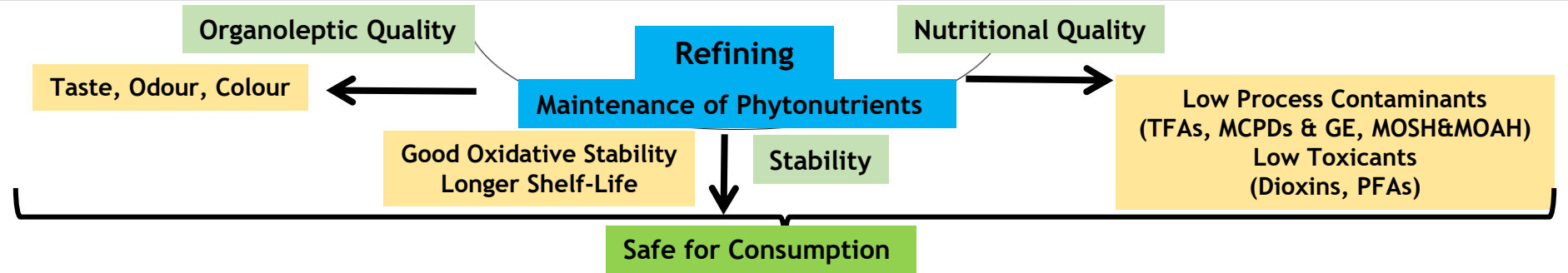


# Testing and Analysis of Process Contaminants and Toxins in Rice Bran Oil

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Refining,  
Process  
Contaminants  
& Toxins in  
Rice Bran Oil



	TFAs	MCPDs & GE	MOSH & MOAH	Dioxins	PFAs
<b>Source</b>	Processing (Heat)	Processing	Processing	Persistent environmental pollutants (POPs)	Environmental pathways Manufacturing waste, landfill leachate
<b>Generation</b>	Refining/ partial hydrogenation	Deodorization Predominantly	Crop harvesting; during transportation of seeds and crude oils; during oil extraction and refining; and from packaging	Improper municipal waste incineration and burning of trash Forest fires and volcanoes	Predominantly form of fire fighters foam
<b>Mitigation</b>	Optimization of the heat process parameters	Optimization of the deodorization process, Controlling the temperature, DG & MG content and reduction of chlorides by water washings	Precautions must be taken to avoid migration of MOSH & MOAH. Deodorization during refining can remove them	Strict control of industrial processes to reduce formation of dioxins	Avoid fluoropolymers containing materials (packagings, coatings, & containers)
<b>Testing &amp; Analysis</b>	GC-FID, Method: FSSAI/AOCS/AOAC/WHO; Column-100m CRM's & internal standard, LOQ-0.15%, LOD-0.05%	GC-MSMS: Method- AOCS Cd 29a/b/c-13, CRM's & internal standards (Isotope-labeled); LOQ-50 µg/kg, LOD-10µg/kg	HPLC-UV-GC-FID: Method-EN 16995:2017; CRM's & internal standards; LOQ-1.5 mg/kg, LOD-0.5mg/kg	GC-MSMS: Isolated laboratory with extraction set-up; Method- EU 2017/644; CRM's & internal standards (Isotope-labeled); LOQ- 0.08pg/g, LOD-0.05pg/g	LC-MSMS: Method- FDA (C-010.02); CRM's & internal standards (Isotope-labeled); LOQ-0.02ng/g, LOD-0.005 ng/g
<b>Limits/ Specification</b>	<u>WHO &amp; FSSAI</u> ▪ NMT-2% ▪ <1 % for the claim <u>of trans fat free</u> in oil (FSSAI)	<u>EU regulations</u> ▪ 3-MCPD-2500µg/kg, ▪ GE-1000 µg/kg, ▪ 2-MCPD-Not specified	<u>EU regulations</u> ▪ MOAH-2mg/Kg ▪ MOSH-Not specified	<u>EU regulations</u> 0.75 pg/g	Not specified

FARE Labs Facility Scope: TFAs, MCPDs & GE, MOSH & MOAH and Dioxins

PFAs-Under Validation