

bio-based content vs bio-based carbon content

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1. Introduction

The term biomass covers all materials of biological origin, apart from fossil materials and/or those incorporated into geological formations.

The term therefore applies to plants, trees, algae, marine organisms, microorganisms, animals,... but not petroleum.

A bio-based product is a product derived from biomass.

2. Different concepts

Two related but different concepts have been developed in this field:

- bio-based content, based on the amount of biomass in a product, taking account of the four key components: carbon, hydrogen, oxygen and nitrogen; The bio-based content is expressed as a percentage of the overall weight of the product in question.
- the bio-based carbon content is focused on carbon and is generally expressed as a percentage of the carbon the product contains (organic carbon or total carbon).

Both approaches are based on European or international standards, each of which has its advantages and drawbacks.

Let us imagine a product part of which is bio-based and the other is not and show them schematically to illustrate the two approaches.

The product in question comprises PLA (plant-origin, containing 50% carbon) and polypropylene (fossil-origin, containing 86% carbon), in a ratio of 30/70%.

3. Bio-based content

With the first concept, "bio-based content", the calculation factors in all the constituents, which must be known exactly. The EN 16785-1 standard defines the details of the methodology to follow to determine the bio-based content:

- the manufacture's detailed composition declaration,
- determination of the theoretical bio-based content,
- measurement of the bio-based carbon (C14) and the different constituents (TC-TH-TO-TN), and
- validation of the initial declaration based on the measurements.

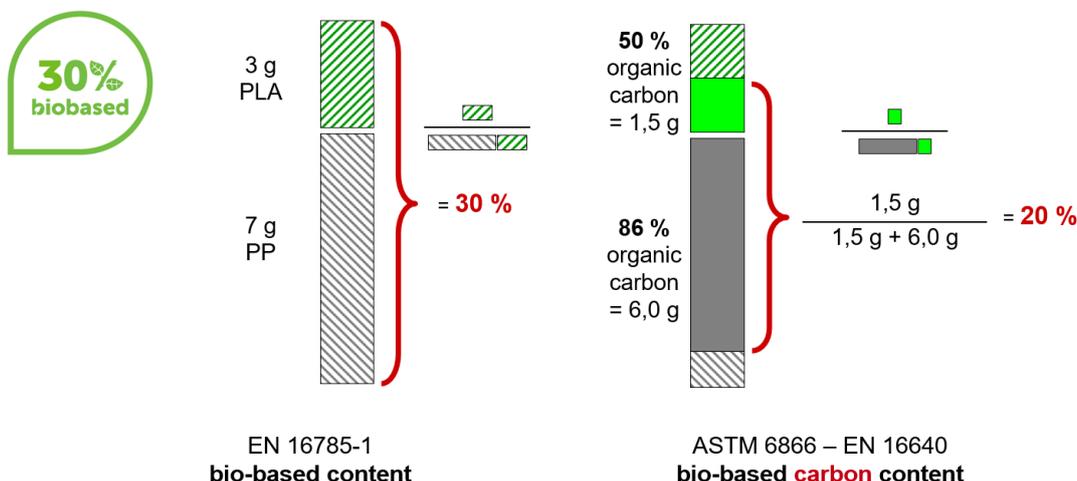
According to this method a perfect knowledge of the composition of all the constituents is required, whether they be fossils or bio-based, and various measurements. Conversely, the certified values may be higher than those obtained by the "bio-based carbon content" approach.

4. Bio-based carbon content

With this second approach, "bio-based carbon content", it is simply a question of determining the carbon fraction and measuring the bio-based percentage therein (C14 measurement).

Based on the ASTM D6866 and EN 16640 standards, this approach is therefore less expensive and makes it possible to incorporate constituents and/or components whose origin and detailed composition is unknown: these are typically regarded as of fossil origin.

As can be seen, both methods have advantages and drawbacks.



5. Standards and certification schemes

The European standard EN 16935:2017, specifying the 'business-to-consumer' communication procedures for bio-based products, is based on the "bio-based content" value but also allows the use of "bio-based carbon content", provided this is no higher than the former, which is easy to check.

Back in 2009, subsequent to three years research and development activities, we broke new ground by launching the "OK biobased" certification system, premised on the "bio-based carbon content" approach, which is easier to apply and check when the products are available on the market.



In 2010, we took part in standardisation activities, activities that culminated, six years later, in the definition of the business-to-business (B2B - EN 16848), and business-to-consumer (B2C - EN16935) communication requirements.

It was only natural that when the Netherlands Standardisation Institute NEN decided to develop a certification system based on the EN 16785-1 standard that we would join the board of experts which drew up this new system and was then chosen as the certification body for its implementation.



TÜV AUSTRIA is therefore the only certification body to offer its customers the two certification systems and their respective logos.

6. Communication

For OK biobased, a system of stars (from 1 to 4) allows an easy communication of the bio-based carbon content :

	≥ 20% & < 40%
	≥ 40% & < 60%
	≥ 60% & < 80%
	≥ 80%

On the other hand, the NEN biobased% label specifies the percentage of bio-based content (from 1 to 100%):

