Bio-based PE film

Frequently Asked Questions

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Does the bio-based PE film have an improved carbon footprint vs fossil-based PE?

Q A

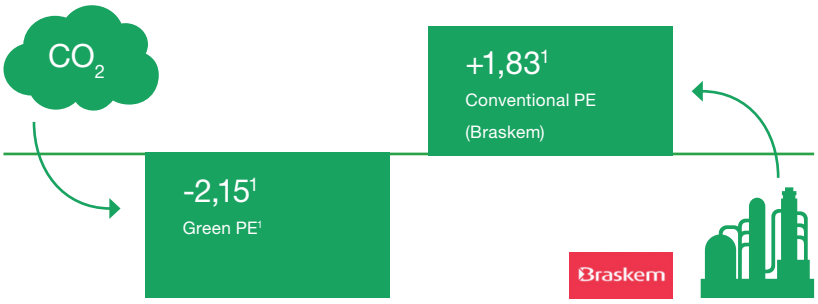
Yes – A life cycle assessment methodology has been conducted to assess the environmental impact of using a sugar cane-based polyethylene resin for the film facestock compared to fossil fuel-based PE resin. The LCA methodology makes use of this primary LCI data for sugar cane PE resin provided by Braskem[1] (see graph below), and considers:

- Carbon uptake, representing removal from the atmosphere while the sugar cane grows
- Carbon release at End of Life (EoL), similar to the release at the EoL of fossil-based PE[2]
- The actual % of sugar cane-based PE resin, replacing fossil-based resin during the production of the PE film
- The additional emissions from the transport of sugar cane-based resin vs the transport of fossil-based resin to the PE Film producer

(The methodology does not confirm superior performance on other environmental impact indicators).

Braskem's carbon footprint comparison

Carbon footprint (t CO2 q./t polymer)



(1) LCA Study conducted by E4tech & LCA works on behalf of Braskem (from cradle to Braskem factory gate) According to this study, the sugar cane-based PE-resin production absorbs 2.15 ton of CO2-equivalent per ton of PE-resin, after deducting all emissions in the overall process. The graph above compares the carbon footprint of the sugar cane-based PE-resin with the conventional PE-resin (also produced by Braskem). Source: Braskem LCA data. Find out more on braskem.com/site.aspx/the-life-cycle-assessment-of-its-green-plastic

Where do the raw materials for Avery Dennison bio-based PE film come from?

Q A

The polyethylene (PE) facestock is made from ethanol, produced by fermenting the sugar from sugar cane. The overall labelling film construction contains more than 80% bio-based content (for both white and clear versions). The sugar cane used to produce the bio-based PE facestock is grown in Brazil.

(2) The environmental benefit of the bio-based material becomes apparent, when using the above approach. The carbon uptake has a significant contribution to the overall result. Please note there are differences of opinion whether to account biogenic carbon separately from fossil carbon.

Does bio-based PE use genetically modified crops?

Q A

The ethanol used to make the bio-based PE film comes from Brazil, where genetically modified sugar cane is not sold. The multidisciplinary group CTNBio (www.ctnbio.gov.br) states that Genetically Modified Organisms (GMOs) approved for commercial cultivation in Brazil are currently restricted to cotton, corn and soybean.

Does bio-based PE affect food production?

Q A

Brazil currently has 330 million[3] hectares of arable land. 52% is used for cattle, 26% remains idle and 22% is used for agriculture. Only 1.4%[4] of all arable land[5] in Brazil is dedicated to ethanol production, and the production of the bio-based PE film involves a tiny fraction of that 1.4% (0.02% in total). In addition, 60%[6] of the country's sugar cane is planted in São Paulo, where legumes are used to fix nitrogen in the soil during crop rotation. 15-20% of sugar cane producing areas therefore cultivate soybean, beans and peanuts, which go to the food market.

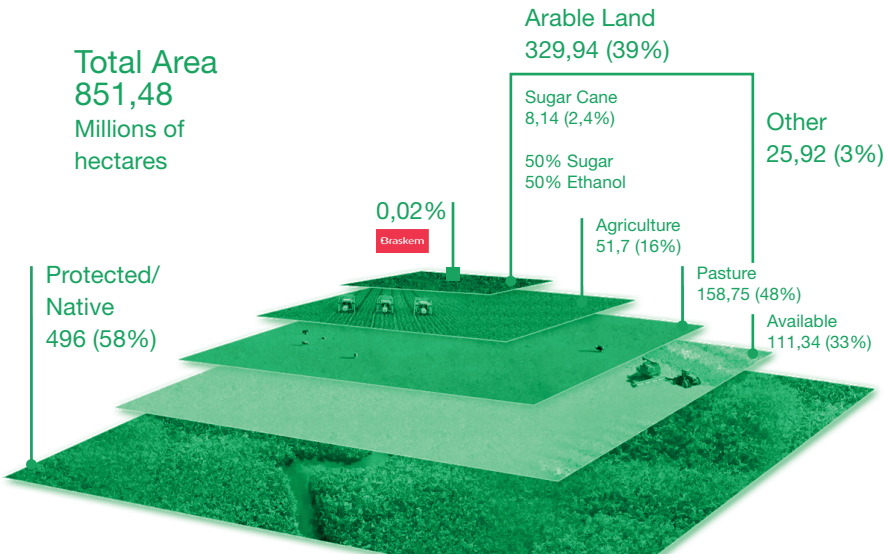
How much land is used for production?

Q A

Making 200,000 tons of bio-based PE film needs around 65,000 hectares of sugar cane cultivation – or around 0.02% of the total arable land in Brazil.

Land Usage

Significant potential for sustainable growth



Braskem's capacity of I'm green™ polyethylene production: 200kton/year

460 millions liters of Ethanol = approx. 68 thousand hectares

Source: Braskem - I'm Green™ polyethylene

(3) Source: Sugarcane Industry Association (UNICA): http://unica.com.br/.

(4) Sources: IBGE, Conab and UNICA (www.unica.com.br). Data compiled by ICONE and Unica.

(5) Arable land excludes all protected land - high biodiversity biomes such as Amazon Rainforest and Pantanal and other Environmental Reserves. Brazilian law also states that all properties should protect at least 20% of their area.

(6) Sources: IBGE, Conab and UNICA (www.unica.com.br). Data compiled by ICONE and Unica.

How much energy is used during cultivation?

Q A

A waste product from the crushing process, sugar cane bagasse, is often used to generate electricity. This can supply the entire ethanol production process, making it energy self-sufficient. Surplus power is also sent to the Brazilian grid.

Where is the sugarcane grown – and does it affect the Amazon?

Q A

Around 90%[7] of the Brazilian sugar cane plantations involved in ethanol production are in the South-Central region states, more than 2,500 km away from the Amazon region. The rest are mainly in the Northeast region. All expansion of sugar cane cultivation is governed by Sugarcane Agroecological Zoning, and so has to avoid the Amazon and Pantanal biomes as well as some other areas.

What is Sugarcane Agroecological Zoning (ZAE Cana)?

Q A

Zoneamento Agroecologico da Cana de Açúcar (Sugarcane Agroecological Zoning, or ZAE Cana) is a policy instrument created by the Brazilian government to study the climate and soils of Brazil's different regions. It takes into account environmental, economic and social issues, to ensure that sugar cane expansion takes place sustainably. Restrictions imposed mean that expansion of sugar cane cultivation is limited to 7.5% of Brazil's landmass (65.7 million hectares). The proposal submitted by ZAE Cana was approved on September 17, 2009.

What kind of land can be used for new sugar cane agriculture?

Q A

Brazil's 2009 Agro-ecological zoning (AEZ) policy dictates permissible areas and forbids expansion in all of the following:

- Amazonia and Pantanal biomes
- The hydrographical basin of the Paraguay River
- Areas with any type of native vegetation
- Areas without favourable soil and climate conditions
- Areas that require full irrigation
- Protected areas
- Indigenous reserves
- Areas with a high conservation value for biodiversity

New sugar cane production is authorised only from direct conversion of pastureland (degraded, natural and cultivated) or from another previous crop (soybean, cotton, maize). When replacing degraded pasture land, sugar cane helps recover the soil and increases its carbon content.

Are pesticides and fungicides used?

Q A

Sugar cane plantations usually address pests with biological controls and genetic improvement programs. Pesticide use is low, and fungicide use is close to zero.

(7) Source: Sugarcane Industry Association (UNICA): http://unica.com.br/.

Are sugar cane fields burned during cultivation?

Q A

Burning before manual harvesting is designed to make cutting sugar cane safer by burning the straw. However, a deadline has been set in Brazilian law to end burning, and a voluntary protocol was launched in 2007 in São Paulo (Protocolo Agroindustrial do Estado de São Paulo) which sets even stricter targets. Mills signing up have committed to ending burning from 2014 to 2021 in mechanized areas (2017 to 2031 for non-mechanized). Over 95% of all ethanol produced in the state of São Paulo in 2009 came from mills that have signed the Protocol.

How much water is used?

Q A

Water needs in the agricultural phase are met practically entirely by rainfall. This is complemented by the application of vinasse (a co-product of ethanol production rich in water and organic nutrients) in a process called fertigation.

What are the social consequences of sugar cane cultivation?

Q A

Brazilian law and the rules and labour conditions established by the International Labour Organization (ILO) apply, and should be followed by all employers, subject to regular inspections by the government.

Is the bio-based PE film easy to convert and recyclable?

Q A

Yes – the bio-based PE film behaves in an almost identical way to conventional PE, from conversion all the way through to eventual recycling in standard facilities.

How sure are you about the bio-based content of the film facestock?

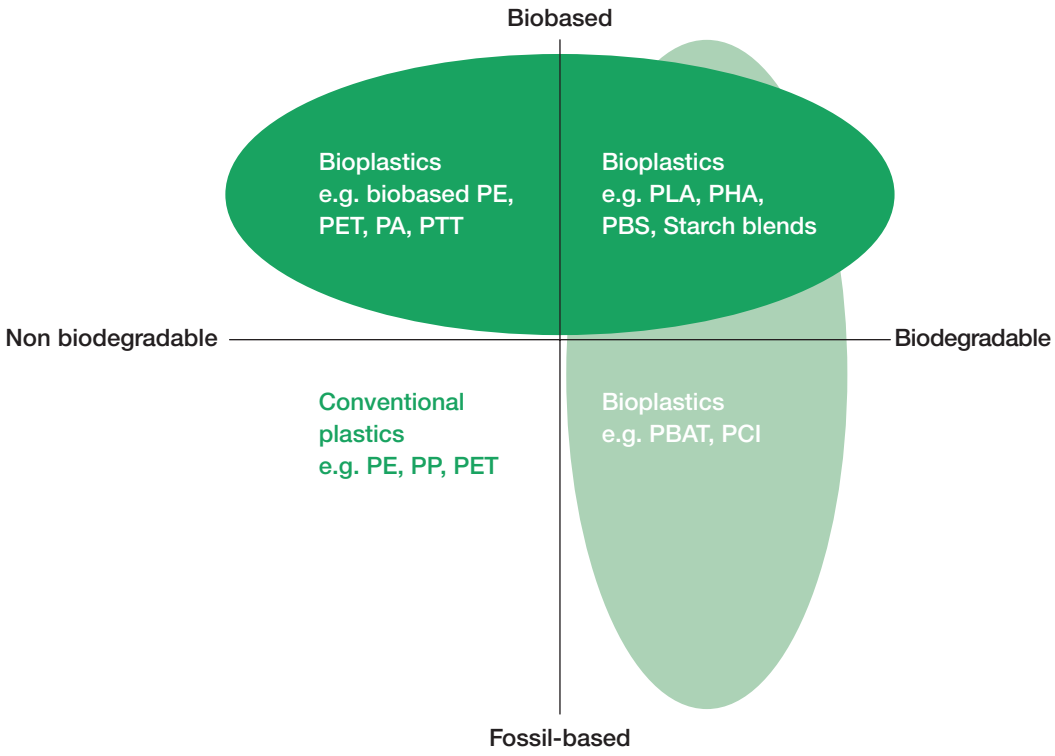
Q A

The bio-based PE label film is tested for Carbon 14 by an independent analytical laboratory. They confirmed the bio-based content was above 80%.

This new product is bio bio-based, but what is the difference between bio-based and biodegradable?

Q ▶ A

A biodegradable plastic is a plastic that undergoes biodegradation. In this process, degradation results from the action of naturally-occurring micro-organisms such as bacteria, fungi, and algae. As of 2008, the accepted industry standard specifications are ASTM D6400, ASTM D6868, ASTM D7081 or EN 13432. Bio-based materials are defined by the fraction of their carbon content that is sourced from biological materials or agricultural resources – rather than from fossil carbon. Bio-based content is measured following the procedures set by ASTM D6866.



Source: © European Bioplastics. What are bioplastics? Fact sheet European Bioplastics, January 2015 For more information please visit: https://www.european-bioplastics.org/news/faq/

Sources

- Braskem LCA data
- Braskem - I'm Green™ polyethylene
- Sugarcane Industry Association (UNICA)
- IBGE, Conab and UNICA
- European Bioplastics