



# Specific requirements for by-products from the Oil & Fat Industry

GMP+ BA 7

Version EN: 1 January 2022

**GMP+ Feed Certification scheme**



## History of the document

Revision no. / Date of approval	Amendment	Concerns	Final implementation date
0.0 / 04-2018	New document	-	<del>01-09-2018</del> 01.04.2019
1.0 / 03-2019	- Crude fatty acids from splitting and pure distilled fatty acids from splitting can, under strict conditions, fall out of scope of GMP+ BA7 - Several flowcharts are corrected / updated	Annex 1  Annex 2	01-04-2019
1.1 / 06-2019	Text correction: 13.6.4 Salts of fatty acids	Annex 1	15-07-2019
1.2 / 11-2020	Several products produced with/ derived from fatty acids from splitting can, under strict conditions, fall out of scope of GMP+ BA7	Annex 1	15-12-2020
2.0 / 10-2021	Editorial change  'Melting point' is deleted as parameters to be analysed for oil and fat by-products	3.1	01-01-2023

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# 1. Introduction

## 1.1. General

The GMP+ Feed Certification scheme was initiated and developed in 1992 by the Dutch feed industry in response to various more or less serious incidents involving contamination in feed materials. Although it started as a national scheme, it has developed to become an international scheme that is managed by GMP+ International in collaboration with various international stakeholders.

Even though the GMP+ Feed Certification scheme originated from a feed safety perspective, in 2013 the first feed responsibility standard has been published. For this purpose, two modules are created: GMP+ Feed Safety Assurance (focussed on feed safety) and GMP+ Feed Responsibility Assurance (focussed on responsible feed).

GMP+ Feed Safety Assurance is a complete module with standards for the assurance of feed safety in all the links of the feed chain. Demonstrable assurance of feed safety is a 'license to sell' in many countries and markets and participation in the GMP+ FSA module can facilitate this excellently. Based on needs in practice, multiple components have been integrated into the GMP+ FSA standards, such as requirements for a feed safety management system, for application of HACCP principles, to traceability, monitoring, prerequisites programmes, chain approach and the Early Warning System.

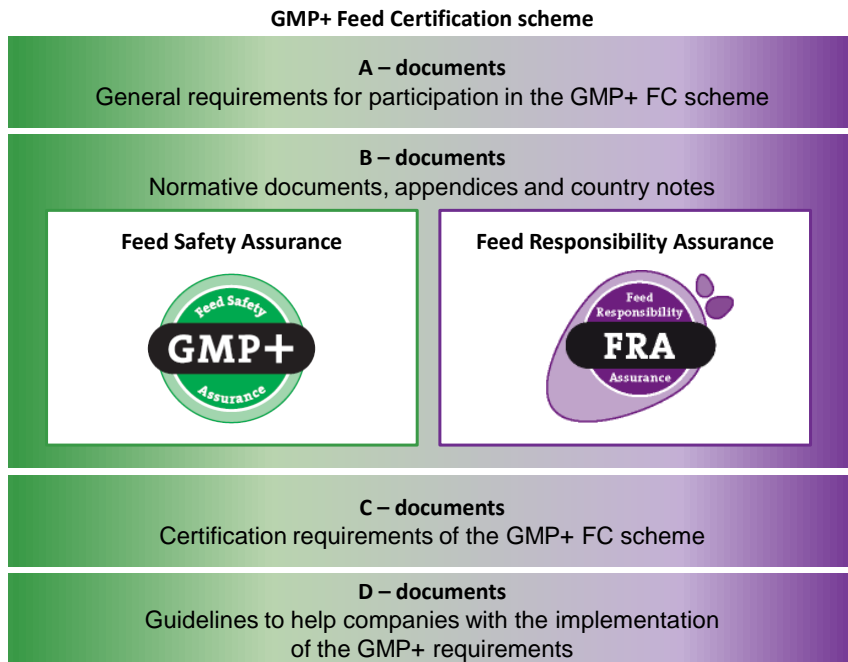
With the development of the GMP+ Feed Responsibility Assurance module, GMP+ International is responding to requests from GMP+ participants. The animal feed sector is confronted with requests to operate more responsible. This includes, for example, the sourcing of soy and fishmeal which are produced and traded with respect for humans, animals and the environment. In order to demonstrate responsible production and trade, a company can get certified for the GMP+ Feed Responsibility Assurance. GMP+ International facilitates via independent certification the demands from the market.

Together with the GMP+ partners, GMP+ International transparently lays down clear requirements in the Feed Certification scheme. Certification bodies are able to carry out GMP+ certification independently.

GMP+ International supports the GMP+ participants with useful and practical information by way of a number of guidance documents, databases, newsletters, Q&A lists and seminars.

## 1.2. Structure of the GMP+ Feed Certification scheme

The documents within the GMP+ Feed Certification scheme are subdivided into a number of series. The next page shows a schematic representation of the content of the GMP+ Feed Certification scheme:



All these documents are available via the website of GMP+ International ([www.gmpplus.org](http://www.gmpplus.org)).

This document is referred to as GMP+ BA7 *Specific requirements for by-products from the Oil and Fat Industry* and is part of the GMP+ FSA module.

## 2. General Requirements

### 2.1. Introduction

By-products from the oils and fats industry are often used in all kind of feed. As part of the harmonisation of key elements in their standards, GMP+ International, OVOCOM, AIC and QS have decided to define together a minimum set of safety control measures and conditions, to be applied by a company who produces or trades one of the above mentioned by-products.

The purpose is – beside creating a level playing field - to increase feed safety when using the by-products coming from the oils and fats industry ( a.o. by-products coming from milling / crushing and refinery). This should contribute to more confidence in the products and ensure even more that only safe products are supplied in the feed chain.

### 2.2. Basic principle

Basic principle is that these by-products need to come out of a closed ('assured') chain. In the framework of GMP+ feed safety assurance and GMP+ certification, this means:

#### For the GMP+ certified producer:

A producer of by-products from the oil and fat industry needs to assure the feed safety in compliance with the relevant GMP+ standards<sup>a</sup>, and be certified as such.

As additional part of this certification, this GMP+-certified producer should specifically demonstrate there is compliance with the relevant additional requirements, which are laid down in chapter 3 of this appendix.

Specific sourcing requirements have been laid down for a soap stock splitter.

#### For the GMP+ certified trader:

A trader/importer of these by-products must - within the framework of his GMP+ certification<sup>b</sup> - purchase from the above mentioned certified producers (or equivalent). This trader must also, demonstrate compliance with the relevant additional requirements, which are laid down in chapter 3 of this appendix.

Note:

- The specified requirements focus mainly on sourcing, producing, labelling and monitoring, and are – as stated above - applicable for both producers and traders of the specified by-products.

#### For a compound feed company

The producer of compound feed which is to be delivered to a farmer does not need to apply this appendix. For fat blender relevant parts of this appendix applies. Think of labelling and transfer of information.

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<sup>a</sup> The best is to apply the GMP+ B2-standard

<sup>b</sup> The best is to apply the GMP+ B3-standard.

## 2.3. Definitions

Term	Explanation
AIC	Agricultural Industries Confederation
EFISC	European Feed and Food Ingredient Safety Certification
First generation GMQ oil	E.g. rapeseed oil, sunflower oil, soya oil, palm oil. This term refers to GMQ oils and fats used as raw materials for soap stock splitting. These soap stocks origin from refineries that have used GMQ oil for refining.
FOSFA	Federation of Oils, Seeds and Fats Associations
GMO	Genetically Modified Organism
GMQ	Good Merchantable Quality "Merchantable quality": goods of any kind which are the subject of a contract for a consumer sale are not of merchantable quality if they are not as fit for the purpose or purposes for which goods of that kind are commonly bought as is reasonable to expect having regard to their price, to any description applied to them by the seller and to all other circumstances.
GROFOR	German Association of Wholesale Traders in Oils, Fats and Oil Raw Materials
MONG	Matter Organic Non-Glycerol MONG is a residue from glycerin, meaning the vegetable fat-like residues (e.g. triglycerides and fatty acids) from the refining of vegetable glycerin. MONG also contains glycerin, salts and water. So basically everything that is not glycerol / glycerin. This is usually a small percentage that is still in the raw glycerin (defined as 100 less the sum of the percentages of glycerol, ash and water). With further processing of the glycerin, MONG is removed and is thus a byproduct of the glycerin refining.
Multi feedstock	Multiple, different raw materials, which are used for the manufacture of a (final or intermediate) product. In the context of this document it concerns different raw materials whose origin may be difficult to trace, for example UCOs and animal fats.
NOFOTA	Netherlands Oils Fats Oilseeds Trade Association
OVOCOM	Belgian consultation platform intended for the feed sector, manages the Feed Chain Alliance Standard
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated biphenyl
POME	Palm Oil Mill Effluent
QS	QS Qualität und Sicherheit, manages the QS scheme
UCO	Used Cooking Oils

### 3. Specific requirements

#### 3.1. Specific requirements for oil and fat by-products

Topic	Requirement/condition	Explanation/guidance
<b>Scope &amp; application</b>		
<p><b>What feed products are we talking about?</b></p>	<p>Any product derived directly or indirectly from crude or recovered oils and fats by oleochemical or biodiesel processing or distillation, chemical or physical refining, other than:</p> <ul style="list-style-type: none"> <li>- refined oils,</li> <li>- products derived from refined oils</li> <li>- feed additives;</li> </ul> <p>to be used in feed</p> <p>As per Annex I of this document</p> <p>(source: Regulation (EU) 2015/1905)</p>	<p><u>These conditions apply to:</u></p> <ul style="list-style-type: none"> <li>- By-products of vegetable oils/fats</li> <li>- Products from the oleochemical industry, which are laid down in Regulation (EU) No 68/2013 (the Catalogue of feed materials), including amendments to this regulation.</li> </ul> <p><u>These conditions do not apply to:</u></p> <ul style="list-style-type: none"> <li>- Crude oil (examples: crude degummed oil, crude palm oil etc.)</li> <li>- By- products of fats/oils from animal origin</li> <li>- Products mentioned in the so-called Feed Materials Register</li> </ul> <p>In Annex 1 examples of products are listed which are in or out of the scope of this appendix.</p> <p>Annex 2 provides an overview of processes of refining of oils, downstream processing of oils and biodiesel production process. These are general descriptions of the processes and may in some details deviate from the processes as laid down in FSP. Products falling under scope of this appendix are highlighted.</p> <p>'To be used in feed': it does not matter under which specification/status the product is purchased. If destination is feed, this appendix applies.</p>



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Topic	Requirement/condition	Explanation/guidance
<b>From which origin?</b>	Any origin, except when produced by an EU based and registered food company	If the producer is based in the EU and registered as an EU food operator and the by-product comes out of a process covered under the EU food registration, this appendix does not apply. The regular scheme requirements apply.
<b>Who must apply this appendix?</b>	Any participant which is involved in the production and trade of the oil and fat by-products, which fall under the scope of this appendix  This participant must comply with the relevant requirements of this appendix.	The producer of compound feed which is to be delivered to a farmer does not need to apply this appendix. For a fat blender this appendix applies. See section 2.2.  For traders this basically means that they must forward product information and analyses results which are requested by this appendix.
<b>Requirements for producers and traders</b>		
<b>Shipment, supervision and sampling</b>	When shipped by sea vessel or barge - Shipment to be carried out under a well-known, in the international trade accepted contract (FOSFA, NOFOTA, GROFOR) to assure <ul style="list-style-type: none"> <li>o Independent supervision</li> <li>o Sampling per lot</li> <li>o Safe previous cargoes and technical equipment</li> </ul>	This assures that shipment is supervised by an independent accredited cargo superintendent  A lot is an expression which is particularly used when shipping by boat or vessel. A lot can be divided on several holds. A lot is often documented by a Bill of Lading.  A batch is more used to indicate a certain volume of product originating from a production process.  Safe previous cargoes and technical equipment as per FOSFA requirements.
	When shipped by vehicles (tank/container): - sampling of each truck	Individual samples must be labelled, sealed and stored correctly. Batches ('truckloads') may be stored together in a tank, which must be tested before delivery. Positive release before delivery.
<b>Testing</b>	Batch by batch	100% positive release. Batches/lots need to be tested before used in feed. Producer of the by-product is responsible unless agreed (in contract or another official document) to transfer this responsibility for testing to his customer. They must also agree that results are shared. Representative test results need to accompany any delivered batch, also to customers.

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Topic	Requirement/condition	Explanation/guidance
	Carried out at a laboratory with complies with the GMP+ requirements	<del>Please, notify your laboratory that spiking should be added directly on the sample before sample extraction, confirmation single spikes should be carried out on unexpected residues. Accreditation must include the specific parameter and matrix.</del>
<b>Parameters to be analysed</b>	<ul style="list-style-type: none"> <li>- Fatty Acid profile</li> <li>- Moisture and impurities</li> <li>- Free Fatty Acid</li> <li><del>- Melting point</del></li> </ul>	Results must fit to the profile of the product and the producer.
	<ul style="list-style-type: none"> <li>- Dioxins, dioxin-like PCBs, non-Dioxin-like PCBs</li> <li>- Pesticides</li> <li>- Heavy metals (Arsenic, Cadmium, Mercury, Lead and Nickel)</li> <li>- Mineral oil</li> <li>- PAH's</li> </ul>	<p>Levels must not exceed the limits as laid down in GMP+ BA1 and Directive 2002/32/EC</p> <p>Pesticides conform Reg. EC) No 396/2005 and based on own risk analysis.</p>
<b>Labelling</b>	Product name (including botanical origin) and number according to Reg. (EU) No 68/2013, as amended, must be declared (see Annex 1 to this appendix)	<p>Labelling requirements applies for all origins, EU and non-EU.</p> <p>Note: Although not addressed in every scheme as a feed safety issue, the GMO labelling must also comply with EU legislation.</p>
	When it concerns composite product, names and numbers of all ingredients must be mentioned.	Specification of oils and fats products including the catalogue numbers and the botanical origin.
<b>Transfer of information</b>	Information, which is generated as a result of application of this appendix, must be unambiguous and must accompany every batch / shipment to demonstrate that requirements have been met.	

### 3.2. Specific requirements for soap stock splitters

Specific purchase requirement for soap stock splitters	Requirement/condition	Explanation/guidance
<b>Sourcing of raw materials for soap stock splitters (acidulators)</b>	Clear contracts with specification of incoming raw materials	A clear contract is a commercial contract with clarity about the contractual parties involved and it should contain all relevant specifications of the in-coming raw materials. The soap stock splitters are to be considered as a starting point in the assured chain.
	Raw materials to be used: <ul style="list-style-type: none"> <li>- Wet gums out of processing food/feed grade oil (GMQ)</li> <li>- Soap stock out of first generation GMQ vegetable oil (chemical refinery).</li> <li>- Soap stocks from neutralisation process (derived from GMQ oil to be used in biodiesel production).</li> </ul>	This is from GMQ crude vegetable oil which quality is also used to process refined oils for human consumption. Note that the oil which is used in biodiesel production is only partly refined, meaning only neutralized. Bleaching and deodorization is normally not part of the biodiesel process.
	Raw materials not be used (negative list): <ul style="list-style-type: none"> <li>- By-products from biodiesel production (e.g. MONG)</li> <li>- soap stocks out of multi feedstock biodiesel. Multi feedstock means non-GMQ vegetable oil. In this case besides oils/fats from vegetable origin, also fats/oils from animal origin or Used Cooking Oils are used to produce the biodiesel</li> <li>- Tank bottoms</li> <li>- Regained oil from bleaching earth</li> <li>- Deodistilates</li> <li>- Skimming fats from water treatment processing (e.g. POME)</li> <li>- Fats from animal origin</li> </ul>	This negative list should be literally stated in the purchase contract of the soap stock splitter and the suppliers of the raw materials to the soap stock splitter.

## Annex 1: Product name and number according to Reg. (EU) No 68/2013

Within the scope of annex	Number	Name	Description	Examples of products falling under this number
No	1.2.13	Crude maize germ oil	Product obtained from maize germ	
No	1.6.13	Rice bran oil	Oil extracted from stabilised rice bran	
No	2.20.1	Vegetable oil and fat <sup>(2)</sup>	Oil and fat obtained from plants (excluding castor oil from the ricinus plant), it may be degummed, refined and/or hydrogenated.	Castor oil, CAS no. 8001-79-4, EC no. 232-293-8; Palm oil stearin fraction; Rape seed stearin fraction; Sunflower stearin fraction
No	2.20.2	Used food factory vegetable oils	Vegetable oils having been used by food business operators in accordance with Regulation (EC) No 852/2004 for cooking purposes and which have not been in contact with meat, animal fats, fish or aquatic animals.	
No	2.21.1	Crude lecithins	Product obtained during degumming of crude oil from oilseeds and oil fruits with water. Citric acid, phosphoric acid, sodium hydroxide or enzymes may be added during degumming of the crude oil.	
No	2.22.3	Hemp oil	Oil obtained by pressing of hemp plants and seeds	
No	7.1.4	Algal oil <sup>(1)</sup>	Oil obtained by extraction from algae. May contain up to 0,1 % antifoaming agents.	
No	9.2.1	Animal fat	Product composed of fat from land animals, including invertebrates other than species pathogenic to humans and animals in all their life stages. If extracted with solvents, may contain up to 0,1 % hexane.	
No	10.4.6	Fish oil	Oil obtained from fish or parts of fish followed by centrifugation to remove water (may include species specific details e.g. cod liver oil).	
No	10.4.7	Fish oil, hydrogenated	Oil obtained from hydrogenation of fish oil	

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Within the scope of annex	Number	Name	Description	Examples of products falling under this number
Yes	13.6.1	Acid oils from chemical refining <sup>(3)</sup>	Product obtained during the deacidification of oils and fats of vegetable origin by means of alkali, followed by an acidulation with subsequent separation of the aqueous phase, containing free fatty acids, oils or fats and natural components of seeds, fruits tissues such as mono- and diglycerides, crude lecithin and fibres.	
Yes <sup>d</sup>	13.6.2	Fatty acids esterified with glycerol <sup>(4)</sup>	Glycerides obtained by esterification of fatty acids with glycerol. May contain up to 50 ppm Nickel from hydrogenation.	
Yes <sup>d</sup>	13.6.3	Mono di and tri glycerides of fatty acids <sup>(4)</sup>	Product consisting of mixtures of mono-, di- and triesters of glycerol with fatty acids. They may contain small amounts of free fatty acids and glycerol. May contain up to 50 ppm Nickel from hydrogenation.	
Yes <sup>d</sup>	13.6.4	Salts of fatty acids <sup>(4)</sup>	Product obtained by reaction of fatty acids with at least four carbon atoms with calcium, magnesium, sodium or potassium hydroxides, oxides or salts. May contain up to 50 ppm Nickel from hydrogenation.	Analysis should be done on the fat component (e.g. PFAD) <del>of</del> or on the end-product.
Yes	13.6.5	Fatty acid distillates from physical refining <sup>(3)</sup>	Product obtained during the deacidification of oils and fats of vegetable origin by means of distillation containing free fatty acids, oils or fats and natural components of seeds, fruits tissues such as mono- and diglycerides, sterols and tocopherols.	
Yes <sup>c</sup>	13.6.6	Crude fatty acids from splitting <sup>(3)</sup>	Product obtained by oil/fat splitting. By definition it consists of crude fatty acids C <sub>6</sub> -C <sub>24</sub> , aliphatic, linear, monocarboxylic, saturated and unsaturated. May contain up to 50 ppm Nickel from hydrogenation.	

<sup>c</sup> The products 13.6.6 and 13.6.7 are out of scope of GMP+ BA7 only in case the feedstock used to produce these products is vegetable oil falling under the Catalogue of feed materials number 2.20.1. When other products are used as the feedstock (e.g. by-products as defined in GMP+ BA7), 13.6.6 and 13.6.7 are within scope of GMP+ BA7.

Specific requirements for by-products from the Oil & Fat Industry - BA 7

Within the scope of annex	Number	Name	Description	Examples of products falling under this number
Yes <sup>c</sup>	13.6.7	Pure distilled fatty acids from splitting <sup>(3)</sup>	Product obtained by the distillation of crude fatty acids from oil/fat splitting potentially plus hydrogenation. By definition it consists of pure distilled fatty acids C <sub>6</sub> -C <sub>24</sub> , aliphatic, linear, monocarboxylic, saturated and unsaturated. May contain up to 50 ppm Nickel from hydrogenation.	Ricin oleic acid (syn. Castor oil acid), CAS no.141-22-0, EC no. 205-470-2 Icosa-5,8,11,14-tetraenoic acid (syn. Arachidonic acid), CAS no. 506-32-1, EC no. 208-033-4 Hexanoic acid (syn. Caproic acid ) of vegetable origin, CAS no.142-62-1, EC no. 205-550-7; Octanoic acid (syn. Caprylic acid) of vegetable origin, CAS no.124-07-2, EC no. 204-677-5 Oleic acid (syn. octadec-9-enoic acid) of vegetable origin, CAS no. 112-80-1, EC no. 204-007-1 Linoleic acid (syn. 9,12-Octadecadienoic acid), CAS no. 60-33-3, EC no. 200-470-9 Linolenic acid (syn. (9Z,12Z,15Z)-9,12,15-Octadecatrienoic acid), CAS no. 463-40-1, EC no. 207-334-8 Stearic acid (syn. octadecanoic acid) of vegetable origin, CAS no. 57-11-4, EC no. 200-313-4
No	13.6.8	Soap stocks <sup>(3)</sup>	Product obtained during the deacidification of vegetable oils and fats by means of aqueous calcium, magnesium, sodium or potassium hydroxide solution, containing salts of fatty acids, oils or fats and natural components of seeds, fruits or animal tissues such as mono- and diglycerides, crude lecithin and fibres.	

Specific requirements for by-products from the Oil & Fat Industry - BA 7

Within the scope of annex	Number	Name	Description	Examples of products falling under this number
Yes <sup>d</sup>	13.6.9	Mono- and diglycerides of fatty acids esterified with organic acids <sup>(4) (5)</sup>	Mono- and diglycerides of fatty acids with at least four carbon atoms esterified with organic acids.	
Yes <sup>d</sup>	13.6.10	Sucrose esters of fatty acids <sup>(4)</sup>	Esters of saccharose and fatty acids.	
Yes <sup>d</sup>	13.6.11	Sucroglycerides of fatty acids <sup>(4)</sup>	Mixture of esters of saccharose and mono and di-glycerides of fatty acids.	
No	13.8.1	Glycerine, crude [Glycerol, crude]	<p>By-product obtained from:</p> <ul style="list-style-type: none"> <li>- the oleochemical process of oil/fat splitting to obtain fatty acids and sweet water, followed by concentration of the sweet water to get crude glycerol or by transesterification (may contain up to 0,5 % methanol) of natural oils/fats to obtain fatty acid methyl esters and sweet water, followed by concentration of the sweet water to get crude glycerol;</li> <li>- the production of biodiesel (methyl or ethyl esters of fatty acids) by transesterification of oils and fats of unspecified vegetable and animal origin. Mineral and organic salts might remain in the glycerine (up to 7,5 %).</li> </ul> <p>May contain up to 0,5 % Methanol and up to 4 % of Matter Organic Non Glycerol (MONG) comprising of Fatty Acid Methyl Esters, Fatty Acid Ethyl Esters, Free Fatty Acids and Glycerides;</p>	

<sup>d</sup> This product is out of scope of GMP+ BA7 in case it is only produced with/ derived from 13.6.6 or 13.6.7 obtained by splitting of vegetable oil falling under the Catalogue of feed materials number 2.20.1. In all other cases, this product is within scope of GMP+ BA7.

Specific requirements for by-products from the Oil & Fat Industry - BA 7

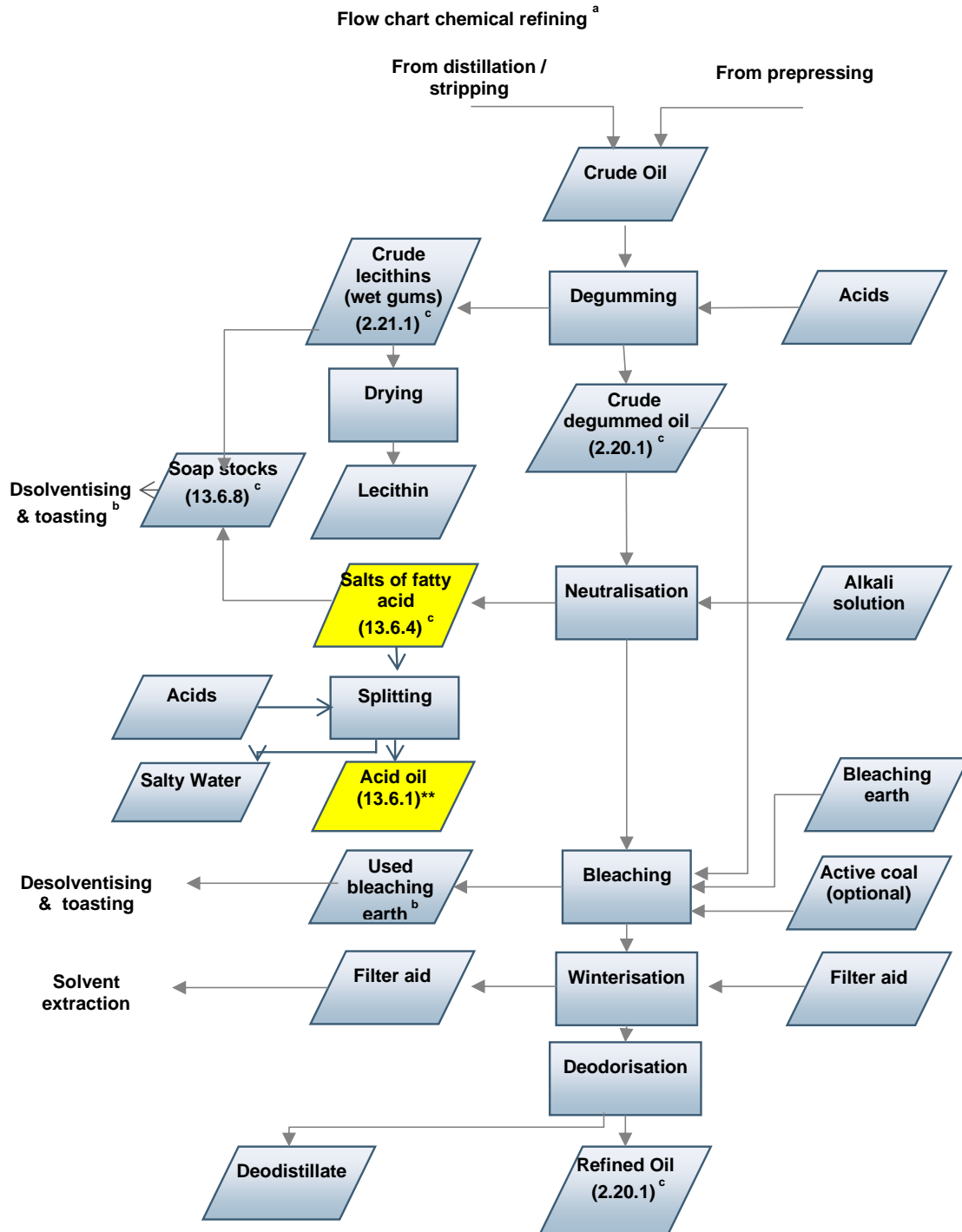
Within the scope of annex	Number	Name	Description	Examples of products falling under this number
			<ul style="list-style-type: none"> <li>- saponification of oils/fats of vegetable or animal origin, normally with alkali/alkaline earths, to obtain soaps.</li> </ul> <p>May contain up to 50 ppm Nickel from hydrogenation.</p>	
No	13.8.2	Glycerine [Glycerol]	<p>Product obtained from:</p> <ul style="list-style-type: none"> <li>- the oleochemical process of (a) oil/fat splitting followed by concentration of sweet waters and refining by distillation (see part B, glossary of processes, entry 20) or ion-exchange process; (b) transesterification of natural oils/fats to obtain fatty acid methyl esters and crude sweet water, followed by concentration of the sweet water to get crude glycerol and refining by distillation or ion-exchange process;</li> <li>- the production of biodiesel (methyl or ethyl esters of fatty acids) by transesterification of oils and fats of unspecified vegetable and animal origin with subsequent refining of the glycerine. Minimum Glycerol content: 99 % of dry matter;</li> <li>- saponification of oils/fats of vegetable or animal origin, normally with alkali/alkaline earths, to obtain soaps, followed by refining of crude Glycerol and distillation.</li> </ul> <p>May contain up to 50 ppm Nickel from hydrogenation.</p>	
No	13.11.1	Propylene glycol; [1,2-propanediol]; [propane-1,2-diol]	Organic compound (a diol or double alcohol) with formula $C_3H_8O_2$ . It is a viscous liquid with a faintly sweet taste, hygroscopic and miscible with water, acetone, and chloroform. May contain up to 0,3 % di-propylene glycol.	



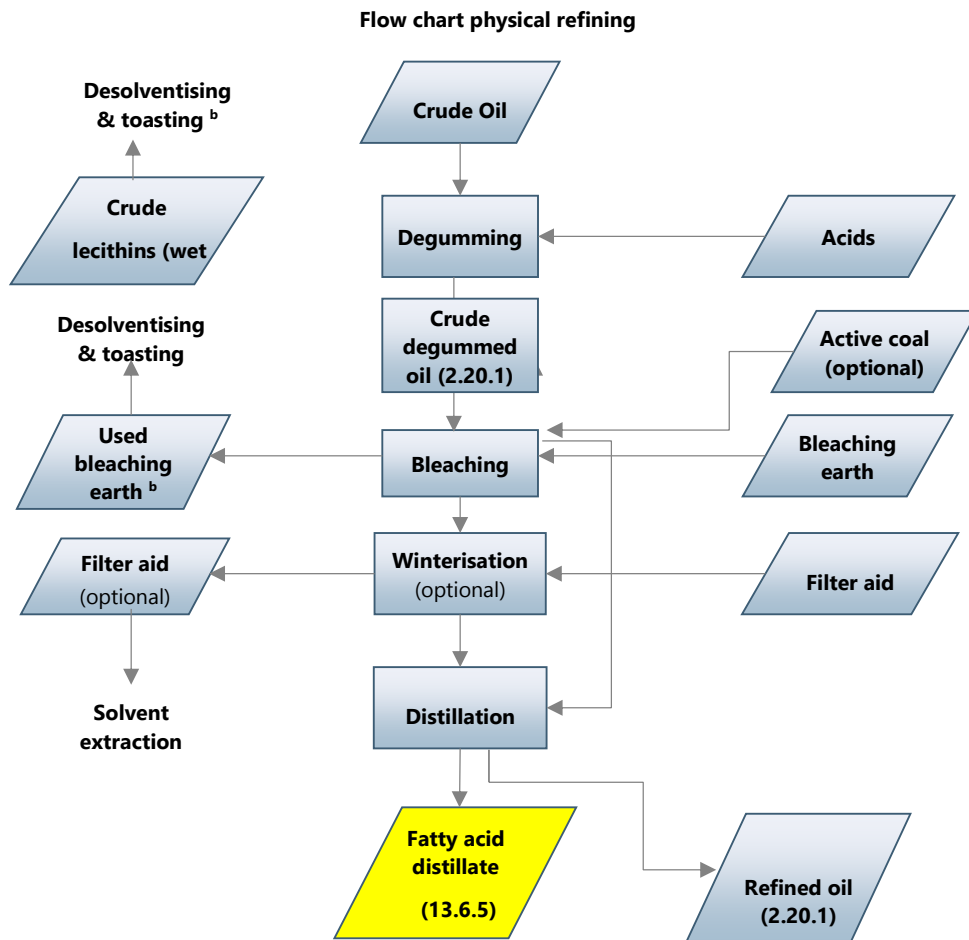
Specific requirements for by-products from the Oil & Fat Industry - BA 7

Within the scope of annex	Number	Name	Description	Examples of products falling under this number
Yes	13.11.2	Mono-esters of propylene glycol and fatty acids <sup>(4)</sup>	Mono-esters of propylene glycol and fatty acids, alone or in mixtures with di-ester	
			( 1 ) The name shall be supplemented by the species. ( 2 ) The name shall be supplemented by the plant species. ( 3 ) The name shall be supplemented by the indication of the botanical or animal origin. ( 4 ) The name shall be amended or supplemented to specify the fatty acids used. ( 5 ) The name shall be amended or supplemented to specify the organic acid.	

## Annex 2: Overview of processes of refining of oils, downstream processing of oils and biodiesel production process (source: FSP and EFISC)



- a. Typical flow chart; the order of the process steps may vary amongst production plants
- b. Used bleaching earth with active coal is not fed back to meal at integrated crushing and refining and is disposed of outside of the feed chain
- c. The number refers to that in the Catalogue of Feed Materials - Commission Regulation 68/2013

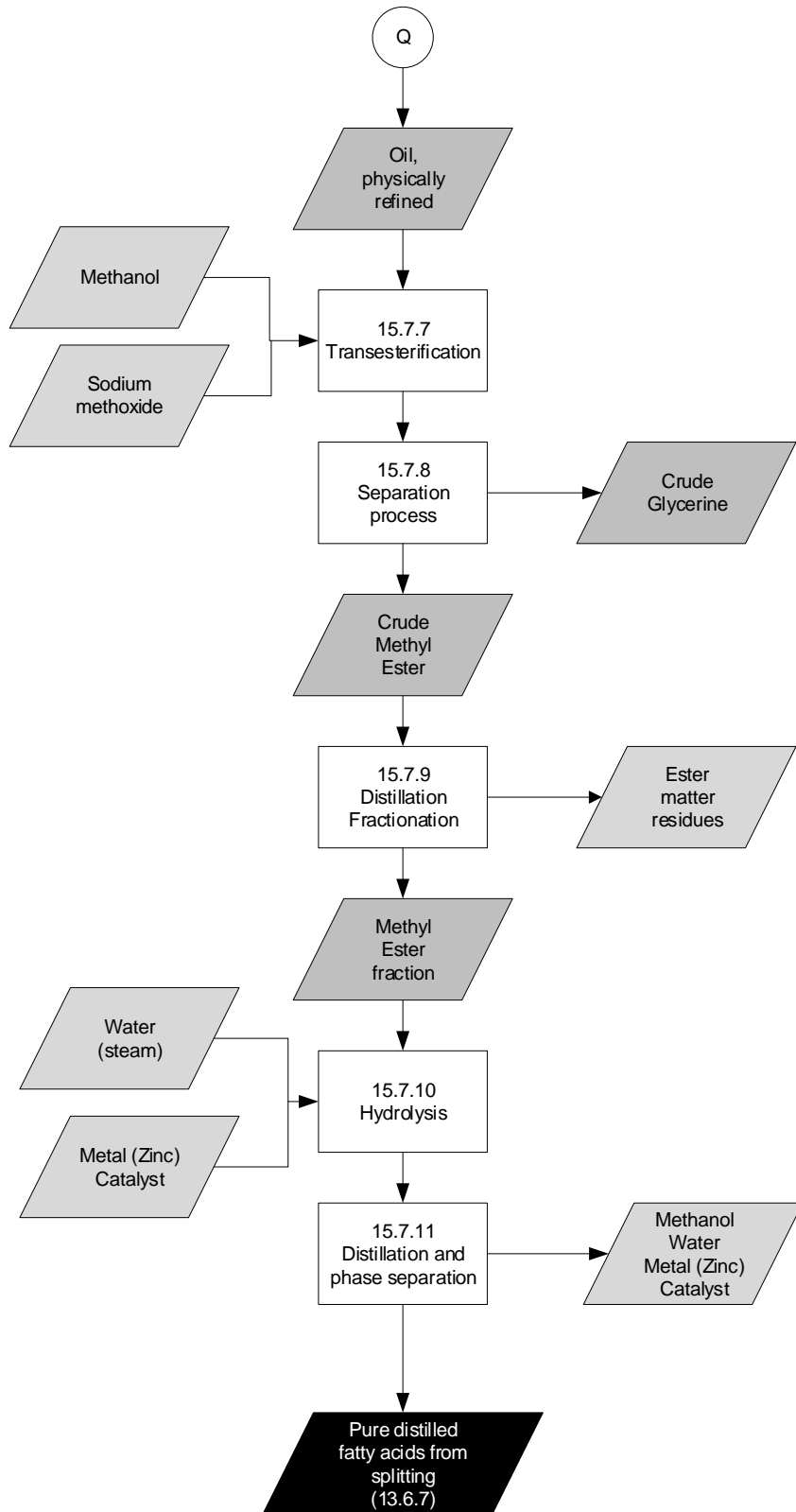


<sup>a</sup>Typical flow chart; the order of the process steps may vary amongst production plants

<sup>b</sup>Used bleaching earth with active coal is not fed back to meal at integrated crushing and refining and is disposed of outside of the feed chain

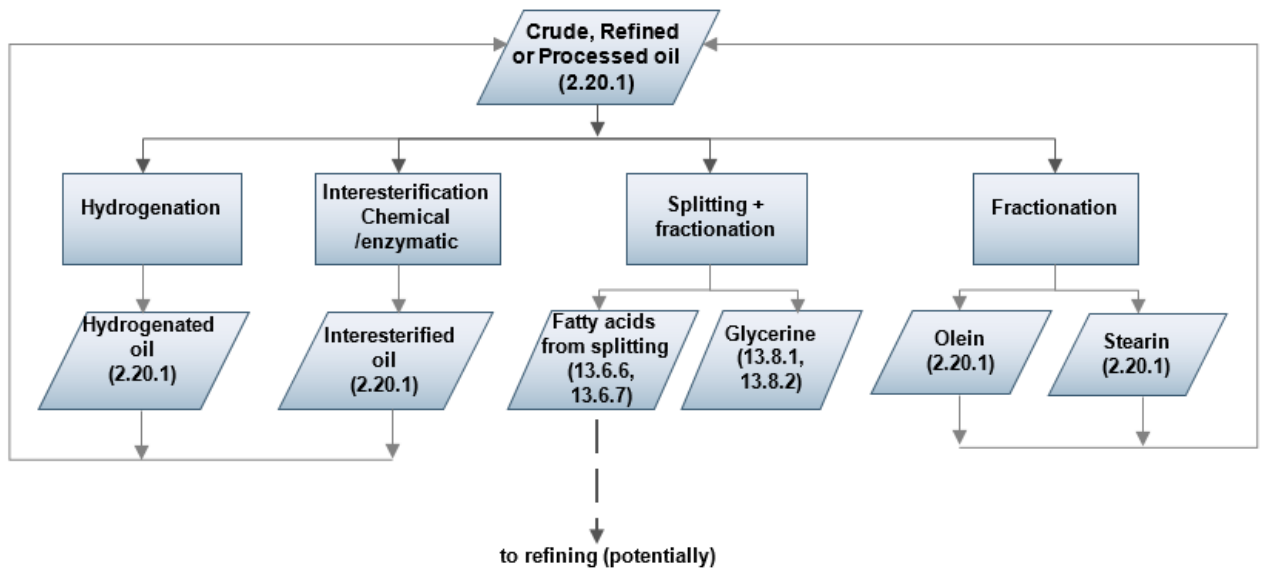
**Flowchart Oil Industry**

**Physical refinery**

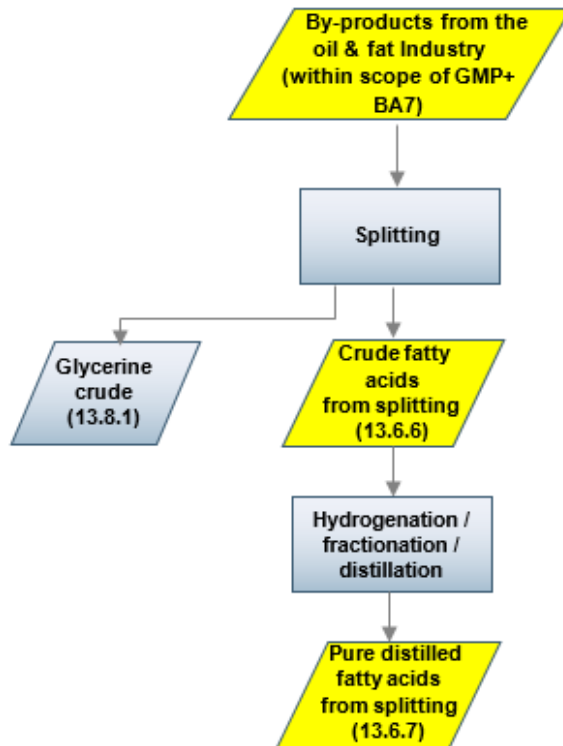


( ): Codes conform the Catalogue of feed materials or Feed Material Register

Flow chart downstream processing

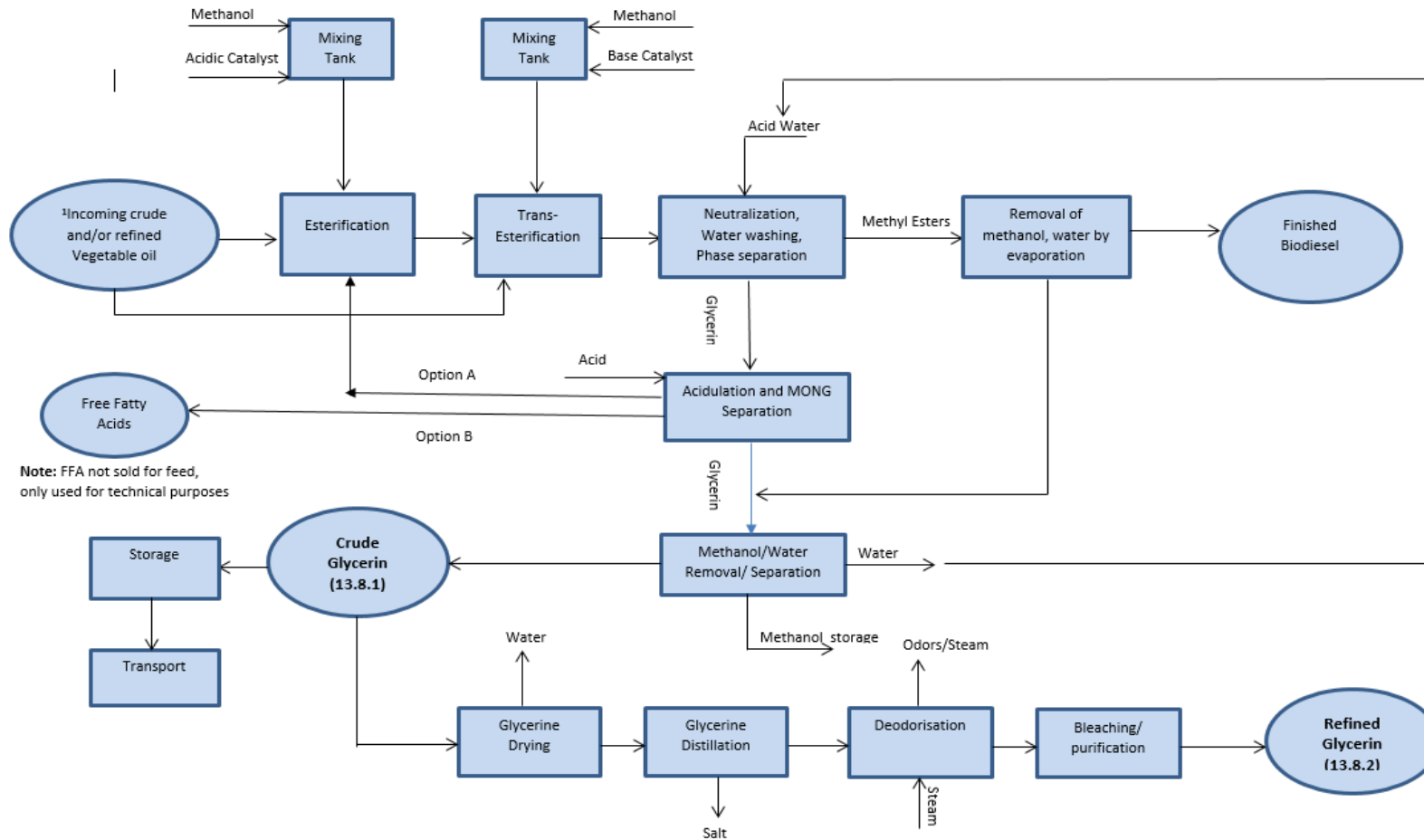


Oleochemical production processes



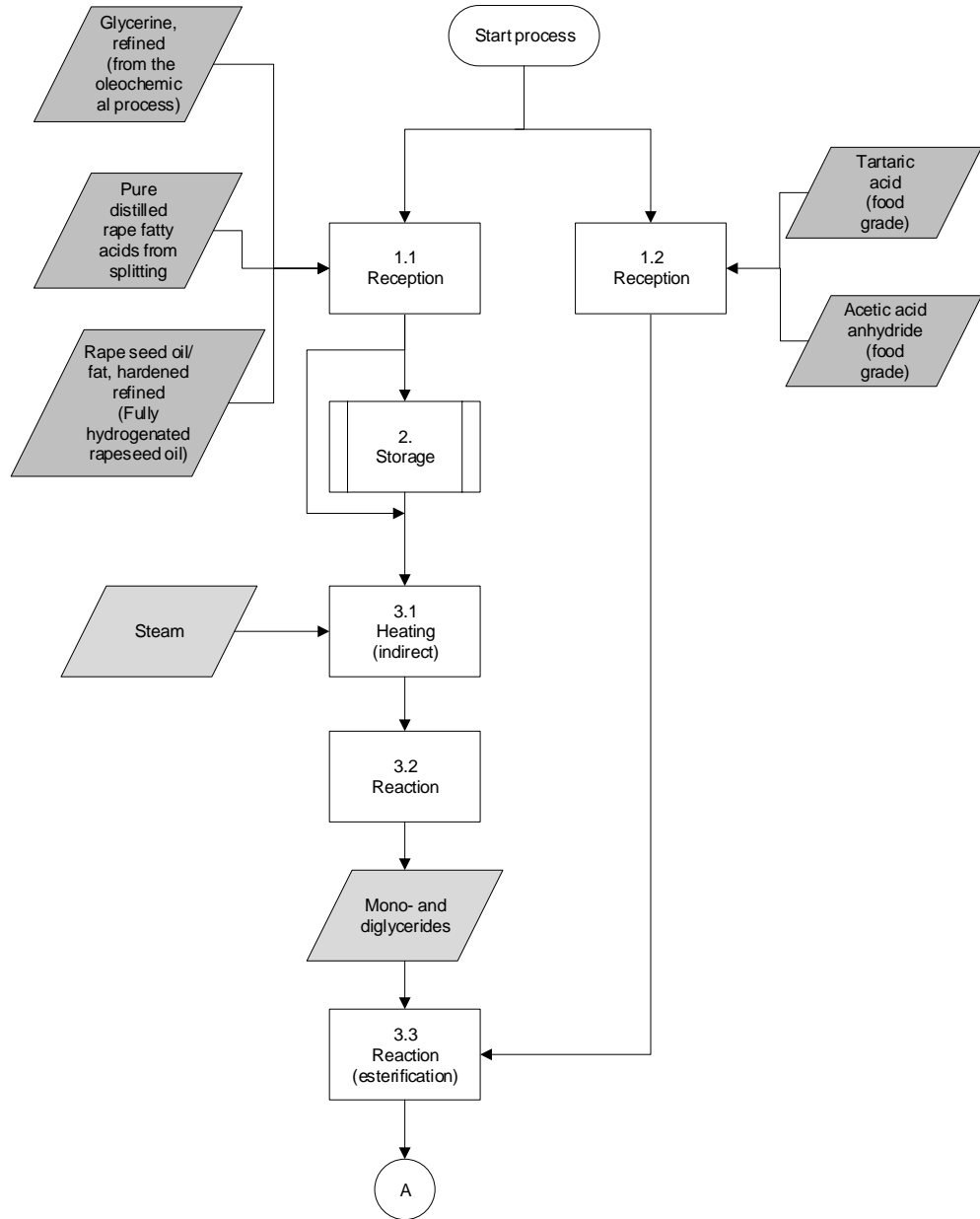
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### Biodiesel production process

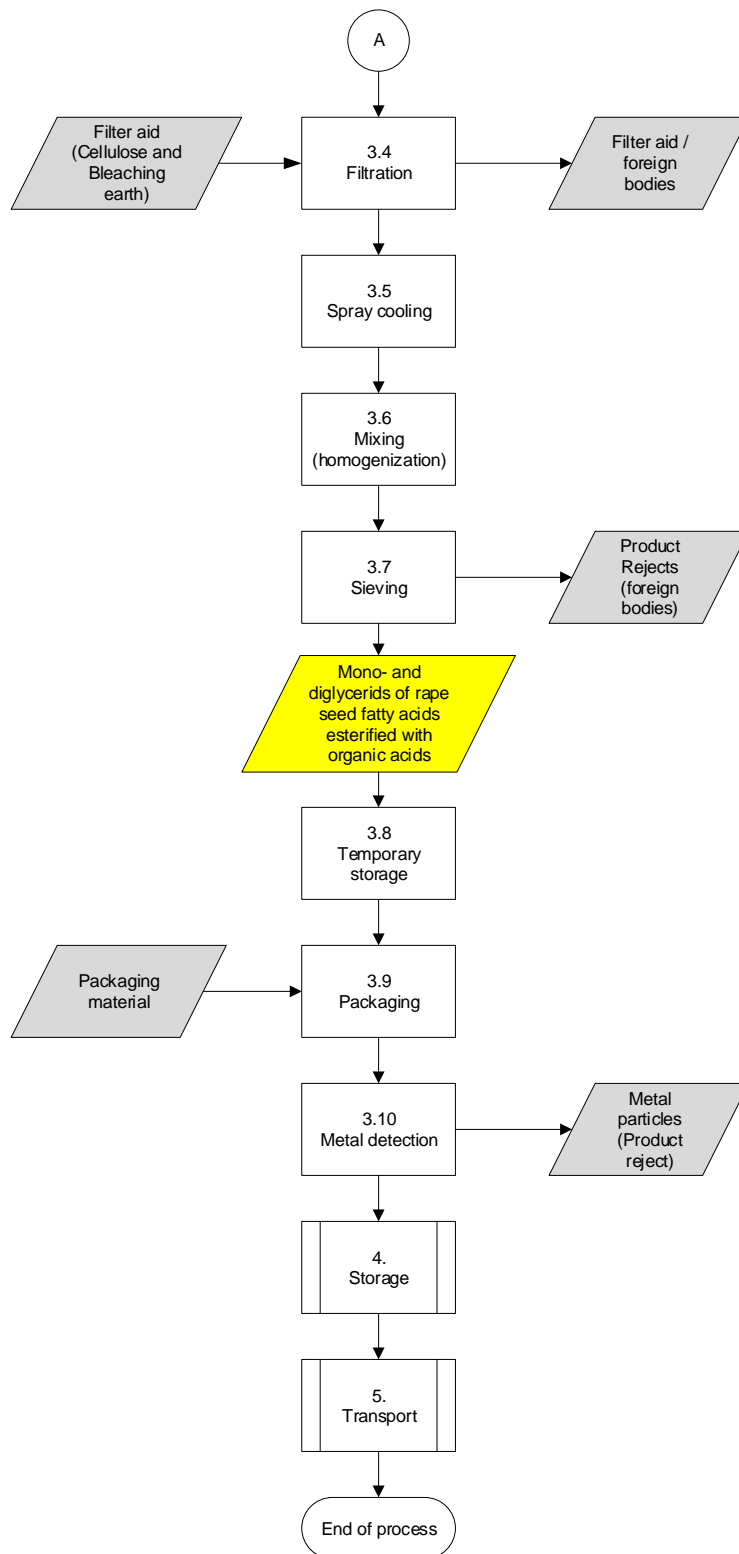


<sup>1</sup>Some preceding processing steps could take place. See FEDIOL sector document

**Flowchart Mono- and diglycerides of rape seed fatty acids esterified with organic acids**

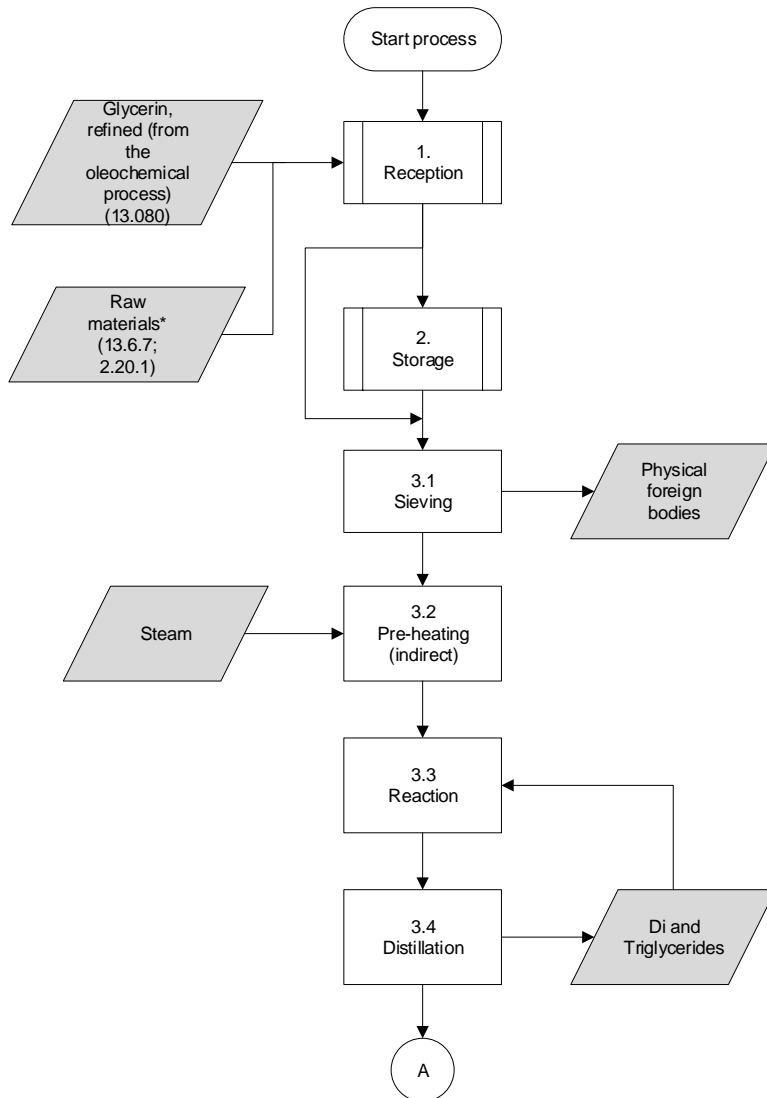


**Flowchart Mono- and diglycerides of rape seed fatty acids esterified with organic acids**





**Flowchart Mono-, di- and triglycerides of vegetable fatty acids**



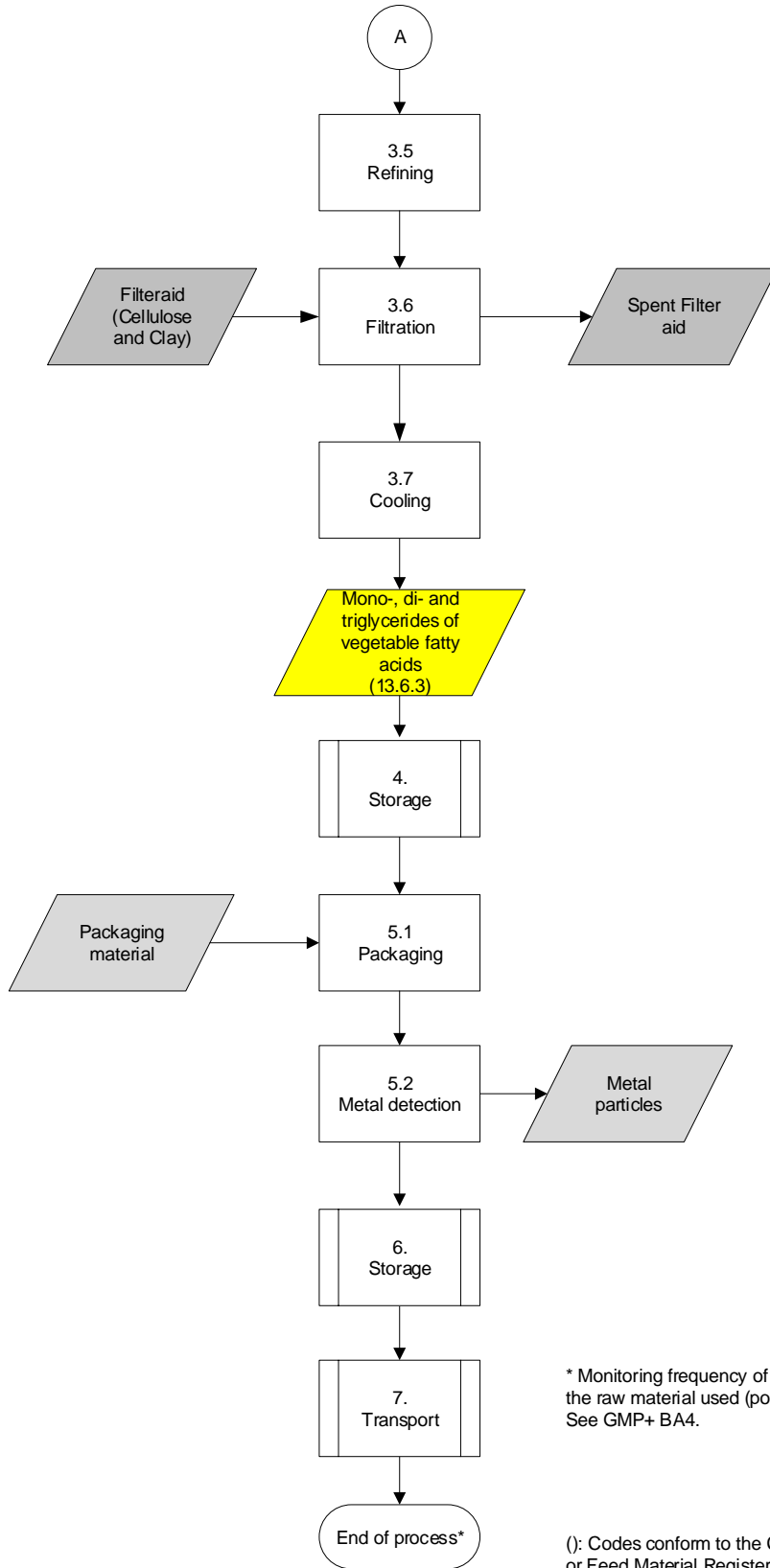
\* Raw materials used:  
 - Pure distilled fatty acids from splitting (13.6.7)  
 - Vegetable oil / fat, hardened (hydrogenated) refined (2.20.1)

Into GMP+ chain, only the feed materials already included in the FSP product list (with its risk assessment available) as well as food grade raw materials can be used as raw materials (note that technical grade raw materials are excluded).

**Note:** The name must be amended or supplemented to specify the fatty acids used as well as the botanical origin.

( ): Codes conform to the Catalogue of feed materials or Feed Material Register

**Flowchart Mono-, di- and triglycerides of vegetable fatty acids**

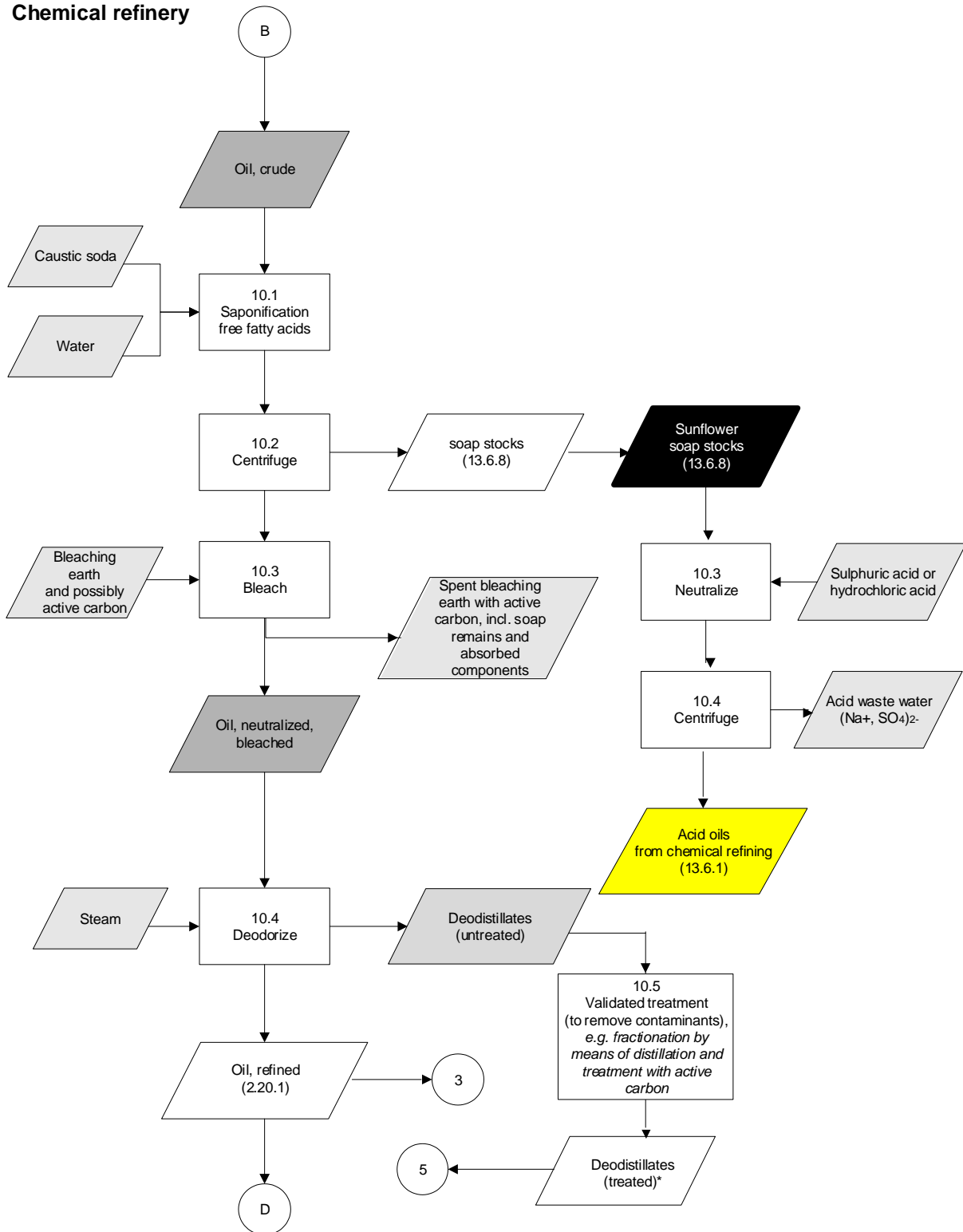


\* Monitoring frequency of end product depends on the raw material used (positive release for dioxins). See GMP+ BA4.

( ): Codes conform to the Catalogue of feed materials or Feed Material Register

Flowchart Oil Industry

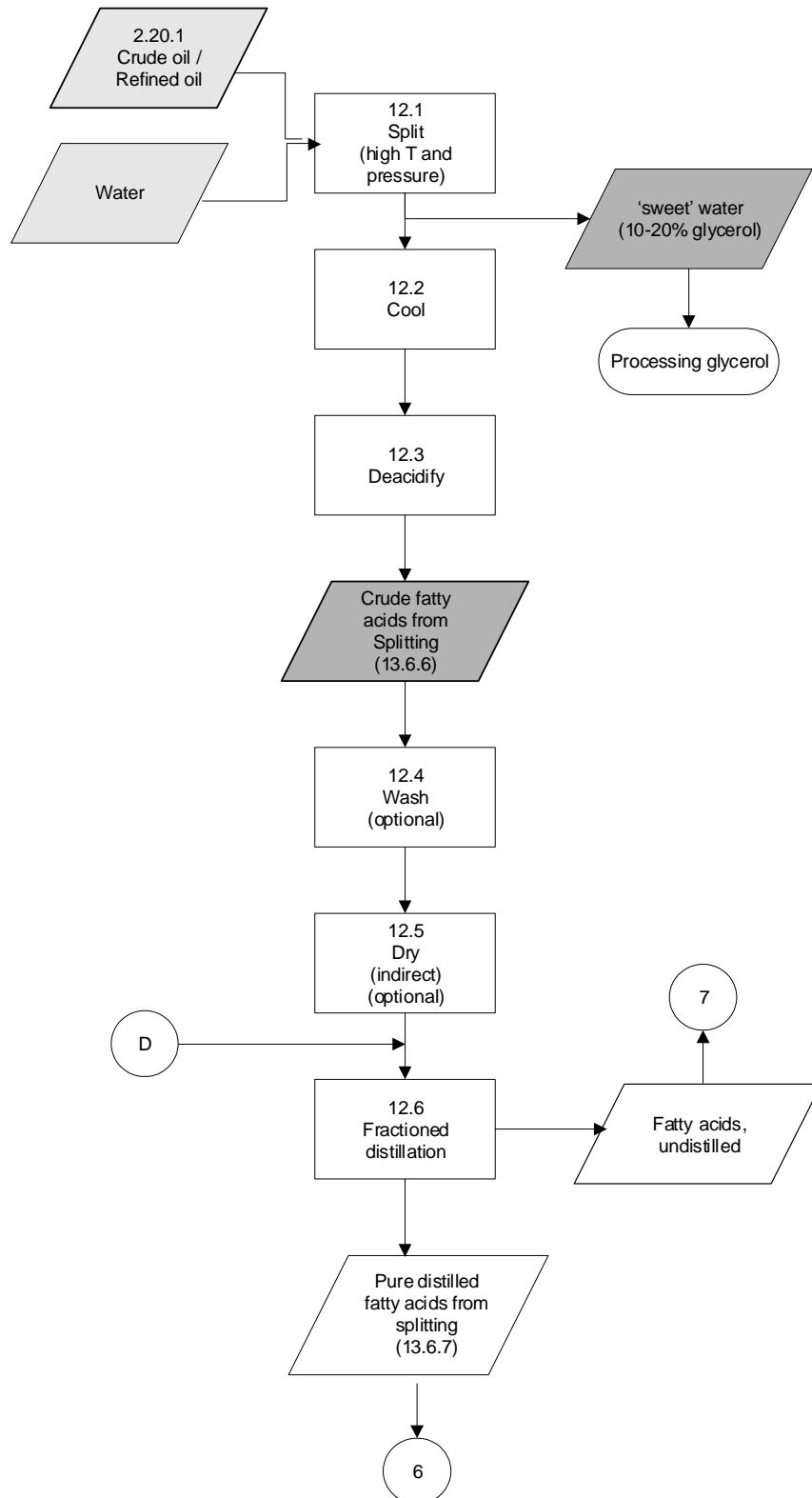
Chemical refinery



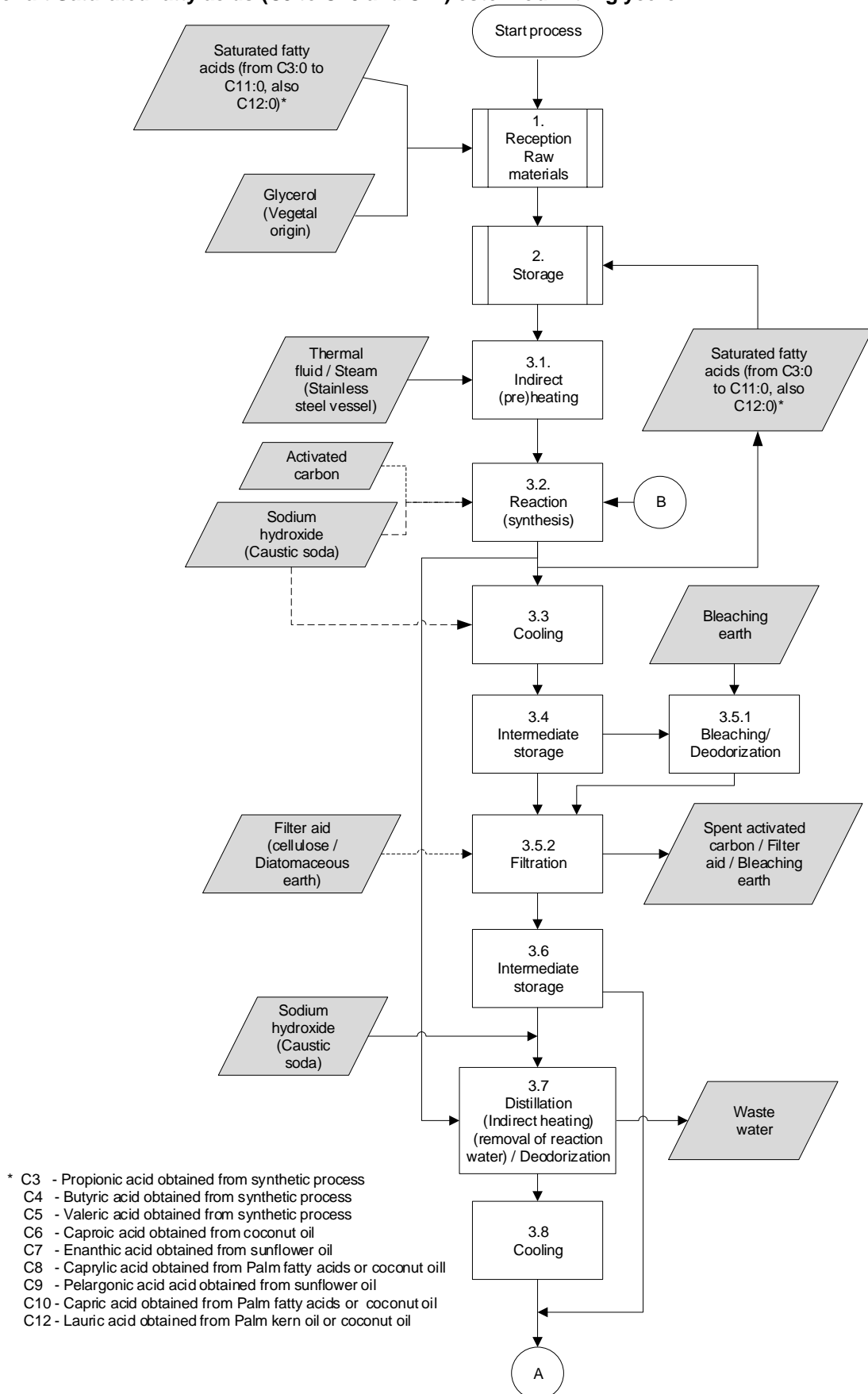
\* These treated deodistillates can only be marketed under positive release for dioxin.

**Flowchart Oil Industry**

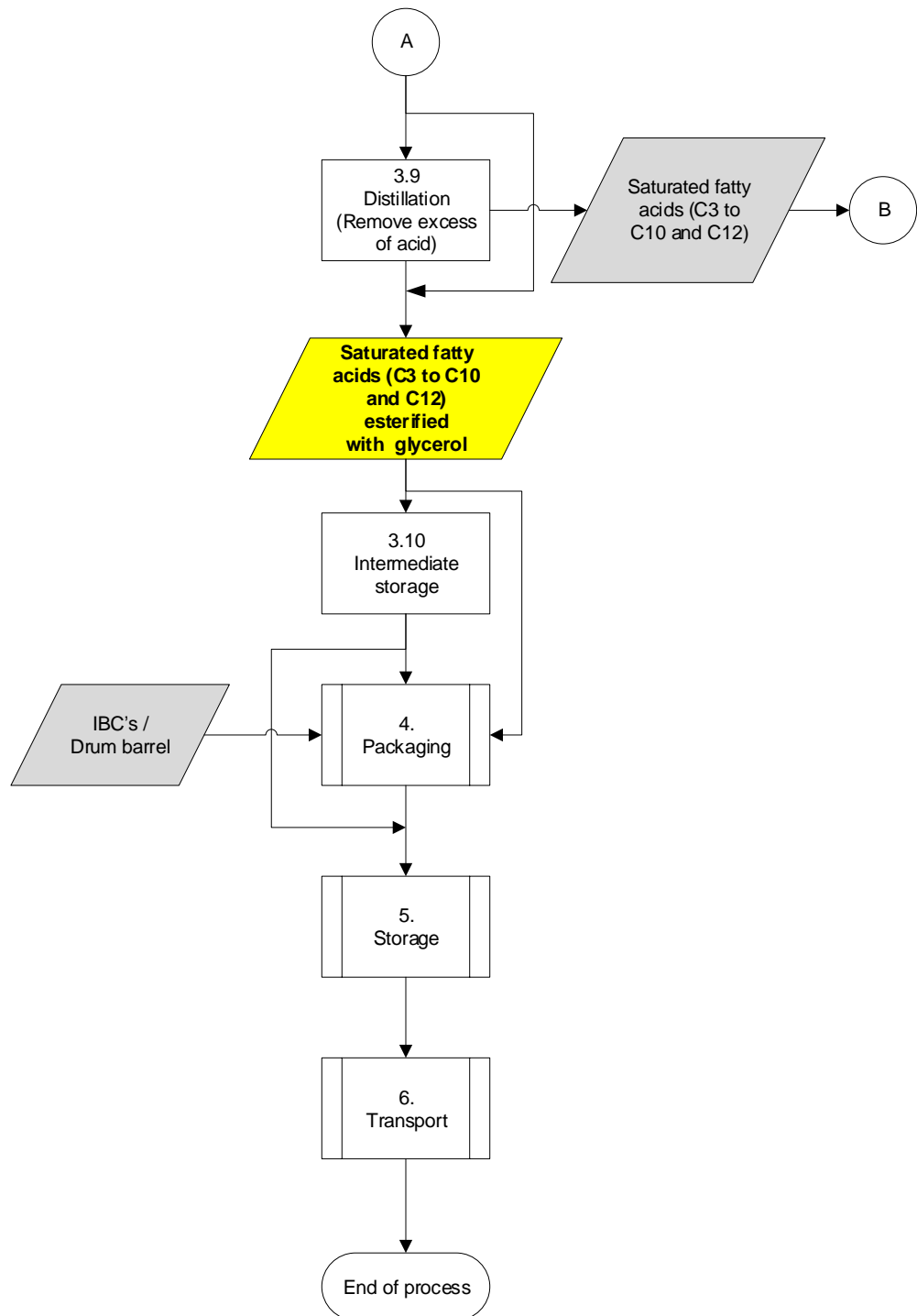
**Splitting**



**Flowchart Saturated fatty acids (C3 to C10 and C12) esterified with glycerol**



**Flowchart Saturated fatty acids (C3 to C10 and C12) esterified with glycerol**



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