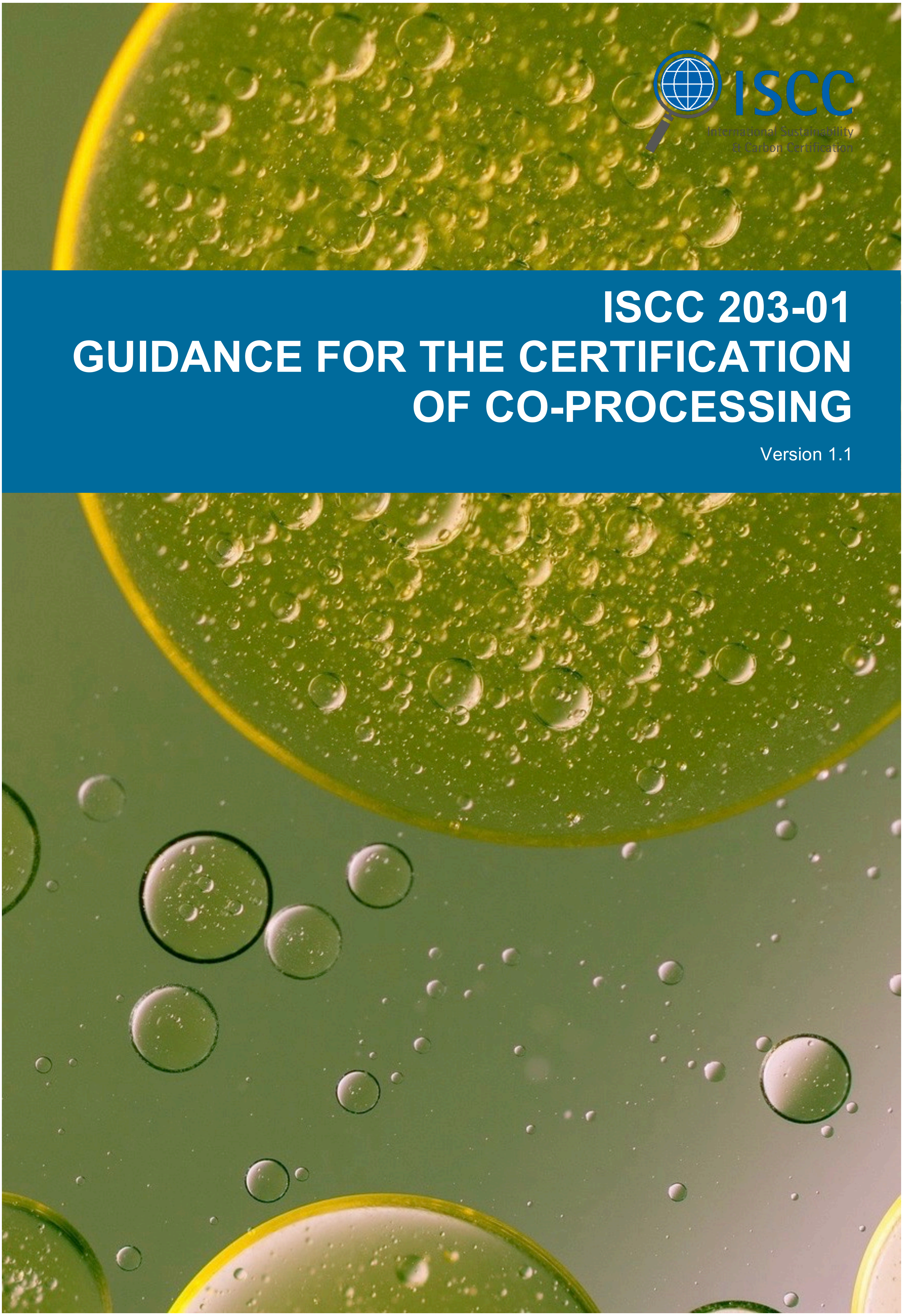

ISCC

International Sustainability
& Carbon Certification

ISCC 203-01
GUIDANCE FOR THE CERTIFICATION OF CO-PROCESSING

Version 1.1

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1 Introduction

Simultaneous processing of fossil and bio-based feedstock

Bio-based and fossil based feedstock processing may be carried out simultaneously. Processing includes any modification during the life cycle of a fuel or energy supplied causing a change to the molecular structure of the product. The co-processing of vegetable and animal oils (hereinafter referred to as bio-based inputs) and fossil inputs results in mixed products with the same chemical properties. One example of co-processing is the simultaneous processing of vegetable oil and fossil gasoil in a plant with the goal to produce diesel. The diesel derived from this process cannot be differentiated into bio-based and fossil diesel. This means that for co-processed diesel the chemical determination of the bio-content is hardly possible. Generally, the system boundary for the simultaneous processing of bio-based feedstocks and fossil feedstocks is the mineral oil refinery as depicted in figure 1. In essence, different kinds of outputs (diesel, gasoline, jet fuel, naphtha, liquefied petroleum gas (LPG), fuel gas or any other product) can be derived from co-processed bio/fossil feedstocks.

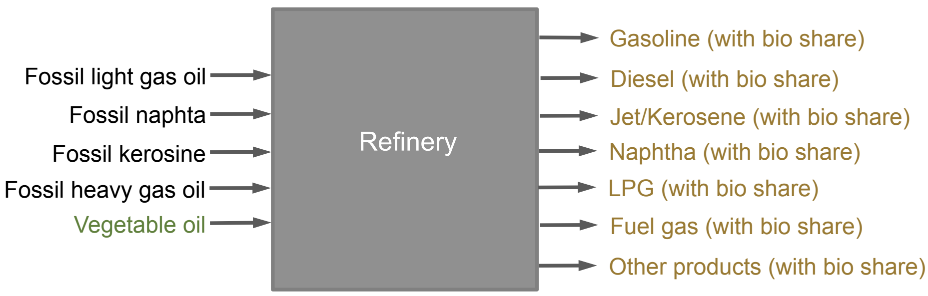

Figure 1: Co-processing of bio-based and fossil feedstocks in a mineral oil refinery

The following chapters describe the relevant requirements that must be fulfilled for the simultaneous co-processing of sustainable bio and fossil feedstocks to be in compliance with the International Sustainability and Carbon Certification (ISCC) scheme.

2 Requirements

Applicability

The requirements of this document are applicable for all processes that simultaneously pro-cess bio-based inputs and fossil inputs. They apply to any refining steps, where different bio-based inputs (e.g. vegetable oil, used cooking oil, animal fat) are co-processed with fossil feedstocks in order to produce diesel, gasoline, kerosene, naphta, LPG, fuel gas or any other product. The addition of denaturant or other auxiliaries are not regarded as co-processing.

GHG

The quantity of the co-processed biofuel is determined according to the energy balance and efficiency of the co-processing process. The energy content and thus the energy balance affect the greenhouse gas emission value of the co-processed biofuel. Relevant requirements on greenhouse gas emission values and actual calculation are covered in chapter 2.1.

Process efficiency

The quantity of the co-processed biofuel is related to the efficiency of the co-processing process. Although the individual outputs are chemically identical, irrespective if they are bio or fossil based, the energetic performance and efficiency of the bio- and fossil processes is different. Thus, under ISCC there are different options to determine the share of simultaneous co-processed bio-products, which all take into account the difference of bio and fossil inputs and processes. The determination of the bio-yield in co-processing processes is further de-scribed in chapter 2.2.

For co-processed renewable fuels in the European Union certain member states' regulations on co-processing may exist. For a recognition of the co-processed fuel in the respective member state, those rules shall apply.

2.1 Sustainability and GHG calculation requirements

Sustainable bio-based input

When bio-based inputs are simultaneously co-processed with fossil inputs, the bio-based share must meet the sustainability requirements and greenhouse gas emission requirements as referred to in ISCC documents 202 (and 205 for ISCC EU certifications). The quantity of the bio-based input co-processed, that does not meet the sustainability criteria referred to in the ISCC standard cannot be counted as renewable fuel in accordance with ISCC.

Preservation of sustainability characteristics

Where bio-based inputs with different sustainability characteristics (e.g. type of feedstock, country of origin, greenhouse gas (GHG) emissions) are co-processed with fossil inputs, the quantity and type of the different bio-based oils is taken into account in the calculation of the biofuel amounts. At least on a bookkeeping basis the product and sustainability characteristics shall be preserved (see ISCC document 203).

The greenhouse gas intensity of biofuels co-processed with fossil fuels shall reflect the post-processing state of the biofuel. The GHG emissions for co-processed biofuels can be determined by actual calculations (individually calculated GHG values).

GHG calculation

Any actual GHG calculation shall be done in accordance to the methodology of ISCC 205. If a fuel production process produces one or more products, the greenhouse gas emissions shall be divided between the fuel or its intermediate product and the co-products[1] in proportion to their energy content (determined by lower heating value in the case of co-products other than electricity). When products of a fuel production process are used internally, the (direct and indirect) emission factors used shall reflect the characteristics of the products (i.e. if it is handled as bio-based or fossil-based). If the product is awarded in the bio-yield calculation, only bio-based products can be regarded as bio-based in the GHG calculation.

[1] Including all fossil and biobased products where overall processing emissions have been calculated

2.2 Calculation of the bio-output

Bio-yield

In a simultaneous co-processing of bio and fossil inputs the amount of co-processed biofuels is always calculated based on the bio-yield of the process. In order to calculate the bio-output, the amount of incoming bio-inputs is multiplied with the relevant bio-yield. The calculation of the bio-yield must always be site-specific and process specific, i.e. done for the process within a site, where the bio-based input material is actually used. Depending on the specific boundary conditions of a production site a determination of the bio-yield under day-to-day operational conditions may not be possible. In these cases the determination of the bio-yield may require specific test conditions.

Calculation approaches of bio-yield

In order to calculate the bio-yield, three different approaches can be used:

A) Energetic determination;

B) Determination through the efficiency/losses of a process; or

C) ^{12}C or ^{14}C analyses

It is also possible to combine different approaches to strengthen the result. If different approaches result in two different results, the conservative approach should be followed.

For all three approaches, the determined sustainable bio-output can be attributed to the respective products. If ^{12}C or ^{14}C analyses are conducted for a specific product, only the determined bio-content of this product can be sold as such.

Other approaches

Other approaches than approaches A) to C) always require an evaluation by ISCC prior to their application. The requirements of mass balance as highlighted in the ISCC document „Mass balance“ do also apply.

EU Member State requirements

Please note that in some EU Member States certain requirements on the calculation of the bio-outputs might apply. If so, those requirements must be met above all.

A) Energetic determination

Energetic determination in detail

In this approach, the calculation of the bio-yield is based on energetic weighted ratios of bio-based and fossil inputs. Therefore, typical amounts and energy contents (based on lower heating values of different raw materials) of bio and fossil inputs as well as total output amounts are determined under different conditions (e.g. different shares of biobased raw materials). An energetic weighting factor is determined based on the fraction of the energy content of the biological input on the total energy content of all relevant inputs. The bio-output is calculated by multiplying the energetic weighting factor with total output amounts. Based on the calculated bio-output and the bio-input of a given condition, the bio-yield of the process is calculated. During daily operations, this bio-yield can be applied for incoming bio-based input materials. Where inputs and outputs are clearly linked (in time or physically) and thus amounts of in- and outputs can be assigned to each other, as an alternative to calculating the bio-yield it would be also possible to designate the share of biobased energy content in the inputs directly to the outputs.

B) Determination through the efficiency of a process and thus the losses

Process efficiency

As an alternative, the bio-yield can also be determined in simultaneous co-processing based on the efficiency and specific losses of the bio-based process.

Process losses

Although the bio/fossil outputs of a co-processing are chemically identical, the efficiencies of the parallel processes are different. This is especially the case where vegetable oils are co-processed in a refinery. Due to the oxygen content of the vegetable oils, the process losses (mainly water and CO2) are significantly higher than for the fossil input material. Thus, the simultaneous processing will result in parallel reactions with prefixed, differentiating fossil and bio-based outputs.

Determination of bio-fraction

In order to calculate the typical bio-outputs produced in a co-processing unit, it is necessary to determine the fraction of incoming biobased raw material as well as the fraction of produced biobased products. Therefore, an experimental set up can be used, whereby based on the specific outputs of varying bio-/fossil input shares the typical losses of a 100% bio-process are determined. The total bio-output and thus the bio-yield are determined by subtracting all losses of the bio-process from the amount of relevant bio-based input material.

As the bio-yield takes into account specific losses of processing bio-based inputs and therefore also the efficiency of the simultaneous co-processing of bio-based and fossil inputs, it is in line with the requirements to include the efficiency of the process.

Application of bio-yield

The determined bio-yield can be applied in daily operations for varying amounts of bio-inputs.

C) ^{12}C or ^{14}C analyses

Determination by ^{12}C or ^{14}C analyses

A ^{12}C or ^{14}C measurement to determine typical bio-based outputs shall be done based on the standard tests ASTM D6866 for determining the bio-based content of solid, liquid and gaseous samples, or CEN/TS 16640 for determining the bio-based carbon content of products. The ^{12}C or ^{14}C measurement shall be based on one of the three methods accepted by ASTM D6866 and CEN/TS 16640:

- Proportional Scintillation Method (PSM),
- Beta Ionisation (BI) or

- Accelerated Mass Spectrometry (AMS).

Fuel measurement & sampling regime

A “fuel measurement & sampling (FMS) regime”, which is a plan set out of how often and how much sampling takes place of the feedstocks, may be appropriate at the start of a given process. The ^{12}C or ^{14}C measurement should be repeated under different conditions (e.g. different shares of bio-based inputs) in order to adapt the overall bio-yield for different bio/fossil input ratios. The analysis results may be calibrated to account for ^{12}C or ^{14}C – total biomass uncertainty.

Application during daily operations

Where the amount of bio-inputs is known, ^{12}C or ^{14}C analyses can be conducted for the outputs only, whereby the dependency of the feedstocks and the bio-yield is determined based on the FMS regime. Where the bio-based fraction of an input is not known (e.g. in municipal solid wastes or tires), ^{12}C or ^{14}C analyses are conducted for the relevant outputs of the process. The resulting fraction of bio-based products can be directly used during the daily operations.