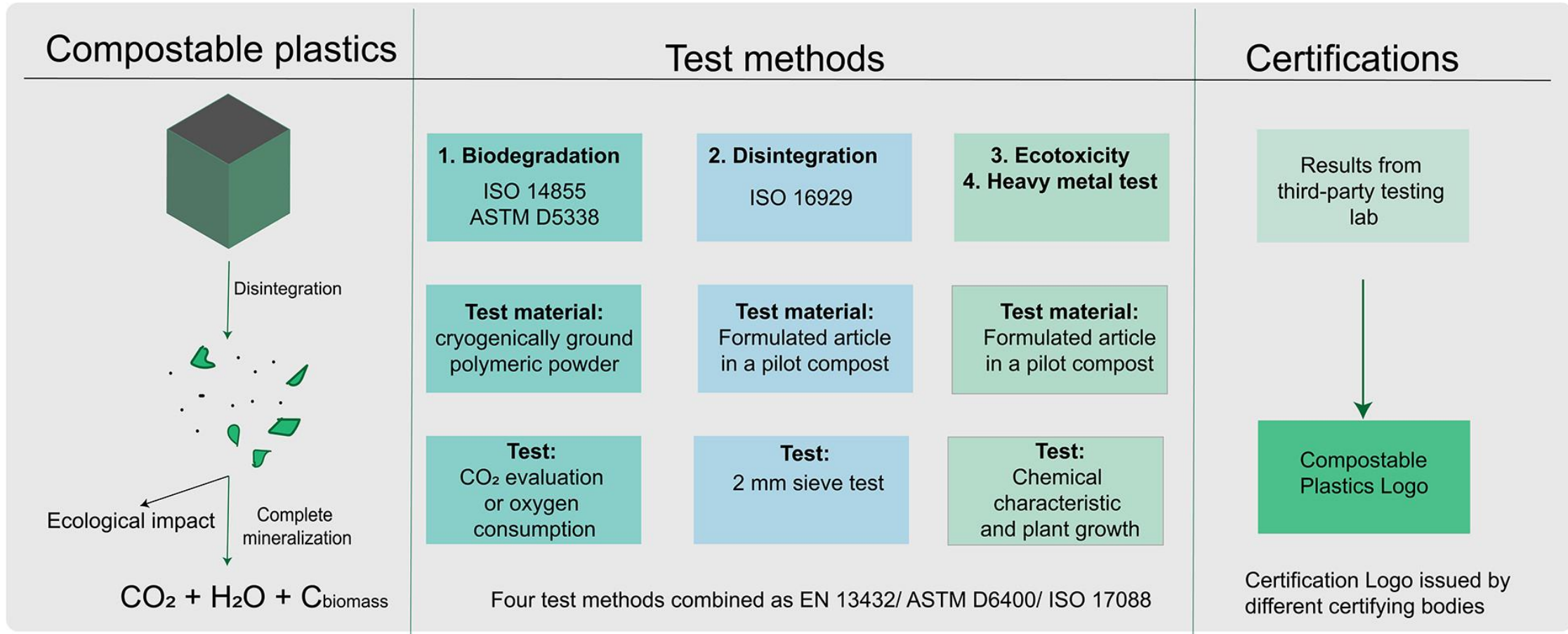
There is a **harmonized EN standard (EN 13432) for industrially compostable packaging**. There is **no EN standard for marine biodegradation**. Although standards and certification schemes do exist for biodegradability in industrial composting, only some countries such as Australia (AS 5810) and France (NFT 51-800) have a standard for **home composting**. There is also no international standard (i.e. ISO) for home composting.

Comparison of standard requirements for different types of degradation

Objective of tests	Norm/Standard	Requirements on biodegradability
Industrial composting	EN 13432, ISO 17088*, EN 14995, ISO 18606*, ASTM D6400*, AS 4736	Minimum 90% degradation after maximum 6 months
Home composting	AS 5810, NF T 51-800	Minimum 90% degradation after maximum 12 months
Biodegradable in soil	EN 17033	Minimum 90% degradation after maximum 24 months
Biodegradable in freshwater	EN 13432, EN 14995, adapted to freshwater; EN 14987 (water soluble, dispersible polymers)	Minimum 90% degradation after maximum 56 days
Biodegradable in marine water	ASTM D7081	Minimum 90% degradation after maximum 6 months

* Separate testing of constituents if these weigh > 1% by weight.

TEST METHODS AND CERTIFICATION FOR INDUSTRIALLY COMPOSTABLE PLASTICS





INDUSTRIAL COMPOSTING (EN 13432)

The **current standard of for compostable packaging EN 13432** has been in place and largely **unchanged for almost 20 years**. Scientific understanding of the process of biodegradation, the facilities themselves and the materials being tested have all changed since that time.

The EU study into “Relevance of Biodegradable and Compostable Consumer Plastic Products and Packaging in a Circular Economy” recommends that EN 13432 (and consequently EN 14995) be updated to reflect new understanding by incorporating the following requirements:

- The introduction of a **nitrification inhibition test** and an **earthworm toxicity test**.
- A requirement that **Substances of Very High Concern (SVHC)** and those on the candidate list **shall not exceed a concentration limit of 0.1 %** in the material of the product.

HOW CURRENT BIODEGRADABLE STANDARDS COULD BE IMPROVED



- To assess any **residue** which may be left behind as a result of degradation and its impacts on the natural environment.
- Current composting standards should be revised to ensure they are **aligned with current industrial composting processes**.
- Biodegradable standards should be at international and/or national level and that these should be aligned. **There is currently no international or European standard for home composting**. However, there are several national regulations, standards and certifications: UNI 11183 (Italy), AS 5810 (Australian), NT T 51-800 (France), OK Compost (Belgium).
- **Standards should be linked to a certification scheme rather just being a stand-alone entity**. This would provide further assurance to both industry and the public that products have been tested and independently verified to comply with an existing standard.



KEY MESSAGES

- **Consumer perceptions of bio-based and biodegradable plastics are positive**, as informed by positive environmental associations with the terminology and expected end-of-use disposal options.
- Current technical terminology relating to ‘bio-based’ and ‘biodegradable’ plastics is incongruent with public understanding of the different terms. **There is widespread consumer confusion about what plastic materials can be considered biodegradable, their degradation pathways in different environments, and how they should be handled post-consumption.** In particular, the difference between biodegradable and (home) compostable plastic materials is not clear to many consumers. To avoid consumer confusion and deception, the use of the term ‘biodegradable’ should not be used for materials that do not degrade in the environment in which they are likely to end up.
- **Consumer confusion about proper disposal routes and the degradation properties of biodegradable plastics may cause unintended consequences**, including biodegradable materials ending up in the wrong recycling stream, improper composting and an increased risk of materials ending up in the open environment through littering.



KEY MESSAGES



- **A lack of clear standardised labelling** not only has the potential to confuse but also to mislead. Given consumer confusion about the nature and provenance, degradation pathways and correct disposal of biodegradable plastics, **information policies, such as educational campaigns and labelling, are essential to transition successfully to a circular bioeconomy.** Labelling and certification are unlikely to be sufficient to fully change consumer behaviour in support of a circular bioeconomy.
- **Market-based policies (including taxes, subsidies and Extended Producer Responsibility) and regulations (bans, standards, and certification) are also needed to change the behaviour of actors across different economic sectors and contexts.** Policies and standards specific to biodegradable plastics need to be considered to work alongside an **effective waste management infrastructure, in order to avoid biodegradable plastic materials being mismanaged and them ending up and accumulating in the open environment.**



intertek

Total Quality. Assured.