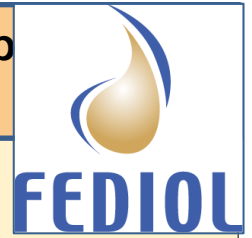
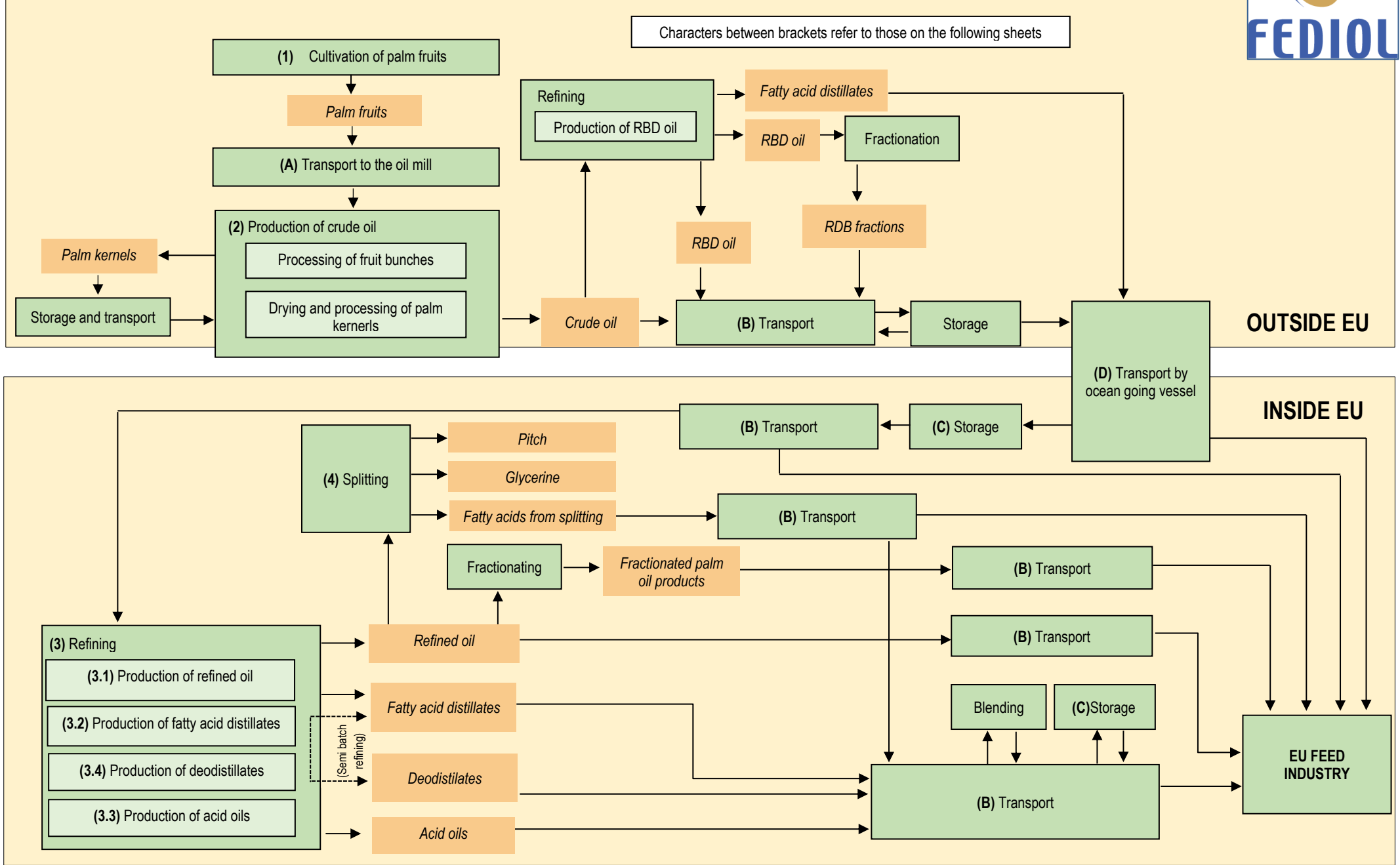


Flow chart of the production chain of palm oil and palm kernel oil products for feed applications



Characters between brackets refer to those on the following sheets



Risk assessment of the chain of palm and palm kernel oil products

1. Risk assessment of the chain of palm and palm kernel oil products

			1. Cultivation of palm fruits*					
HAZARD	CAT.	CHANCE	SERIOUSNESS*	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C				The countries of export of palm oil (Indonesia, Malaysia and others such as South America and Africa) work with positive lists for the use of pesticides during cultivation which, for some substances, may conflict with European pesticide residue legislation. Hitherto no residues of pesticides have been detected in palm and palm kernel oil.	EC Regulation 396/2005 prohibits putting into circulation commodities that do not comply with the MRLs set in the annexes. EC Regulation No. 178/2006 establishes Annex I lists the food and feed products for which pesticide residue limits apply. Regulation 149/2008 establishes Annexes II, III and IV that sets the MRLs for the products listed in Annex I.		

* Assessment of risks outside the EU is out of the scope of this document. For more information, see section d) Methodology of the FEDIOL food and feed chain risk assessments of the Sector reference document on the manufacturing of safe feed materials from oilseed crushing and vegetable oil refining.

Risk assessment of the chain of palm and palm kernel oil products

			2. Production of crude palm oil and crude palm kernel oil*					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Boiler chemicals	C				Increased risk at plants without good manufacturing practices.			Steam (using boiler chemicals) that directly comes into contact with the product must be suitable for use in the food industry.
Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C				Regular monitoring of pesticide residues shows that these residues seldom occur in crude palm oil and if present are always within legal limits.	Regulation 396/2005 sets limits for residues of pesticides. This regulation allows using a processing/concentration factor for pesticides into processed products, providing food safety is assured. The FEDIOL position (11SAF181) concludes that based on the average oil content in palm fruits, ranging from 50%-55%, and in palm kernels, of 45 %, processing factors of 2 should be used to establish the MRL of fat soluble pesticide residues in palm oil and palm kernel oil.		Regulation (EC) 882/2004 allows for the processing of non-compliant agricultural commodities into compliant food or feed products under the control of the authorities.
Pesticides residues as listed in EU Directive 2002/32 for undesirable substances in feeding stuff	C				Some of the banned pesticides may be present in the environment. The chance of finding them in crude palm or palm kernel oil, however, is very low.	Directive 2002/32/EC sets limits for a number of pesticides residues in feeding stuff.		
Recycling of contaminated fat from fat traps in effluent water.	C				Effluent water may be chemically contaminated.			Fat from fat traps in effluent water must not be recycled for food or feed application.
Contaminants in hydraulic oil or in lubricants from	C				Hydraulic oils and lubricants may contain toxic			The prerequisite programme should assure that the contamination of the product with

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Risk assessment of the chain of palm and palm kernel oil products

equipment					compounds.			<p>non-food grade hydraulic oils or lubricants is avoided and that the risk of contamination of the product with hydraulic oils and lubricants that are suitable for incidental contact with food is minimised. The prerequisite programme could involve recording of the quantities used.</p> <p>The GMP+ International -limit for MOSH C (10-40) in oils is 400 mg/kg when measured with GC-FID. The GMP+ International limit for C (10-40) is 25 mg/kg when assessed as diesel oil and measured with GC-MS.</p>
Foreign bodies	P				Foreign bodies may be present.			A system should be in place that removes any foreign material.

* Assessment of risks outside the EU is out of the scope of this document. See the footnote on the previous sheet.

Risk assessment of the chain of palm and palm kernel oil products

			Utilities: palm and palm kernel oil refining and processing					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Contaminants in hydraulic oils or in lubricants from equipment	C	Low	High	3	Hydraulic oils and lubricants may contain toxic compounds.		<p>The prerequisite programme should assure that the contamination of product with non-food grade hydraulic oils or lubricants is avoided and that the risk of contamination of the product with hydraulic oils and lubricants that are suitable for incidental contact with food is minimised. The prerequisite programme could involve recording of the quantities used.</p> <p>Equipment requires proper lubrication to operate at optimum performance and reliability. In specific cases where no H1 lubricant could meet the particular lubrication requirements of the equipment, a specific assessment of the lubricant to be used should be performed, including consideration as regards the absence of mineral oil hydrocarbons (MOAH).</p>	
Contaminants in water such as Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA)	C	Low	Medium	2	Water is used in the crushing and refining process.	Regulation 183/2005/EC is addressing water use.		

Risk assessment of the chain of palm and palm kernel oil products

Cleaning agents and boiler chemicals	C	Medium	Medium	3	Cleaning agents and steam (using boiler chemicals) come into contact with the product.		Cleaning agents used in the production system should be flushed. Cleaning agents and boiler chemicals must be suitable for use in the food industry.	
Thermal heating fluids (THF) from equipment	C	Medium	High	4	THF may still be used by non-FEDIOL members.	According to the FEDIOL Code of Practice on the Heating of Edible Oils during Processing , the use of THF is not allowed.	Use hot water or steam heating. Otherwise, a control measure should assure that the contamination of product with thermal heating fluids is avoided.	

			3. Refining					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Contaminants in processing aids such as mercury in caustic soda.	C	Low	High	3	Processing aids come into contact with the product.		Processing aids that directly come into contact with the oil must be of food grade quality or for food use.	

Risk assessment of the chain of palm and palm kernel oil products

			3.1 Production of refined palm and palm kernel oil					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Dioxin from bleaching earth	C	Low	High	3	A potential source of dioxin contamination during refining of the oil is bleaching earth. However, the dosage level of bleaching earth during refining is only 1-3%. Dioxin partly evaporates during distillation.	<p>Directive 2002/32/EC limits the dioxin content in feed material of vegetable origin to 0.75 ng/kg (WHO-PCDD/F-TEQ) and limits the sum of dioxin and dioxin-like PCBs to 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ).</p> <p>FEDIOL has developed a Code of Practice on the purchase conditions of fresh bleaching earth for oil refining (16COD137), which includes a max limit for dioxin and dioxin-like PCBs of 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ) as upperbound value.</p>	Purchase fresh bleaching earth from suppliers that fulfil the FEDIOL specifications as listed in the FEDIOL Code of Practice on the purchase conditions of fresh bleaching earth for oil refining.	
Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C	Low	Medium	2	Regular monitoring of pesticide residues shows that these residues seldom occur in crude palm oil and if present are always within legal limits.	Regulation 396/2005 sets limits for residues of pesticides. This regulation allows using a processing/concentration factor for pesticides into processed products, providing feed safety is assured.		Regulation (EC) 882/2004 allows for the processing of non-compliant agricultural commodities into compliant food or feed products under the control of the authorities.
Pesticides residues as listed in EU Directive 2002/32 for undesirable substances in feeding stuff	C	Very low	High	2	Some of the banned pesticides may be present in the environment. The chance of finding them in crude palm or palm kernel oil, however, is very low.	Directive 2002/32/EC sets limits for a number of pesticides residues in feeding stuff.		

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Risk assessment of the chain of palm and palm kernel oil products

Microbiological contamination	B	Low	Medium	2	Moisture content (i.e. water activity) in refined oils is too low for bacteria to grow.			
Foreign materials like glass, wood, metals, etc.	P	Medium	Medium	3			Apply hygienic practices (eg closed systems) and filter before loading.	

Risk assessment of the chain of palm and palm kernel oil products

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			3.2 Physical refining: production of palm and palm kernel fatty acid distillates					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Dioxin	C	Medium	High	4	A potential source of dioxin contamination is environmental deposition and bleaching earth. This dioxin may move to the fatty acid distillates during physical refining.	<p>Directive 2002/32/EC limits the dioxin content in feed material of vegetable origin to 0.75 ng/kg (WHO-PCDD/F-TEQ) and limits the sum of dioxin and dioxin-like PCBs to 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ).</p> <p>Products intended for animal feed containing a level of undesirable substance that exceeds the legal limit may not be mixed for dilution purposes with the same, or other, products intended for animal feed (Directive 2002/32/EC).</p> <p>According to Regulation 225/2012 amending the Feed Hygiene Regulation 183/2005 100% of the batches of fatty acid distillates for feed shall be tested on the sum of dioxins and dioxin-like PCBs.</p> <p>FEDIOL has developed a Code of Practice on the purchase conditions of fresh bleaching earth for oil refining (16COD137), which includes a maximum limit for dioxin and dioxin-like PCBs of 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ) as upperbound value.</p>	<p>This risk may be managed by:</p> <ul style="list-style-type: none"> - positive release of a batch or - active carbon treatment to filter dioxin. <p>Purchase fresh bleaching earth from suppliers that fulfil the FEDIOL specifications as listed in the FEDIOL Code of Practice on the purchase conditions of fresh bleaching earth for oil refining.</p>	
Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C	Low	Medium	2	Regular monitoring of pesticide residues shows that these residues seldom occur in crude palm oil and if present are always within	Regulation 396/2005 sets limits for residues of pesticides. This regulation allows using a processing/ concentration factor for pesticides into processed products, providing feed safety is assured.		

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Risk assessment of the chain of palm and palm kernel oil products

					legal limits.	Footnote 1 of Annex I of Regulation EC No 396/2005 says that MRLs do not apply to products used exclusively as ingredients for animal feed, until separate MRLs will be applicable.		
Pesticides residues as listed in EU Directive 2002/32 for undesirable substances in feeding stuff	C	Low	High	3	Some of the banned pesticides may be present in the environment. The chance of finding them in crude rapeseed oil, however, is very low.	Directive 2002/32/EC sets limits for a number of pesticides residues in feeding stuff.	Non-complying product should not be applied to feed.	
PAH in palm kernel fatty acid distillates	C	High	Medium	4	Light PAHs will concentrate into the fatty acid distillate during deodorisation. In case active carbon have been added, heavy PAHs are removed.		Non-complying product should not be applied to feeding stuff.	For palm kernel oil GMP+ International has a limit for the four PAHs benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene and chrysene of 400 microgram/kg. OVOCOM (GMP) has a limit for BaP of 50 microgram/kg for feed fats.

Risk assessment of the chain of palm and palm kernel oil products

			3.3 Chemical refining: Production of palm or palm kernel soap stocks and acid oils					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C	Low	Medium	2	Regular monitoring of pesticide residues shows that these residues seldom occur in crude palm oil and if present are always within legal limits.	Regulation 396/2005 sets limits for residues of pesticides. This regulation allows using a processing/concentration factor for pesticides into processed products, providing feed safety is assured. Footnote 1 of Annex I of Regulation EC No 396/2005 says that MRLs do not apply to products used exclusively as ingredients for animal feed, until separate MRLs will be applicable.		
Pesticides residues as listed in EU Directive 2002/32 for undesirable substances in feeding stuff	C	Very low	High	2	Some of the banned pesticides may be present in the environment. The chance of finding them in crude palm or palm kernel oil, however, is very low.	Directive 2002/32/EC sets limits for a number of pesticides residues in feeding stuff.		
Dioxin	C	Very low	High	2	The level of oil soluble contaminants in soap stocks mirrors that of crude oils.	FEDIOL factsheet on feed grade soap stocks from integrated crushing and refining (16SAF214) ; FEDIOL factsheet on acid oils from chemical refining for feed (16SAF215) .		

Risk assessment of the chain of palm and palm kernel oil products

			3.4 Chemical refining: production of palm and palm kernel deodistillates					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Dioxin	C	High	High	4	A potential source of dioxin contamination during refining of the oil is bleaching earth. During chemical refining, dioxins concentrate into the deodistillates.	<p>Directive 2002/32/EC limits the dioxin content in feed material of vegetable origin to 0.75 ng/kg (WHO-PCDD/F-TEQ) and limits the sum of dioxin and dioxin-like PCBs to 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ).</p> <p>Products intended for animal feed containing a level of undesirable substance that exceeds the legal limit may not be mixed for dilution purposes with the same, or other, products intended for animal feed (Directive 2002/32/EC).</p> <p>According to Regulation 2015/1905 amending the Feed Hygiene Regulation 183/2005 100% of the batches of deodistillates for feed shall be tested on the sum of dioxins and dioxin-like PCBs.</p> <p>FEDIOL has developed a Code of Practice on the purchase conditions of fresh bleaching earth for oil refining (16COD137), which includes a maximum limit for dioxin and dioxin-like PCBs of 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ) as upperbound value.</p>	<p>Deodistillates from chemical refining are forbidden for use in feed unless they have been treated so as to ensure that dioxin levels are matching limits of the Undesirable Substances Directive 2002/32 (see also the FEDIOL factsheet on safe feed application of deodistillates Ref. 16SAF216).</p> <p>Fatty products obtained from batch refining processes combining physical and chemical refining steps in one and the same equipment may be used for feed purposes, provided that there is analytical proof showing that limits for dioxin and pesticide residues are respected.</p> <p>Purchase fresh bleaching earth from suppliers that fulfil the FEDIOL specifications as listed in the FEDIOL Code of Practice on the purchase conditions of fresh bleaching earth for oil refining.</p>	

Risk assessment of the chain of palm and palm kernel oil products

Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C	Low	Medium	2	Regular monitoring of pesticide residues shows that these residues seldom occur in crude palm oil and if present are always within legal limits.	Regulation 396/2005 sets limits for residues of pesticides. This regulation allows using a processing/concentration factor for pesticides into processed products, providing feed safety is assured. Footnote 1 of Annex I of Regulation EC No 396/2005 says that MRLs do not apply to products used exclusively as ingredients for animal feed, until separate MRLs will be applicable.	.	
Pesticides residues as listed in EU Directive 2002/32 for undesirable substances in feeding stuff	C	Medium	High	4	Some of the banned pesticides may be present in the environment. The chance of finding them in crude palm or palm kernel oil, however, is very low, but they will concentrate into the distillates during refining.	Directive 2002/32/EC sets limits for a number of pesticides residues in feeding stuff.	Deodistillates from chemical refining are forbidden for use in feed unless they have been treated so as to ensure that pesticide residue levels are matching limits of the Undesirable Substances Directive 2002/32 (see also the FEDIOL factsheet on safe feed application of deodistillates Ref. 16SAF216).	
PAH for palm kernel deodistillates	C	High	Medium	4	Light PAHs will concentrate into the deodistillates during deodorisation. In case active carbon have been added, heavy PAHs are removed.		Non-complying product should not be applied to feeding stuff.	For palm kernel oil GMP+ International has a limit for the four PAHs benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene and chrysene of 400 microgram/kg. OVOCOM (GMP) has a limit for BaP of 50 microgr/kg for feed fats.

Risk assessment of the chain of palm and palm kernel oil products

			Splitting of crude and refined oil with water, heat and 4. pressure and subsequent fractional distillation to produce pure fatty acids and glycerine*					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Dioxin from bleaching earth	C				A potential source of dioxin contamination during refining of the oil is bleaching earth. However, the dosage level of bleaching earth during refining is only 1-3%.	<p>Directive 2002/32/EC limits the dioxin content in feed material of vegetable origin to 0.75 ng/kg (WHO-PCDD/F-TEQ) and limits the sum of dioxin and dioxin-like PCBs to 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ).</p> <p>According to Regulation 225/2012 amending the Feed Hygiene Regulation 183/2005 100% of the batches of pure fatty acids from crude oil for feed shall be tested on the sum of dioxins and dioxin-like PCBs.</p> <p>FEDIOL has developed a Code of Practice on the purchase conditions of fresh bleaching earth for oil refining (16COD137), which includes a maximum limit for dioxin and dioxin-like PCBs of 1.5 ng/kg (WHO-PCDD/F-PCB-TEQ) as upperbound value.</p>		Non-complying product should not be applied to feeding stuff.
Pesticide residues above the EU MRL, i.e. residues of herbicides, insecticides, fungicides or rodenticides above the EU MRL.	C				Regular monitoring of pesticide residues shows that these residues seldom occur in crude palm oil and if present are always within legal limits.	Regulation 396/2005 sets limits for residues of pesticides. This regulation allows using a processing/concentration factor for pesticides into processed products, providing feed safety is assured.		Regulation (EC) 882/2004 allows for the processing of EU imported, non-compliant agricultural commodities into compliant food or feed products under the control of the authorities.

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Risk assessment of the chain of palm and palm kernel oil products

Pesticides residues as listed in EU Directive 2002/32 for undesirable substances in feeding stuff	C				Some of the banned pesticides may be present in the environment. The chance of finding them in crude palm or palm kernel oil, however, is very low.	Directive 2002/32/EC sets limits for a number of pesticides residues in feeding stuff.		
Thermal heating fluids (THF) from equipment	C				THF may still be used by non-FEDIOL members.	According to the FEDIOL Code of Practice on the Heating of Edible Oils during Processing , the use of THF is not allowed.		Use hot water or steam heating. Otherwise, a control measure should assure that the contamination of product with thermal heating fluids is avoided.

* Assessment of risks outside the EU is out of the scope of this document. See the footnote on the sheet 1 Cultivation of palm fruits..

Risk assessment of the chain of palm and palm kernel oil products

			5. Hydrogenation of palm fatty acid distillates					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Nickel	C	Low	High	3	Nickel is used as a catalyst with hydrogenation (hardening) of oil products.		Processing aids that directly come into contact with the oil must be for food use or of food grade quality. Filter the hardened product.	The nickel content of hardened oil products from FEDIOL members is well below 20 ppm.
Dioxin congeners turned to ones with a higher toxicity	C	Medium	High	4	Hydrogenation by means of nickel can turn dioxin congeners into more toxic ones.	According to Regulation 2015/1905 amending the Feed Hygiene Regulation 183/2005 100% of the batches of hydrogenated palm fatty acid distillates for feed shall be tested on the sum of dioxins and dioxin-like PCBs.		

Risk assessment of the chain of palm and palm kernel oil products

			A. Transport of fruit bunches and palm kernels to the oil mill and storage of palm kernels*					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Foreign bodies	P				Foreign bodies such as stones from dirty trucks and glass particles, dead rodents and tree leaves can be present.			Load compartments of means of transport must be free from previous load residues before loading fruit bunches.

* Assessment of risks outside the EU is out of the scope of this document. See the footnote on the sheet 1 Cultivation of palm fruits.

Risk assessment of the chain of palm and palm kernel oil products

				B. Transport of palm oil and palm kernel oil and derived products for feed application by tank car, rail tank, barge or coaster (excluding ocean going vessel).				
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Contamination by previous cargo								
- Tank cars, rail tanks and barges	C	Medium	High	4	Tank cars and barges may have been used for non food or non feed compatible products such as petrochemicals.		Tank cars and barges that are not dedicated to the transport of foodstuff or feeding stuff should have undergone a validated cleaning procedure.	
- Tank cars, tank containers, rail tanks and barges following EU standards for the transport of food stuffs	C	Low	High	3	Transport of most of the vegetable oils is by means of transport that is dedicated to food stuffs.	The Food Hygiene Regulation No. EC/852/2004 requires the transport of liquid food stuffs by tank cars, rail tanks and barges to be dedicated to that of food stuffs. FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (Ref 14COD152 chapter A).	Make sure a means of transport is marked "for foodstuffs only".	
- Tank coasters following EU standards for the transport of food stuffs	C	Low	High	3	Tank coasters carrying oils and fats during short sea voyages in the EU must have as an absolute minimum as the immediate previous cargo a product that is either a foodstuff or a product appearing on the EU list of accepted immediate cargoes of Regulation EU	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (Ref 14COD152 chapter B) (including FOSFA operational procedures).	Check previous cargoes via FEDIOL practical guide to previous cargo(es) for means of transport and tank lining (Ref 14COD153). FOSFA certificate of compliance, cleanliness and suitability of Ship's tanks issued by a	

Risk assessment of the chain of palm and palm kernel oil products

					no 579/2014.		FOSFA Member Superintendent. FOSFA combined Masters certificate signed by the Captain/First Officer or an equivalent statement signed by the ship's owner or authorised agent, applicable before any loading or cargo transfer.	
Contamination by cleaning agents								
- Tank cars, rail tanks and barges	C	Medium	Medium	3	Increased risk at cleaning stations that clean both feed and chemical tanks on one site.	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (Ref. 14COD152 chapter A).	Apply good practices for cleaning of tanks.	
- Tank coasters	C	Medium	Medium	3	Increased risk in case coaster is not dedicated to feed- or foodstuff.	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (Ref 14COD152 chapter B) (including FOSFA operational procedures).	FOSFA certificate of compliance, cleanliness and suitability of Ship's tanks issued by a FOSFA Member Superintendent. FOSFA combined Masters certificate signed by the Captain/First Officer or an equivalent statement signed by the ship's owner or authorised agent, applicable before any loading or cargo transfer.	

Risk assessment of the chain of palm and palm kernel oil products

Heating or cooling fluids from equipment								
- Tank cars	C	Low	High	3	Stainless steel tanks are used which are heated with cooling water from the motor through a system of double walls (and not coils).	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (14COD152 chapter A).	Use of thermal heating fluids in direct heating systems is forbidden.	
- Rail tanks, tank barges	C	Low	High	3	Toxic thermal heating fluids may still be used. However, due to the relatively low heating temperatures applied during transport, the chance of leakage of thermal heating fluids into the product is low.	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (14COD152 chapter A).	Heating coils of rail tanks must be of stainless steel . If thermal heating fluids have been used, the transporter of the oil must provide for documentation on possible net losses and analyse accordingly if necessary.	The use of hot water or steam heating is recommended.
- Tank coasters	C	Low	High	3	Toxic thermal heating fluids may still be used. However, due to the relatively low heating temperatures applied during transport, the chance of leakage of thermal heating fluids into the product is low.	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (14COD152 chapter B) (including FOSFA operational procedures).	If thermal heating fluids have been used, the transporter of the oil must provide for documentation on possible net losses and analyse accordingly if necessary.	
Foreign bodies	P	Medium	Medium	3			A quality plan should require the loading of tank cars with refined oils and derived products under a roof.	

Risk assessment of the chain of palm and palm kernel oil products

			C. Storage of crude and refined palm oil and palm kernel oil					
HAZARD	CAT.	CHANCE	SERIOUSNESS	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Contamination due to lack of segregation (contamination from previous cargoes, use of incorrect joinings, shared equipment)	C	Low	High	3	This risk classification applies to terminals that store both chemicals and vegetable oils. Less risk is involved when the tank terminal applies the EU list of acceptable previous cargoes during sea transport to the storage of vegetable oils. Least risk is involved when the vegetable oils are stored in tanks that are dedicated to the storage of foodstuffs.	Terminals in the EU that store oils and fats for food application are obliged to apply HACCP (EC Regulation No. 852/2004)	Food or feed dedication of storage tanks. Otherwise, storage tanks must at least adhere to the EU rules on previous cargoes that have been set up for sea transport in Regulation EU No 579/2014 as amended by Commission Regulation 2016/238.	
Contamination by cleaning agents	C	Low	High	3	This risk classification applies to terminals that store both chemicals and vegetable oils. They may abstain from using cleaning agents that are suitable for use in the food industry. For tank terminals in the EU that apply HACCP and that keep the storage of vegetable oils and chemicals separated, the chance of using the wrong cleaning agents is very low.		Cleaning agents must be suitable for use in the food industry.	
Solvent from coating	C	Low	High	3	Solvents from virgin coatings migrating to the oil, which may		Use stainless steel tanks or in case of use of tanks with	

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Risk assessment of the chain of palm and palm kernel oil products

					end up in the fatty acid distillates during refining		virgin coating, or do not sell the fatty acid distillate as feed.	
Thermal heating fluids from failing equipment	C	Low	High	3	Toxic thermal heating fluids may still be used. However, due to the relatively low heating temperatures applied during storage, the chance of leakage of thermal heating fluids into the product is low.		If thermal heating fluids have been used, the storage company must provide for documentation on net losses and analyse accordingly, if necessary.	The use of water and steam heating is recommended.
Misuse of additives	C	Low	Medium	2	Additives allowed for food oil applied to oil going to feed –or vice versa- for which use they may not have been approved.			

Risk assessment of the chain of palm and palm kernel oil products

			D. Transport of palm oil and palm kernel oil by ocean going vessel					
HAZARD	CAT.	CHANGE	SERIOUSNES S	RISK CLASS.	JUSTIFICATION	LEGISLATION, INDUSTRY STANDARDS AND/OR CONTRACT TERMS	CONTROL MEASURE	REMARKS
Transport contamination								
- Contamination by previous cargoes present in tanks or pipes	C	Medium	Medium	3	Ocean going vessels carrying oils and fats for edible use into the EU must have as an absolute minimum that the immediate previous cargoes is a product that is either a foodstuff or a product appearing on the EU list of accepted immediate cargoes of Directive 96/3/EC.	<p>Regulation EU No 579/2014 as amended by Commission Regulation 2016/238 (Derogation to EC Regulation No. 852/2004) requires that previous loads have to be checked.</p> <p>FOSFA contracts oblige the seller to inform the buyer what the three preceding cargoes have been during the sea transport of oils and fats.</p> <p>FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (Ref 14COD152 chapter B) (including FOSFA operational procedures).</p> <p>The EU has not regulated the sea transport of oils and fats for feed application.</p>	<p>FOSFA certificate of compliance, cleanliness and suitability of Ship's tanks issued by a FOSFA Member Superintendent. FOSFA combined Masters certificate signed by the Captain/First Officer or an equivalent statement signed by the ship's owner or authorised agent, applicable before any loading or cargo transfer.</p> <p>The use of dedicated pipe lines at loading and unloading.</p>	
- Contamination by cleaning agents	C	Low	Little	1	Usually maritime business sticks to good practice and cleans with sea			

Risk assessment of the chain of palm and palm kernel oil products

					water.			
Solvent from coating	C	Low	High	3	Solvents from virgin coatings migrating to the oil, which may end up in the fatty acid distillates during refining		Do proper analyses on maiden voyages oil before accepting and monitor refining or, or do not feed the fatty acid distillate.	
Thermal heating fluids (THF) from equipment	C	Low	High	3	Toxic thermal heating fluids may still be used. However, due to the relatively low heating temperatures applied during transport, the chance of leakage of thermal heating fluids into the product is low.	FEDIOL Code of Practice for the transport in bulk of oils and fats into or within the European Union (Ref. 14COD152 chapter B) (including FOSFA operational procedures).	If thermal heating fluids have been used, the transporter of the oil must provide for documentation on possible net losses and analyse accordingly if necessary.	The use of water and steam heating is recommended.
Hydraulic oils from portable pumps	C	Low	High	3	Hydraulic oils from portable pumps may be toxic.		The use of portable pumps with clear separation of hydraulic motor from pump. If not, hydraulic oils of food grade quality must be used.	Hydraulic motors that are directly linked to the pump allow for unwanted leakages of hydraulic oil into the vegetable oil in case of seal failure.