



BSI Standards Publication

## Algae and algae products – Terms and definitions

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## National foreword

This British Standard is the UK implementation of [EN 17399:2020](#).

The UK participation in its preparation was entrusted to Technical Committee EH/3/-/5, Algae and Algae Products.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

## Algae and algae products - Terms and definitions

Algues et produits d'algues - Termes et définitions

Algen und Algenprodukte - Begriffe

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**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

This document ([EN 17399:2020](#)) has been prepared by Technical Committee CEN/TC 454 “Algae and algae products”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2020, and conflicting national standards shall be withdrawn at the latest by September 2020.

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## Introduction

This document has been prepared by the experts of CEN/TC 454 'Algae and algae products'.

The European Committee for Standardization (CEN) was requested by the European Commission (EC) to draft European standards or European standardization deliverables to support the implementation of [Article 3](#) of Directive 2009/28/EC for algae and algae-based products or intermediates.

This request, presented as Mandate M/547<sup>1)</sup>, also contributes to the Communication on “Innovating for Sustainable Growth: A Bio economy for Europe”.

The former working group CEN Technical Board Working Group 218 “Algae”, was created in 2016 to develop a work programme as part of this Mandate. The technical committee CEN/TC 454 'Algae and algae products' was established to carry out the work programme that will prepare a series of standards.

The interest in algae and algae-based products or intermediates has increased significantly in Europe as a valuable source including but not limited to, carbohydrates, proteins, lipids, and several pigments. These materials are suitable for use in a wide range of applications from food and feed purposes to other sectors, such as textile, cosmetics, biopolymers, biofuel and fertilizer/biostimulants. Standardization was identified as having an important role in order to promote the use of algae and algae products.

The work of CEN/TC 454 should improve the reliability of the supply chain, thereby improving the confidence of industry and consumers in algae, which include macroalgae, microalgae, cyanobacteria, Labyrinthulomycetes, algae-based products or intermediates and will promote and support commercialisation of the European algae industry.

This document has been developed with the aim to cover the horizontal definitions for algae and algae-based products or intermediates. Hence, other terms and definitions are given in the other standards developed by CEN/TC 454 “Algae and algae products”.

For food, feed and non-food, non-feed applications additional definitions may exist in other product specific standards.

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1) Available at <http://ec.europa.eu/growth/tools-databases/mandates/index.cfm?fuseaction=refSearch.search#>

## 1 Scope

This document defines the terms related to functions, products, and properties of algae and algae products. In order to better pack the methodologies, algae are regarded as a functional group of organisms consisting of microalgae, macroalgae, cyanobacteria and Labyrinthulomycetes.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

### 3.1

#### **algae biorefinery**

facility that integrates algae biomass conversion processes and equipment to produce a spectrum of bio-based products (food, feed, chemicals, materials) and bioenergy (biofuels, power and/or heat)

[SOURCE: International Energy Agency Bioenergy. Task 42 – Biorefining in a Circular Economy.]

### 3.2

#### **algae oil**

glyceridic fraction of lipids derived from algae

### 3.3

#### **algae strain**

population of unicellular/pluricellular organisms of a single algae species, all descended from the entirety/or a part of an organism or several organisms, being synonymous with a monoclonal culture and a genetic representative of a single algae species

NOTE This definition includes sexual and asexual reproduction.

### 3.4

#### **amino acid**

organic molecule that consist of a basic amino group ( $-NH_2$ ), an acidic carboxyl group ( $-COOH$ ), and an organic R group (or side chain) that is unique to each amino acid

NOTE In this context the term amino acid is short for  $\alpha$ -amino [alpha-amino] carboxylic acid. Each molecule contains a central carbon atom, called the  $\alpha$ -carbon, to which both an amino and a carboxyl group are attached.

### 3.5

#### **artificial light**

photons from a source other than the sun

EXAMPLE fluorescent light and LEDs

Note 1 to entry: The energy to produce light could come from a mix of sources that can range from fossil fuels, nuclear plants and renewable and sustainable sources, such as wind, photovoltaics, biomass, etc.

Note 2 to entry: Energy consumed and emissions associated with this should be accounted for in the assessment of the sustainability.

### 3.6

#### **bioenergy**

energy derived from biomass

NOTE Biomass can be processed into solid, liquid or gaseous fuels or stored energy in biomass can be directly converted into other forms of energy (e.g. heat, light).

[SOURCE: ISO 13065:2015, definition 3.3]

### 3.7

#### **biofuel**

liquid fuel for transport produced from biomass

[SOURCE: Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources]

### 3.8

#### **bioliquid**

liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass

[SOURCE: Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources]

### 3.9

#### **biomass**

material of biological origin excluding material embedded in geological formations and/or fossilized

EXAMPLE (Whole or parts of) plants, trees, algae, marine organisms, microorganisms, animals, etc.

[SOURCE: EN 16575:2014, definition 2.7]

### 3.10

#### **biomass fuel**

gaseous and solid fuels produced from biomass

[SOURCE: Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources]

### 3.11

#### **carbohydrate**

biomolecule consisting of Carbon, Hydrogen and Oxygen, characterizable, in a first approximation, by the formula  $(CH_2O)_n$

Note 1 to entry: They include sugars, oligo and polysaccharides as well as polyols derived.

Note 2 to entry: "Gross composition": carbohydrates, lipids, polyols and proteins plus ashes should sum as close as possible to 100 % dry weight of algae biomass as a raw material for food, feed and other applications.

### 3.12

#### **contamination**

presence of hazardous and/or undesired substances, materials or organisms that can result in physical, chemical and/or biological modifications of properties

### 3.13

#### **cyanobacteria**

photoautotrophic, mixotrophic or heterotrophic prokaryotic organisms, able to obtain energy by using chromophores

### 3.14

#### **deoxyribonucleic acid**

##### **DNA**

polymer of deoxyribonucleotides occurring in a double-stranded (dsDNA) or single-stranded (ssDNA) form

[SOURCE: EN ISO 22174:2005, definition 3.1.2]

### 3.15

#### **DNA sequencing**

determining the order of nucleotide bases (adenine, guanine, cytosine, and thymine) in a molecule of DNA

NOTE Sequence is generally described from the 5' end.

[SOURCE: ISO/TS 17822-1:2014, definition 3.20]

### 3.16

#### **enzyme**

biologically produced protein catalyst that accelerates the conversion of one compound (or compounds) to another (or others)

[SOURCE: EN ISO 11074:2015, definition 6.4.15]

### 3.17

#### **eukaryotes**

organisms with a cell structure in which the nucleus is surrounded by a nuclear membrane

[SOURCE: ISO 6107-8:1993, definition 18]

### 3.18

#### **fouling**

non-target organisms either on the surface or within algal biomass (epiphytes or endophytes), including macroalgae, microalgae, bacteria, cyanobacteria, fungi, or animals, including harmless organisms and pathogens

NOTE This also includes such organisms within production systems not directly associated with target organisms, but associated with tanks, ropes/nets, bioreactors and all cultivation surfaces; potentially compromising quality and value including purity and safety of target algal growth

### 3.19

#### **genus**

principal taxonomic category that ranks above species and below family

NOTE When using taxonomy to name an organism, the genus is used to determine the first part of its two-part name (genus and species)

### 3.20

#### **heterotrophy**

metabolism that utilizes organic compounds as energy and carbon source

NOTE Light is not required as an energy source.

### 3.21

#### **identification**

process for determining that an isolate belongs to one of the established taxa

[SOURCE: EN ISO 22174:2005, definition 3.1.9]

### 3.22

#### **labyrinthulomycetes**

labyrinthulea

class of protists or chromista that produce a network of filaments or tubes and includes the family Thraustochytriaceae

### 3.23

#### **lipids**

class of natural organic substances characterized by very low water solubility, high organic solvents solubility, high carbon and hydrogen content, biosynthesized for energy storage and/or metabolic and structural functions

### 3.24

#### **macroalgae**

macroscopic eukaryotic pluricellular organisms composed of single differentiated cells able to obtain energy using chromophores

### 3.25

#### **microalgae**

microscopic eukaryotic organisms composed of single differentiated cells able to obtain energy using chromophores

NOTE Generally single celled, but can occur as filamentous or colonial.

### 3.26

#### **mixotrophy**

metabolism that utilizes simultaneously different sources of energy and carbon

NOTE Used by those organisms that have the ability to utilize a combination of the phototrophic and heterotrophic metabolic pathway.

### 3.27

#### **natural light**

photons that originate from the sun

NOTE The light can be filtered (e.g. by wavelength) or can be redirected and focused (e.g. with mirrors and glass fibre).

### 3.28

#### **photoheterotrophy**

metabolism that utilizes light as energy source and organic compounds as carbon source

NOTE Photoheterotrophy is a form of mixotrophy.

### 3.29

#### **phototrophy**

photoautotrophy

metabolism that utilizes light as energy source and inorganic compounds as carbon source

### 3.30

#### **pigment**

any colouring matter in the cells and tissues of plants

[SOURCE: ISO 5527:2015, definition 2.3.1.25]

### 3.31

#### **pluricellular**

made up of several cells

### 3.32

#### **primer**

oligonucleotide of defined length and sequence complementary to a segment of an analytically relevant DNA sequence

NOTE A primer borders the target DNA sequence.

[SOURCE: EN ISO 22174:2005, definition 3.4.12]

### 3.33

#### **prokaryotes**

bacteria, including actinomycetes and cyanobacteria which do not possess nuclear membranes

[SOURCE: ISO 6107-8:1993, definition 44, modified – “(blue-green algae)” has been removed]

**3.34**

**purity**

percentage of specific component in the total amount of product

**3.35**

**seaweed**

marine macroalgae

**3.36**

**species**

group of organisms that have a high level of genetic (DNA) similarity (often containing subspecies, varieties or forms)

NOTE A species is designated in italics by the genus name followed by the specific name, e.g. *Chlorella vulgaris*.

[SOURCE: ISO 16577:2016, definition 3.193 modified – “and are capable of interbreeding” has been removed and “races” is replaced by “forms”]

**3.37**

**taxon**

particular group or category into which related organisms are classified

[SOURCE: ISO 16577:2016, definition 3.204]

**3.38**

**thraustochytriaceae**

family of mostly marine, heterotrophic, fungus-like, unicellular eukaryotic microorganisms that lack a plastid

NOTE Thraustochytriaceae include industrially relevant genera, such as *Schizochytrium* and *Ulkenia*, used to produce Omega-3 “algae oils” even though they are not “algae” in a scientific sense, because of the absence of plastid.

**3.39**

**unicellular**

made up of only one cell

**3.40**

**yield**

amount of final product relative to the starting product

EXAMPLE g extract/g algae dry weight or % weight/weight

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- [10] International Energy Agency Bioenergy. Task 42 – Biorefining in a Circular Economy



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## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK