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Algae and algae products — Specifications for chemicals and biofuels sector applications

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National foreword

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

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Algae and algae products - Specifications for chemicals and biofuels sector applications

Algues et produits d'algues - Spécifications pour les applications dans le secteur de la chimie et de la bioénergie

Algen und algenbasierte Produkte - Spezifikationen für Anwendungen im Chemie- und Biokraftstoffsektor

This Technical Report was approved by CEN on 5 December 2021. It has been drawn up by the Technical Committee CEN/TC 454.

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European foreword

This document (CEN/TR 17739:2021) has been prepared by Technical Committee CEN/TC 454 “Algae and algae products”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

The European committee for Standardisation (CEN) was requested by the European Commission (EC) to draft European standards or European standardisation deliverables to support the implementation of Article 3 of Directive 2009/28/EC for algae and algae products or intermediates. The request presented as Mandate M/547, 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 the Mandate. The technical committee CEN/ TC 454 “Algae and algae products” was established to carry out the work program the secretariat of which is held by NEN. CEN TC 454 set up a number of topic specific working Groups listed below to develop standards for algae and algae products.

This document has been prepared by Working Group 5 “Specifications for the chemicals and fuels applications sector” with the support of UNI as the secretariat in close collaboration with the other CEN TC 454 working groups:

CEN TC 454 WG 1 “Terminology”

CEN TC 454 WG 2 “Identification”

CEN TC 454 WG 3 “Productivity”

CEN TC 454 WG 4 “Specifications for food/feed sectors applications”

CEN TC 454 WG 6 “Product test methods”

The interest in algae and algae-based products or intermediates as a renewable and sustainable source of carbohydrates, proteins, lipids and pigments has increased significantly in Europe.

Algae-based products and intermediates, in this TR referred to as ‘products’, are defined as whole biomass, extracts or derivatives from algae, including algae oil and algal meal.

This document will allow the stakeholders to have access to a clear point of reference on the use of algae in technical applications.

Algae as raw materials have specific challenges and show a wide potential from sustainability and blue economy point of view. This document aims helping to fill this gap.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The interest in algae and algae-based products or intermediates as a renewable and sustainable source of carbohydrates, proteins, lipids and pigments has increased significantly in Europe.

The biochemical composition of algae with regard to the ratio of usable components is unique and the selected conversion pathway determines the kind of products that can be obtained.

Algae are available and used in many countries as fertiliser, biostimulant, animal feed, medicine, cosmetic and food ingredients, and can provide different compounds depending on species. Due to the high interest in replacing fossil feedstock for chemicals and fuels by biological ones, as algae, several pilot initiatives have been undertaken in last decades. Results strongly vary, as many techno-economic parameters are expected to influence the success of an algae related initiative.

Cultivation of algae has advantages over other sources of biomass, since they can be cultivated on marginal lands and unused aquatic areas, generating new economic opportunities for rural soil and aquatic areas, which would not have traditionally been used.

Due to their relatively simple cellular structure, algae have a large biomass productivity per unit area. Algae are of great ecological importance, since they act in the capture of atmospheric CO_2, and can be used as wastewater treatment, due to their capacity to remove nutrients, as their growth requires sunlight, water, CO_2 and nutrients.

1 Scope

The purpose of this document is to provide an overview on how quality indicating parameters for algae and algae products and intermediates relevant for chemical and bioenergy applications can be handled and to identify the need for future standards development for chemicals, bioenergy and biofuels applications.

This document does not provide instructions on handling of technical requirements in existing legislations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 17399:2020, *Algae and algae products - Terms and definitions*

EN 14214, *Liquid petroleum products - Fatty acid methyl esters (FAME) for use in diesel engines and heating applications - Requirements and test methods*

EN 590, *Automotive fuels - Diesel - Requirements and test methods*

EN 16734, *Automotive fuels - Automotive B10 diesel fuel - Requirements and test methods*

EN 16709, *Automotive fuels - High FAME diesel fuel (B20 and B30) - Requirements and test methods*

EN 16723-1, *Natural gas and biomethane for use in transport and biomethane for injection in the natural gas network - Part 1: Specifications for biomethane for injection in the natural gas network*

EN 14103, *Fat and oil derivatives - Fatty Acid Methyl Esters (FAME) - Determination of ester and linolenic acid methyl ester contents*

EN 17477, *Algae and algae products - Identification of the biomass of microalgae, macroalgae, cyanobacteria and Labyrithulomycetes - Detection and identification with morphological and/or molecular methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 17399:2020 and the following apply.

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

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

3.1
Raw Material Specification
RMS
technical dossier, several pages long, about the product, usually prepared by manufacturer, directed to provide all product approval information to the customer and usually attached to commercial contract

Note 1 to entry: Examples of models of RMS for some algae categories are reported in Annex A.