ENVIRONMENTAL PRODUCT DECLARATION

ADBIOPLASTICS

ADVANCED & FUNCTIONAL TECHNOLOGIES FOR BIOCOMPOSITES S.L., (hereinafter ADBioplastics) focuses on offering the manufacturing industry and their markets sustainable materials (biodegradable and compostable PLA based biopolymer and biopolymer additive materials) and new solutions that increase customers' profitability while at the same time reducing the overall environmental impact. ADBioplastics is driven by sustainability as a natural and integral part of the whole business and value chain. The raw material comes mainly from responsibly managed biomass feedstocks and manufacturing takes place in resource efficient production units that are constantly improved to minimize their environmental impact. ADBioplastics has a production site in Spain. Production capacity is close to 60 tonnes.

The range of products includes ADBio PLA+ impact modifier and strength agent additive and different additivated PLA Premium grades for different processing technologies (extrusion, injection, etc.) and applications (packaging, retail, textile, 3D printing, building, etc.). Through our products and solutions, we aim to help our customers to response to the world's current major challenges and thus to make the world a better place for living.

DECLARATION OF CONTENTS

Polylactide acid ADBio PLA+ additive and PLA Premium bioplastic grade products are obtained by chemical reaction and mixing of natural bio-based pure PLA and additives, and non-bio-based constituents.

Natural bio-based products are products which are wholly derived from biomass.

Product description / Percentage of bio-based content of the product, related to total carbon:

Reference	Bio-based content %
ADBio PLA+	> 65
PLA-Premium grades	> 90-95

Calculation methodology:

The information of the bio-based content of the different constituents of the formulation of the product has been obtained from suppliers' technical data sheets. ADBioplastics has considered the certified (EN16785-1) percentage of the bio-based carbon content that is stated on those.

For the calculation of the bio-based content of the product, and characterization of the amount of biomass contained in the product, expressed as a percentage of the total mass, it has been considered the following parameters: total mass, number of constituents, mass of each constituent, bio-based content of each constituent expressed as a percentage of the mass of the constituent.

ENVIRONMENTAL PERFORMANCE

All products produced by ADBioplastics meet the targets specified in the EU's waste management hierarchy within the EU Waste Framework Directive 2008/98/EC as well as the essential requirements of the EU Packaging Waste Directive 94/62/EC. According to that Directive in 2030 all plastic packaging should be recyclable, compostable and/or reusable.

ADBioplastics respond to European circular economy policies such as: EU Circular Economy Package, European Strategy of Plastics 2018 and European Green Deal 2019 – Circular Economy Plan.

Waste handling

ADBioplastics's products help to divert organic waste from landfill or incineration to composting facilities and prevent the formation of persistent microplastics from conventional plastic products commonly incorrectly disposed of in the organic waste stream.

To avoid issues in the waste stream a proper communication of disposal for consumers must be implemented. So that consumers are informed that PLA product waste should be thrown away together with organic materials like food debris.

Local recycling technology status on PLA in the plastic waste stream should be evaluated in the country(ies) where the product is to be put on the market.

Products and packaging for which collection and treatment in an industrial composting facility is highly unlikely should not be labelled as "industrially compostable". Local regulations on the treatment of industrially compostable products should be considered when communicating this end-of-life option. This could be done by a suggestion on the product to check with the local waste management authorities

When inappropriately mixed with other plastics like polyesters and polyolefins ADBioplastics' PLA based end product waste can be recovered and separated from them and sorted with Fourier-transform infrared (FTIR) technologies. An equipment which is adjusted properly should be able to sort PLA.

Recovery/ Valorization

ADBioplastics products are valorizable/recoverable by composting and anaerobic digestion in accordance with the material requirements in EN 13432:2000 (Requirements for packaging recoverable through composting and biodegradation - Test scheme and evaluation criteria for the final acceptance of packaging). Similar standards proving compostability are ISO 18606 or ASTM D 6400

Biodegradability and Compostability

Certification

TÜV AUSTRIA CERT GMBH checked that PLA-Premium grades (thermoplastic bio-material natural transparent granulates composed of commercial PLA and different percentages of ADBio PLA+ additive) complies with the requirements stipulated in the OK compost INDUSTRIAL certification scheme, under requirements of the EN 13432 standard, which applies to packaging and packaging materials. Thus, accreditation can be only mentioned if the raw material is integrated in a packaging. The OK compost INDUSTRIAL certificate guarantees compostability in an industrial composting plant.

Certificate	Date	Licensee code	Logo
TA8012105739	20/05/2021	S2274	OK compost / TÜV AUSTRIA / INDUSTRIAL S2274

Certified maximum nominal thickness in film format are between 400 and 1000 µm depending on the PLA-Premium composition

Assessment procedure description

TÜV Austria based its evaluation on the requirements of the EN 13432 standard according to pure PLA grades in the PLA-Premium formula already assessed by it, and according to the test reports requested by it and delivered by ADBioplastics (as described below). Besides TÜV created an infrared fingerprint (by Fourier Transform Infrared Spectroscopy analysis method) of the submitted material to identify the examined PLA-Premium compound.

ADBioplastics' products are based on polylactic acid and some additives which will be degraded by microorganisms in industrial facilities. The decomposition time required depends on several factors such as temperature, humidity, microbiological activity, and pH. For a product to be classified as biodegradable, at least 90% shall be biodegraded under aerobic conditions, according to the standard EN 13432:2000. As this varies between products and grammages, more basic information is provided by ADBioplastics and upon request more in detail.

In this sense, ADBioplastics has analysed its products as shown in the Table 1 following the procedures described below:

- Determination of the regulated metals (Zn, Cu, Ni, Cd, Pb, Hg, Cr, Mo, Se, As, Co) and hazardous substances (F) in test material according to the requirements established in UNE-EN 13432:2001
- Determination of the ultimate aerobic biodegradability in compost according to the requirements established in UNE-EN 13432:2001 and following the technical procedure detailed in UNE-EN ISO 14855-1:2013
- Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test according to requirements established in UNE-EN 13432:2001 and following the technical procedure detailed in ISO 16929:2019
- Determination of the ecotoxicity of packaging and packing material and other products based on its effect on the germination and subsequent growth of higher plants under controlled conditions detailed in OCDE 208:206

Table 1. Description of the samples analysed.

Sample	Report no.	Additive %	Max. Thickness (µm)	Metal content	Biodegradation	Desintegration	Ecotoxicity
ADBio PLA+	C01	100	1000	X	X		
PLA Premium	C02, C04	5	1000			X	X
	C03, C05, C06, C07, C08	10 to 30	400			X	X

According to this analysis, ADBioplastics states that the materials included in this study are fully biodegradable and compostable under industrial composting conditions, guarantees that the resulting compost is of good quality and the products do not have a negative impact on the environment.

This declaration is based on Test reports as listed in "VERIFICATION" generated by Compostability Laboratory of ITENE[1]. This documentation is available upon request.

Remark for PLA-Premium customers

A finished product made of an OK compost INDUSTRIAL certified basic or raw material like PLA-Premium, does not automatically comply with the requirements of the OK compost INDUSTRIAL certification scheme. Because of the other unknown components that can be added to the finished product (ink, reinforcement path, glue, ...), this finished product needs to be submitted to OK compost INDUSTRIAL certification in order to have the permission to put the OK compost INDUSTRIAL mark on this finished product.

Product waste minimisation

All products in the ADBioplastics' portfolio are based on ADBio PLA+ additive with enhances/modifies impact and strength properties. Strong end use products and packaging protection keeps product damage and prevents waste (i.e. food) to a minimum in demanding supply chains.

Substitution effect

Using ADBioplastics' bioplastic products means that products based on higher use of fossil feedstocks are replaced, or substituted. While not a part of official climate reporting, the climate effect from substitution is important as it means that the substituted fossil energy sources stay underground.

DEFINITIONS

Biodegradable product

Which degrades in environmental conditions that occur in nature (not specified time or conditions)

Compostable product

Which degrades in a controlled period of time and under certain conditions

Biodegradable plastic (EU Directive 904/2019)

Plastic capable of suffering physical or biological decomposition, so that, ultimately, it decomposes into carbon dioxide (CO2), biomass and water, and which, in accordance with European standards for packaging, it is valorizable by composting and anaerobic digestion.

Organic recycling

The aerobic (composting) or anaerobic (biomethanization) treatment by microorganisms and under controlled conditions

[1] ITENE is the Packaging Research Center (www.itene.com)

VERIFICATIONS

Compostability tests

Test report no.	Date
C01.0819	July 2019
C02.1120	October 2020
C03.1120	
C04.1120	
C05.1120	
C06.1120	
C07.1120	
C08.1120	

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