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Carbon footprint for seafood — Product category rules (CFP-PCR) for macroalgae

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Foreword

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This document was prepared by Technical Committee ISO/TC 234, *Fisheries and aquaculture*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

With the increasingly serious global climate problem, the low-carbon revolution of globalization is rising, and carbon peaking and carbon neutrality have become important goals of global low-carbon development. Countries all over the world are actively carrying out double carbon research to achieve the goal of carbon neutrality as soon as possible.

As an important participant in the ocean carbon cycle, algae can synthesize organic matter through photosynthesis and release oxygen to achieve carbon sequestration, so it is of great significance to study its carbon footprint.

This document contains product category rules for the calculation and communication of the carbon footprint of macroalgae products, providing a convenient and feasible carbon footprint evaluation basis for the macroalgae farming industry.

This document sets out rules for the calculation and communication of farmed macroalgae products, which are applicable to the evaluation of the carbon footprint of the entire value chain of farmed macroalgae. The methodology is based on the requirements of the life cycle assessment and International Standards for the carbon footprint of products. The overarching aim of the document is to provide a basis for reliable and accurate information about the climate impact of the product. It is a pre-condition for a market-driven reduction of climate impact of macroalgae products that dealers and consumers are able to choose the products with the least climate impact. In addition to this, the document will provide:

— a basis for the development of tools and database for calculating the carbon footprint of macroalgae products;

— a basis for internal improvement efforts in the macroalgae industry;

— an improved knowledge base concerning the value chains of macroalgae products, their resource consumption and climate impacts;

— a basis for further understanding the environmental impact of macroalgae products beyond climate change alone.

This document is intended to function in line with ordinary market mechanisms. Providing credible and transparent information about the products' climate impact will pave the way for increased demand and market value of the most climate-friendly macroalgae products. It will also provide incentives to drive further improvements and reduce energy consumption and climate impacts from all links in macroalgae value chains. This document ~~will promote~~promotes the transformation of the global fishery industry structure and the innovative development of low-carbon technology, which can contribute to realizing the construction of low-carbon fishery and increasing the carbon sink of fishery, thus making due contribution to the global low-carbon development.

Carbon footprint for seafood — Product category rules (CFP-PCR) for macroalgae

1 Scope

This document specifies requirements for calculating the carbon footprint specific to farmed macroalgae product category rules (CFP–PCR). This methodology builds on the requirements of International Standards for life cycle assessment (LCA) and products' carbon footprints.

This document is applicable to the calculation and communication of farmed macroalgae products' carbon footprints from seedling production to the consumption of macroalgae products. It is applicable to the carbon footprints of products from aquaculture value chains.

This document used alone does not apply to specifying a product's overall environmental or sustainability characteristics.

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.

ISO 14026:2017, *Environmental labels and declarations — Principles, requirements and guidelines for communication of footprint information*

ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

ISO 14044, *Environmental management — Life cycle assessment — Requirements and guidelines*

ISO 14067:2018, *Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1 Quantification of the carbon footprint of a product

3.1.1
carbon footprint of a product
CFP
sum of *greenhouse gas (GHG)* (3.4.1) emissions and GHG removals in a *product system* (3.2.14), expressed as *CO_2 equivalents* (3.1.2) and based on a life cycle assessment using the single impact category of climate change

[SOURCE: ISO 14067:2018, 3.1.1.1, modified — Notes 1 and 2 to entry deleted.]

3.1.2
carbon dioxide equivalent
CO_2 equivalent
CO_2e
unit for comparing the radiative forcing of a *greenhouse gas* (3.4.1) to that of carbon dioxide

Note 1 to entry: Mass of a GHG is converted into CO_2 equivalents by multiplying the mass of the GHG by the corresponding global warming potential (GWP) or global temperature change potential (GTP) of that gas.

Note 2 to entry: In the case of GTP, CO_2 equivalent is the unit for comparing the change in global mean surface temperature caused by a GHG to the temperature change caused by CO_2 within a certain time (usually 100 years).

Note 3 to entry: Radiative forcing refers to difference between incoming solar radiation on the Earth and outgoing thermal radiation from the Earth. A positive radiative forcing tends to warm the surface and a negative radiative forcing tends to cool the surface.

[SOURCE: ISO 14067:2018, 3.1.2.2, modified — "within a certain time (usually 100 years)" added to Note 2 to entry. Note 3 to entry added.]

3.1.3
partial carbon footprint of a product
partial CFP
sum of *greenhouse gas (GHG)* (3.4.1) emissions and GHG removals of one or more selected process(es) in a *product system* (3.2.14), expressed as *CO_2 equivalents* (3.1.2) and based on the selected stages or processes within the *life cycle* (3.2.11)

Note 1 to entry: A partial CFP is based on or compiled from data related to (a) specific process(es) or footprint information modules, which is (are) part of a product system and can form the basis for quantification of a CFP. More detailed information on information modules is given in ISO 14025:2006, 5.4.

Note 2 to entry: "Footprint information modules" is defined in ISO 14026:2017, 3.1.4.

Note 3 to entry: The results of the quantification of the partial CFP are documented in the CFP study report expressed in mass of CO_2 equivalent per *declared unit* (3.2.15).

[SOURCE: ISO 14067:2018, 3.1.1.2]

3.2 Products, product systems and processes

3.2.1
product
any goods or service

[SOURCE: ISO 14050:2020, 3.5.2]

3.2.2
product category
group of *products* (3.2.1) that have an equivalent function

3.2.3
primary product
primary output of commercial value from a production process

[SOURCE: ISO 22948:2020, 3.2.3]

3.2.4
by-product
secondary output from a process, but of commercial value, that is produced in addition to a defined *primary product* (3.2.3)

[SOURCE: ISO 22948:2020, 3.2.4]

3.2.5
intermediate goods
raw materials or semi-finished goods, which may be recycled or recovered, that are fed into the *product system* (3.2.14)

[SOURCE: ISO 22948:2020, 3.2.5]

3.2.6
capital goods
products (3.2.1) that are not used up in consumption or production over a brief period but that retain their function over a longer time

3.2.7
seafood
food, of which a significant proportion of the content derives directly from animals or plants that live in the sea, lakes or watercourses

[SOURCE: ISO 22948:2020, 3.2.7]

3.2.8
algae
large group of single- or multi-cellular eukaryotic organisms, which usually contain chlorophyll or other pigments

Note 1 to entry: Algae are usually aquatic and capable of photosynthesis.

[SOURCE: ISO 6107:2021, 3.21]

3.2.9
macroalgae
macroscopic eukaryotic pluricellular organisms composed of single differentiated cells able to obtain energy using chromophores

Note 1 to entry: Macroalgae mainly include Rhodophyta, Phaeophyta and Chlorophyta. Common macroalgae are kelp, laver, wakame, gulfweed, ulva, etc.

[SOURCE: EN 17399:2020, 3.24, modified — Note 1 to entry added.]

3.2.10
edible product
quantity of macroalgae and macroalgae product*s* (3.2.1) as available for sale from a retailer, excluding packaging

3.2.11
life cycle
consecutive and interlinked stages of a *product system* (3.2.14), from raw material acquisition or generation from natural resources to final disposal

[SOURCE: ISO 14040:2006, 3.1]

3.2.12
value chain
range of activities or parties that create or receive value in the form of *products* (3.2.1) or services

3.2.13
carbon footprint of a product–product category rules
CFP–PCR
set of specific rules, requirements and guidelines for *CFP* (3.1.1) or *partial CFP* (3.1.3) quantification and communication for one or more *product categories* (3.2.2)

[SOURCE: ISO 14067:2018, 3.1.1.10, modified — Notes 1 and 2 to entry deleted.]

3.2.14
product system
collection of unit processes with elementary and product flows, performing one or more defined functions, and which models the *life cycle* (3.2.10) of a *product* (3.2.1)

[SOURCE: ISO 14040:2006, 3.28]

3.2.15
declared unit
quantity of a *product* (3.2.1) for use as a reference unit in the quantification of a *partial carbon footprint of a product (CFP)* (3.1.3)

EXAMPLE Mass (1 kg of primary steel), volume (1 m^3 of crude oil).

[SOURCE: ISO 14067:2018, 3.1.3.8]

3.2.16
functional unit
quantified performance of a *product system* (3.2.14) for use as a reference unit

Note 1 to entry: As the *carbon footprint of a product (CFP)* (3.1.1) treats information on a *product* (3.2.1) basis, an additional calculation based on a *declared unit* (3.2.15) can be presented.

[SOURCE: ISO 14067:2018, 3.1.3.7]

3.2.17
allocation
partitioning the input or output flows of a process or a *product system* (3.2.14) between the product system under study and one or more other product systems

[SOURCE: ISO 14040:2006, 3.17]

3.2.18
energy carrier
substance of phenomena that can be used to produce mechanical work or heat, or to operate chemical or physical processes

[SOURCE: ISO 16818:2008, 3.75]

3.2.19
harvesting
process of taking some technical measures to collect macroalgae from natural waters or cultivation facility and carrying back

3.2.20
refrigerant
fluid used for heat transfer in a refrigerating system, which absorbs heat at a low temperature and a low pressure of the fluid, and rejects it at a higher temperature and a higher pressure of the fluid usually involving changes of the phase of the fluid

Note 1 to entry: Refrigerants are listed in ISO 817.

[SOURCE: ISO 5149-1:2014, 3.7.9]

3.2.21
cut-off criterion
specification of the amount of material or energy flow or the level of environmental significance associated with unit processes or *product system* (3.2.14) to be excluded from the study

[SOURCE: ISO 14040:2006, 3.18]

3.3 Data and data quality

3.3.1
primary data
quantified value of a process or an activity obtained from a direct measurement or a calculation based on direct measurements

Note 1 to entry: Primary data need not necessarily originate from the *product system* (3.2.14) under study because primary data could relate to a different but comparable product system to that being studied.

[SOURCE: ISO 14064-1:2018, 3.2.2, modified — Note 1 to entry replaced.]

3.3.2
secondary data
data obtained from sources other than *primary data* (3.3.1)

Note 1 to entry: Such sources can include databases and published literature validated by competent authorities.

[SOURCE: ISO 14064-1:2018, 3.2.4]

3.3.3
data quality
characteristics of data that relate to their ability to satisfy stated requirements

[SOURCE: ISO 14040:2006, 3.19]

3.4 Greenhouse gases

3.4.1
greenhouse gas
GHG
gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere and clouds

Note 1 to entry: For a list of GHGs, see the latest Intergovernmental Panel on Climate Change (IPPC) Assessment Report.

Note 2 to entry: Water vapour and ozone are anthropogenic as well as natural GHGs, but are not included as recognized GHGs due to difficulties, in most cases, in isolating the human-induced component of global warming attributable to their presence in the atmosphere.