

ISCC GUIDANCE WASTE AND RESIDUES FROM FOOD AND FOOD PROCESSING

Version 1.0



Copyright notice

© 2024 ISCC System GmbH

This ISCC document is protected by copyright. It is freely available from the ISCC website or upon request.

No part of this copyrighted document may be changed or amended. The document may not be duplicated or copied in any form or by any means for commercial purposes without the permission of ISCC.

Document Title: ISCC Guidance on Waste and Residues from Food and Food Processing

Version 1.0

Valid from: 2024-12-18

Content

1	Introduction	2
2	Scope and normative references.....	2
3	Feedstocks	2
3.1	Used cooking oil.....	2
3.1.1	Definition	2
3.1.2	Target biofuels.....	3
3.1.3	Chemical and physical properties	3
3.1.4	Description of point of origin.....	4
3.1.5	Description of collection practices	5
3.1.6	Guidance on assessing plausible yields.....	6
3.1.7	Example supply chain	6
3.1.8	Audit considerations	7
3.2	Brown Grease	8
3.2.1	Definition	8
3.2.2	Target Biofuels	8
3.2.3	Chemical and physical properties	8
3.2.4	Description of point of origin.....	9
3.2.5	Description of collection practices	10
3.2.6	Guidance on assessing plausible yields.....	10
3.2.7	Example supply chain	10
3.2.8	Audit considerations	10

1 Introduction

Waste and residue feedstocks are a privileged group of materials with specific legislation in place to encourage their use in the production of biofuels. This document sets out definitions for specific waste and residue materials as well as additional information on the places where these substances accumulate and other considerations for auditors.

2 Scope and normative references

The contents of this guidance focus on points of origin and collecting points for waste and residues feedstocks. Topics like the properties of the waste and residue feedstocks, supply chain elements involved and points to consider for plausibility are described. This document has been developed through a multi-stakeholder ISCC working group on wastes and residues involving members of the ISCC Association (companies and industry associations with expertise in this topic), certification bodies and auditors. This document supplements the ISCC EU system document 202-5 Waste and Residues in its currently applicable version as published on the ISCC website. The document will be reviewed and updated periodically.

3 Feedstocks

This section contains detailed information on a selection of waste and residue feedstocks listed in Annex IX of the Directive (EU) 2018/2001. Currently, only Used Cooking Oil and Brown Grease are included, however the materials covered will be expanded through ongoing consultation with members of the ISCC working group on waste and residues.

3.1 Used cooking oil

3.1.1 Definition

Used cooking oils (UCOs) are oils and fats of vegetable or animal origin that have been used in the cooking, frying, preparation, or preservation of food for human consumption. This may also include fats and oils that naturally render out of food during cooking. Food preparation includes marinating, whereas preservation involves methods like pickling and canning foods in fats or oils.

Wastes from other uses of cooking oil, such as lubrication of food processing machinery, may be classified as used cooking oil, so long as this is not contrary to any local regulation of such practices, for example where there is a specific waste management process for such a waste.

UCO may originate from vegetable oils, animal fats or a mixture of both. It may be specified that it is entirely of vegetable origin, or partly or entirely of animal origin. UCOs are treated as waste under the RED II and are widely accepted as waste by EU Member States with some restrictions. For example, Germany only accepts UCO entirely of vegetable origin¹. In cases where vegetable fats or oils are used to deep-fry animal products (e.g. when cooking fried chicken), the resulting UCO may contain unavoidable "contamination" with animal fats or oils. Under these circumstances, it still qualifies as UCO of vegetable origin and the biofuel produced from this UCO can still be counted towards the German quota obligation².

UCO is a waste if it is considered no longer fit for the purpose of cooking food for human consumption. UCO is listed in Annex IX part B of the RED II and thus may qualify for double-counting but does not qualify as "advanced".

Used cooking oil may also be known by other names such as:

- Used vegetable oil
- Waste vegetable oil
- Waste cooking oil

In the United States 'yellow grease' is a term used to refer to a mixture of UCO and animal fats. Also, one shall distinguish waste vegetable oil from expired vegetable oil that are to be discarded because of their unsuitability for human consumption.

3.1.2 Target biofuels

UCO is a suitable feedstock for biodiesel, hydrotreated vegetable oil (HVO), and other processes capable of hydrogenating esters and fatty acids. It may also be suitable for co-processing with fossil feedstocks.

3.1.3 Chemical and physical properties

Fresh cooking oils are composed mostly of triglycerides. These oils are obtained from many different sources and modified using a multitude of different processes, for example by pressing and purifying vegetable oil seeds. Other methods, such as solvent extraction and hydrogenation, are also used in the industry to extract and modify vegetable oils. Please also note that some oils, like olive oil and coconut oil, come from the fruit or nut of the plant rather than the seed. Furthermore, the term "purifying" can encompass various processes beyond pressing, including

¹ According to paragraph 37b(8) Nr. 3 Federal Immission Control Act (Bundesimmissionsschutzgesetz - BImSchG)

² According to Article 9 paragraph 3 of the 36. BImSchV

refining, bleaching, and deodorizing, which are commonly employed to enhance the quality and stability of the oil.

UCOs share the main characteristics of the virgin oil from which they were derived, however the cooking process changes their chemical and physical properties. In general, UCO will be darker colored and stronger smelling than the virgin oil from which it is derived. It will also have higher free fatty acid (FFA) content, as well as changes in other trace markers such as polar compounds other than FFAs (e.g. mono- and diglycerides), and sulfur and nitrogen containing compounds.

Religion and culture have an impact on cooking styles and the types of oil used in different regions. These factors influence the physical and chemical properties of the UCO collected in that region. For example, the use of cooking oil to fry food is more prevalent in Mexican and Chinese cultures than in Japan. Besides religion and culture, the cooking process itself also influences the physical and chemical properties of the UCO. If the process involves food with a high moisture content, or the same oil is used repeatedly, or heated and cooled frequently, it will degrade the oil further and increase the content of FFAs, sulfur, nitrogen, moisture, and other impurities.

Some biodiesel producers will have a limit for FFA content in oils that they can process. Strict limitations on FFA content are most relevant to biodiesel producers. HEFA/HVO facilities may be able to process higher FFA content. If used as a feed in a co-processing facility, there is almost no limit on the FFA content due to the small amount of biocomponent mixed into the fossil feed. Although HVO and co-processing can tolerate high free fatty acid content, a low metal content is essential to maintain catalyst longevity. Thus, the use of UCO usually necessitates pre-treatment for large-scale applications. Collecting points may measure FFA content. This is typically done using titration against a standard.

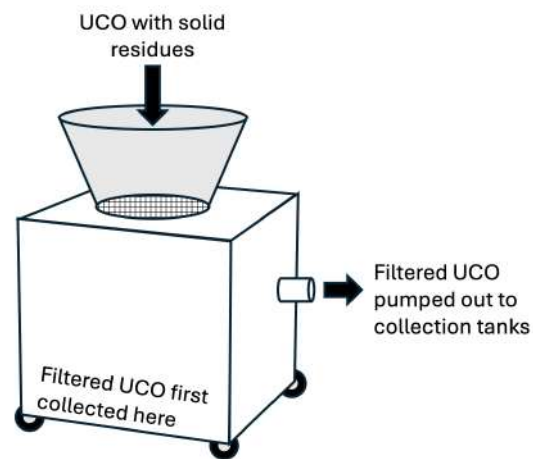
3.1.4 Description of point of origin

UCO is predominantly collected from three types of points of origin (PoO):

- Food and beverage outlets, such as restaurants, hotels, and hospitals
- Industrial and communal food processing facilities; and
- Municipal collecting facilities serving household kitchens

Food and beverage outlets include all kinds of restaurants, fast food chains, cafeterias, and catering services, including those in bigger venues such as stadiums and hospitals. Industrial food processing facilities are factories which process food through frying or cooking to sell in supermarkets or other food outlets. Household kitchens may also be points of origin for UCO in some countries.

In a restaurant or food processing facility, UCO can be collected either directly from friers or pans, or by using a dedicated oil filter that removes solids.



Oils and fats that collect in a grease trap below a sink are not considered UCO – see Brown Grease.

A Collecting point (CP) is a central location where UCO from multiple points of origin is collected. It may be collected from PoOs in small containers before being combined into larger tanks or purification units at the CP. The PoO shall keep a record of the quantity of oil collected by or transferred to a CP. As well as private collection points for UCO, in some regions there are also public collection points installed by municipal authorities.

Collection of UCO from households is done via a municipal facility or waste management company. Such collecting facilities should keep a record of the geographic area served. UCO collected by or from households as a segregated waste stream should be classed as UCO (Annex IX, Part B.) and not Biowaste (Annex IX, Part A. (c)).

3.1.5 Description of collection practices

The predominant arrangement for UCO collection is one where an organisation visits many PoOs, collecting the UCO in small batches that are aggregated at a central collecting point. Other arrangements exist, such as:

- The biofuel producer sets up a door to door collecting system to collect directly from the PoOs of UCO.
- PoOs of UCO deliver it to centralized collection points. The biofuel producer collects the UCO directly from these locations.
- The collecting point or biofuel producer supplies the virgin vegetable oils or animal fats to the PoO of UCO and collects it for recovery after use.

3.1.6 Guidance on assessing plausible yields

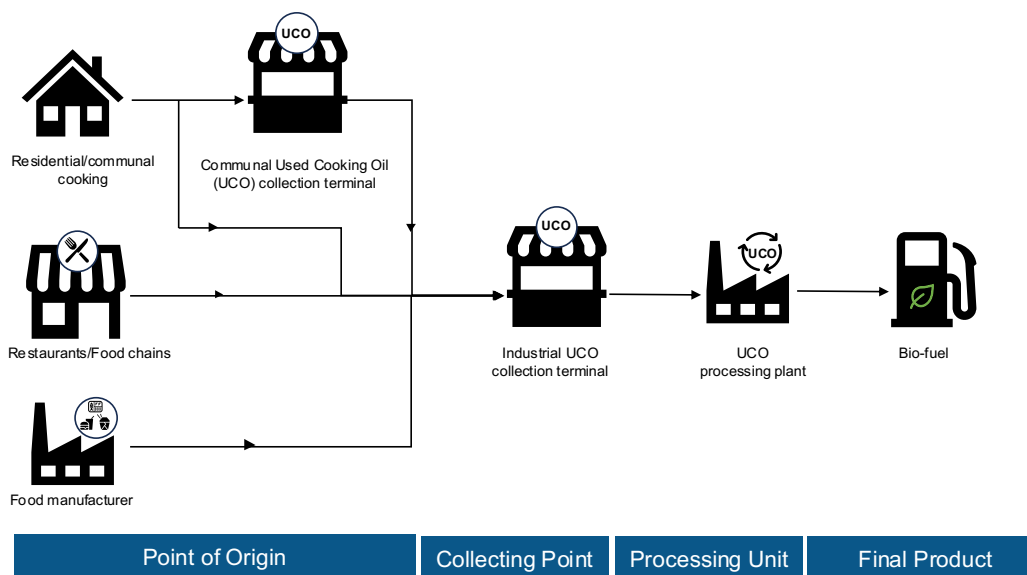
It can be challenging to assess whether the quantity of UCO produced at a particular location is plausible. This requires careful consideration of the type of PoO, the type of waste, the material it is derived from, and any other wastes associated with the parent material. The comments below should be treated as a guide for audits, however auditor discretion will be required in each individual case.

The amount of UCO that accumulates in a particular PoO will be related to the following factors:

- The quantity of virgin oil acquired and used at the PoO in the period between collections
- The type of cooking or preparation done at the PoO
- The waste management practices at the point of origin

It is important to note that, if purification of the oil is taking place at the collecting point, this will incur losses. The size of these losses will depend on the quality of oil collected from PoOs and the purification practices employed by the CP. ISCC System Users and literature³ suggest that from 100 kg of crude UCO approximately 10-30 kg could be impurities such as solids and water.

3.1.7 Example supply chain



³ Cárdenas, J., Orjuela, A., Sánchez, D. L., Narváez, P. C., Katryniok, B., & Clark, J. (2020). Pre-treatment of used cooking oils for the production of green chemicals: A review. *Journal of Cleaner Production*, 289, 125129. <https://doi.org/10.1016/j.jclepro.2020.125129>

3.1.8 Audit considerations

Under ISCC EU, the risk level must always be high for all audits (certification and surveillance audits) of individually certified Points of Origin, Collecting Points, and Central Offices that handle waste/residues from processing of animal or vegetable oils / soap stock, food waste, POME oil, brown grease/grease trap fat, sewage sludge and/or UCO. General and specific requirements as listed in the document ISCC EU 203 – Traceability and Chain of Custody forms the basis of audit requirements for different supply chain elements handling wastes and residues. Having said that, the following are the considerations for auditors to check specific aspects in UCO supply chains.

3.1.8.1 Point of Origin

Auditors shall consider the type of point of origin for the UCO; is it from food and beverage services, kitchens, or food processing facilities? Another important aspect to be checked is type of oil used and how much is used. Auditors can retrieve this information from inventory invoices, oil change/oil refill rate. Auditors shall check the origin of virgin oil, whether it was an animal or vegetable oil. PoOs shall be audited on-site on a sample basis.

3.1.8.2 Collecting Point

Collecting points must be audited on-site. Auditors shall assess bookkeeping of wastes and shall assess the correct classification of the waste material according to its chemical and physical properties. Auditors should inspect any documentation relating to analysis of volumes and type of incoming or outgoing materials. The equipment and record keeping for measuring the mass of incoming and outgoing materials should be checked for inconsistencies, such as unusually round numbers and regular “patterns” in the documentation (e.g. sequence of numbers, timing of deliveries). Any purification steps (e.g. removing residues, control of free fatty acids content) should be assessed for their suitability for handling the types and qualities of material received from PoOs. Storage facilities for waste materials shall be separate from, or different to, those used for non-waste materials for the physical segregation approach.

3.1.8.3 Processing Unit, Biodiesel or HVO plant

At this stage of the supply chain, the auditor must check the correct documentation and mass balancing of the UCO that is being processed. In addition to this, auditors may check any certificate of analysis available including product description of UCO. These certificates might help an auditor to check quality of incoming material and if the material is correctly declared or not. Wrong declaration of material is considered a critical non-conformity and leads to the immediate withdrawal of a certificate. Entities shall be informed of the ISCC’s strengthened requirements for waste and residue supply chains effective since 1st of August 2023.

3.2 Brown Grease

3.2.1 Definition

Brown grease / grease trap fat (BG) is defined as oil, fat and grease that is recovered from grease traps below sinks or in drainage systems. It is often a mixture of water, oils, fatty acids, and sediment. A grease trap is designed to prevent these contaminants from clogging sewage piping. BG is generally removed by specialized collection service providers and disposed of in landfills or wastewater treatment plants.

Material removed from the publicly owned sewage system shall not be reported under this category.

By definition, brown grease accumulates in the presence of water. This has implications for how it can be collected, the chemical and physical properties of the material, and hence the processes required to turn it into a fuel.

While compounds suitable for the production of FAME or HVO are present, the highly contaminated and low-quality nature of BG can lead to higher processing costs in comparison to UCO due to the requirement for pre-treatment in the form of dewatering (sometimes up to 85% water content) and filtration/separation.

Brown grease refers to the complete portion of the grease trap that is removed by the collector.

3.2.2 Target Biofuels

The lipophilic portion of BG may be a suitable feedstock for biodiesel (esters of fatty acids, such as FAME), hydrotreated vegetable oil (HVO), and other processes capable of hydrogenating esters and fatty acids. It may also be suitable for co-processing with fossil feedstocks. The aqueous and solid fractions of BG may be a suitable feedstock for biogas production. It may also be possible to use the whole content of the grease separator, i.e. untreated BG, as feedstock for biogas production.

3.2.3 Chemical and physical properties

Grease traps are designed to separate water and grease. As such, brown grease accumulates in wet environments and the glycerides that make up the oil fraction will be subject to hydrolysis. This means that oily fraction of brown grease collected from a restaurant would likely have a higher free fatty acid (FFA) content than a UCO collected from the same location.

Brown grease can take a range of forms but is generally a mixture of oils, fats, water, and sediment. It is usually contaminated with other food residues and surfactants used for cleaning.

3.2.4 Description of point of origin

Points of origin for brown grease are grease traps. Grease traps, sometimes referred to as grease separators, are devices designed to reduce the amount of fat and grease entering the sewage system. A grease separator could be installed under the sink in the PoO (e.g. restaurant) or set outside the building.

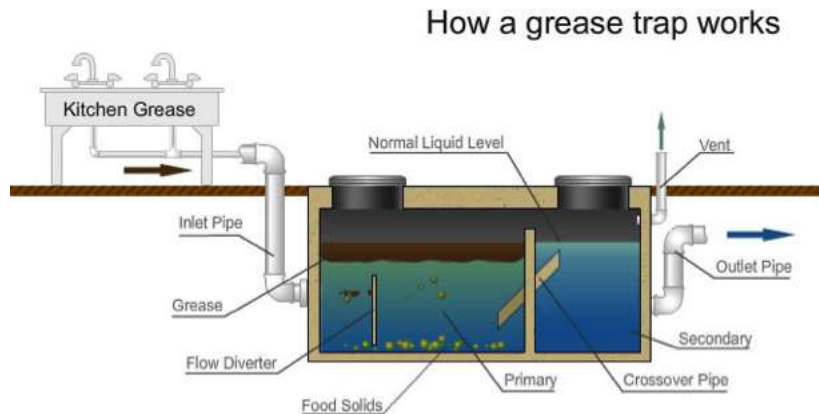
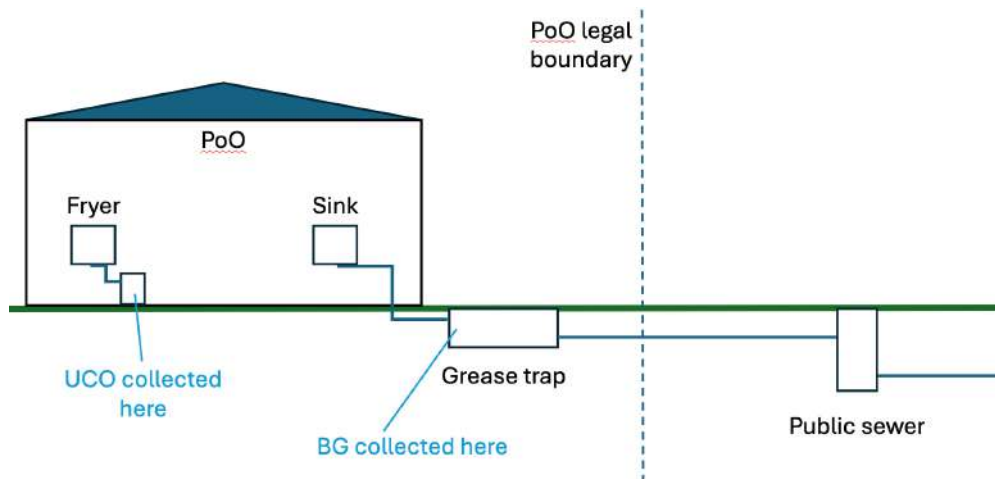


Image taken from <https://grease-cycle.com/blog2/how-does-a-grease-trap-work>

These may be located on the premises of restaurants or food processing units, or they may serve several different wastewater producing sites. In each case the point of origin is defined as the responsible legal entity within whose boundaries the grease separator is located.



Material removed from the sewage system shall not be reported under this category.

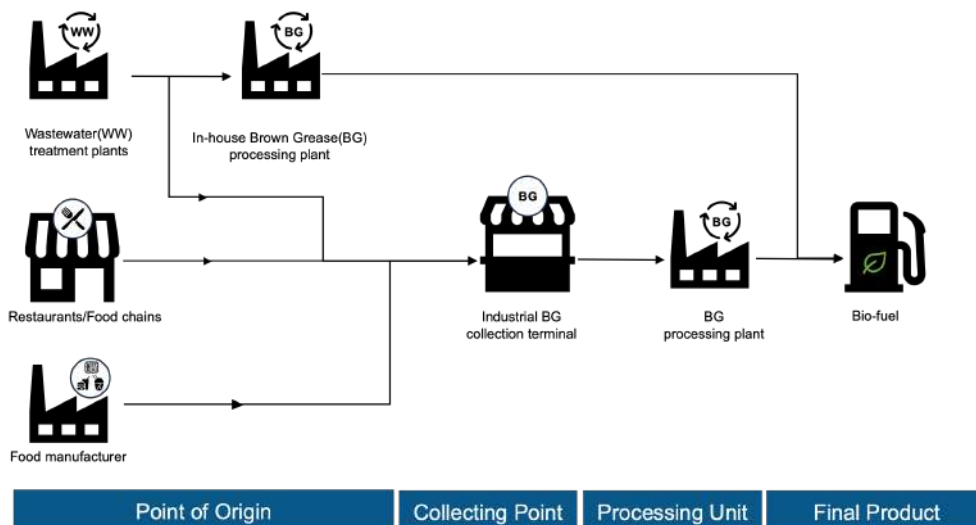
3.2.5 Description of collection practices

The collection arrangements for brown Grease may be similar to those of UCO, however extracting the material from separators requires specialized equipment. Due to the heterogeneous nature of the material, it will generally be taken from the PoO to specialized processing plants or pre-treatment plants. These specialized processing or pre-treatment plants dewater the brown grease through heating and decanting processes.

3.2.6 Guidance on assessing plausible yields

Yields of material suitable for fuel production after treatment processes vary greatly depending on the exact nature of the brown grease collected. Some facilities report that, from the brown grease removed from a separator, approximately one percent treated brown grease can be obtained, others report up to 10%. The proportion of oils and fats in collected BG will depend on the collection practices employed. If the whole content of the grease separator is removed, including fats, water and sediment, then the proportion of fats, oils and greases may be low.

3.2.7 Example supply chain



3.2.8 Audit considerations

Disposal and processing of grease separator contents must be carried out separately from UCO collection. Auditors shall check if UCO and BG are kept separated in the mass balance.

The sources of the grease trap contents should be randomly sampled, and the specialized treatment plants/processing units should be audited.

The ratio of the treated grease trap content to the separated quantity of brown grease must be verified by the specialized treatment plants.

Under ISCC EU, the risk level must always be high for all audits (certification and surveillance audits) of individually certified Points of Origin, Collecting Points, and Central Offices that handle waste/residues from processing of animal or vegetable oils / soap stock, food waste, POME oil, brown grease/grease trap fat, sewage sludge and/or UCO the risk level must always be high. As for UCO, general and specific requirements listed in the document [ISCC EU 203 – Traceability and Chain of Custody](#) forms the basis of audit requirements for different supply chain elements handling brown grease as well.