

Occurrence and Estimation of Dietary Exposure of 2-, 3-monochloropropanediol (MCPD) and Glycidol Esters (GE) in Selected Fried Food Products

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BACKGROUND: 2, 3-monochloropropanediol (MCPD) and glycidol bound in the form of fatty acid esters (2- and 3-MCPDEs and GEs) are toxicants that form during processing or refining of commercial oils. The adverse effects of 3-MCPD have been concerned due to its kidney and reproduction toxicity while glycidol is considered a multisite carcinogen in rodents. This study aimed to investigate the occurrence of 2-, 3-MCPDE and GE in selected fried food products using gas chromatography-mass spectrometry (GC-MS) and to estimate the dietary exposure of the contaminants amongst the population.

METHOD: Nine fried food products of different categories (poultry, seafood, and snacks) were collected from food stalls and eateries. All samples were oven dried at 105°C prior to fat extraction procedure using Soxhlet method. Briefly, around 100 mg of extracted fat samples were prepared according to the AOCS Official Method Cd 29a-13 and subjected to GC-MS analysis. The data collection was performed in duplicates. Dietary exposure of the contaminants was then estimated using data from vegetable oil consumption in Hong Kong Food Consumption Survey.

RESULTS: The oil from soy sauce fried chicken contained the highest concentration of 3-MCPD (3.1656 ± 0.004 mg/kg), 2-MCPD (2.1776 ± 0.09 mg/kg) and for glycidyl esters (4.9207 ± 0.5 mg/kg). The estimated dietary exposures to bound 3-MCPD of an average and high adult consumer in Penang were 0.3 and 1.7 μ g/kg bw/day. For 2-MCPD, 0.3 μ g/kg bw/day for average and 1.17 μ g/kg bw/day for high consumers, while the exposure to GE in average and high consumers were 0.6 and 3.16 μ g/kg bw/day, respectively. The exposure values for the of 3-MCPD are lower compared to the tolerable dietary intake (TDI) established by European Food Safety Authority (2.0 μ g/kg bw/day).

CONCLUSION: The result demonstrates that average and high consumers are unlikely exposed to the toxicological effects of the contaminants.