

Glycidyl Esters in Food



Trade Consultation Forum
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Background

- There has been concern on the presence of glycidyl esters (GE) in foods in the recent years.
- After ingestion, GE is broken down in the human body to release glycidol, which is considered to be harmful to health.
- Overseas counterparts are starting to take action to control the level of GE in food.

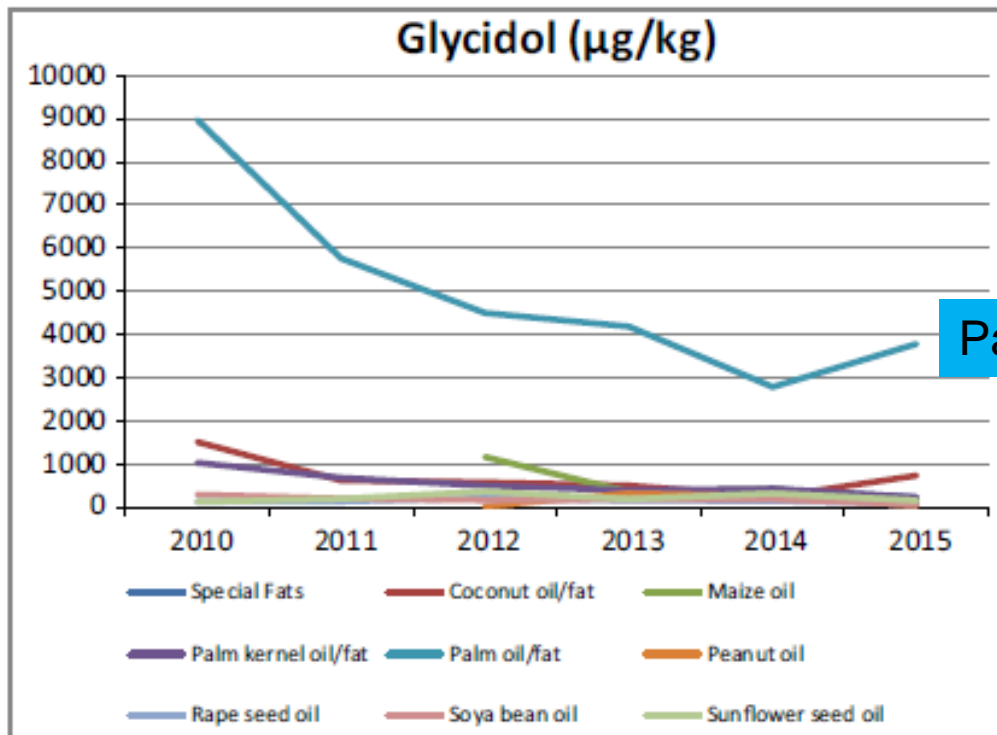
What are Glycidyl Esters (GE)?

- GE is processing contaminants primarily found in refined fats and oils and foods containing fats and oils
- It is formed-
 - during the deodorization step of oil refining
 - from diacylglycerols (DAG)
 - associated with elevated temp. ($>240^{\circ}\text{C}$) and time



Source of GE in Food – Refined Vegetable Oils

- Refined vegetable oils
 - Palm oil generally contains higher level of GE



Source:
EFSA (2016)

Levels of glycidol in vegetables oils in EU

Source of GE in Food – Infant Formula

- Foods containing refined vegetable oils
 - e.g. Infant formula



Why GE is Found in Infant Formula?

- Refined vegetable oils is used as one of the main ingredients for infant formula
 - to meet the compositional requirement of infant formula and provide adequate nutrition to infants
- Some infant formulae use palm oil as ingredient
 - Some studies suggested that products using palm oil as ingredient generally contains higher level of GE than non-palm oil based products

Why There is a Concern on GE?

➤ Glycidol was reported to have the following effects in animal studies:

- Neurotoxicity
- Renal toxicity
- Anti-fertility effects
- Genotoxicity
- Carcinogenicity



➤ Glycidol is currently classified as Group 2A agent (Probably carcinogenic to humans) by IARC

Overseas Studies

- Overseas organisations have conducted studies on GE levels in food, and to assess the health effect on GE associated with food intake
- GE in fats and oils
 - Refined vegetable oils are major contributors to the levels of GE found in food; Level varies in different oils
 - EFSA (2016):
 - Mean middle bound (MB) in fats and oils: 1176 mcg/kg
 - Highest in “palm oils and fats”: 3955 mcg/kg
 - Other non-palm oils and fats: 15-650 mcg/kg
 - Margarines and related fats: 361 mcg/kg

Overseas Studies

➤ GE in other foods

- Apart from fats and oils, GE are also found in other foods containing refined fats and oils
- EFSA (2016):
 - GE level varies in different food groups
 - Levels ranging from 0.4 to 149 mcg/kg

Overseas Studies

- GE in infant formula:
 - GE detected in infant formula in US, Canada, Brazil, etc.
 - EFSA study (published in 2016):
 - 87 mcg/kg (mean MB)
- Several studies such as those conducted by JECFA and EFSA indicated a **possible health concern for infants, in particular formula-fed infants**

Local Studies

- Consumer Council has published studies in 2017 and 2018, which have aroused local concern on presence of GE
- Study on cooking oil in July 2017
 - 60 samples of edible oil being tested
 - GE detected in 46 samples (77%)
 - GE level detected: 67-2000 mcg/kg
- Study on butter and margarines in April 2018
 - 30 samples of margarine and butter
 - GE/glycidol detected in most margarines and spreads being tested
 - Level detected: 13-640 mcg/kg
- No local study on GE in other foods, such as infant formula, has been identified so far

Overseas Recommendations and Standards - JECFA

- JECFA considered not appropriate to establish a health-based guidance value glycidol as it is a substance that is both genotoxic and carcinogenic
- Recommended to implement appropriate efforts to **reduce concentrations of GE and glycidol in fats and oils, in particular when used in infant formula**

Overseas Recommendations and Standards -- Codex

- Codex has not established standards on GE or glycidol in food
- Codex is drafting a code of practice for reduction of 3-MCPDE and GE in refined oils and food products made with refined oils
 - Included recommendations on:
 - Good manufacturing practice (GMP) in oil milling and refining
 - Selection and use of refined oils in food products made from these oils, including infant formula
 - E.g. select refined oils with lower levels of GE

Overseas Recommendations and Standards -- EU

- EU has established regulatory maximum levels for 4 types of foods in Feb 2018

	Foodstuffs ⁽¹⁾	Maximum level (µg/kg)
4.2	Glycidyl fatty acid esters expressed as glycidol	
4.2.1.	Vegetable oils and fats placed on the market for the final consumer or for use as an ingredient in food with the exception of the foods referred to in 4.2.2	1 000
4.2.2.	Vegetable oils and fats destined for the production of baby food and processed cereal-based food for infants and young children ⁽²⁾	500
4.2.3	Infant formula, follow-on formula and foods for special medical purposes intended for infants and young children (powder) ⁽³⁾ ⁽²⁹⁾	75 until 30.6.2019 50 as from 1.7.2019
4.2.4	Infant formula, follow-on formula and foods for special medical purposes intended for infants and young children (liquid) ⁽³⁾ ⁽²⁹⁾	10,0 until 30.6.2019 6,0 as from 1.7.2019

(Source: Commission Regulation (EU) 2018/290)

CFS's Follow-up Action

- Keep in view of the latest situation
 - Overseas development
 - Market situation
 - Standards and recommendations
 - Local situation
 - To conduct a study on GE starting in January 2019 to understand the local situation

~End~