

# Dietary exposure and risk characterisation of glycidyl ester contaminants from common Malaysian fried dishes

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## ABSTRACT

**Introduction:** Food contaminants such as glycidyl esters (GE), are commonly formed in vegetable oils during high temperature refining. Food manufacturers and consumers use refined vegetable oils as an ingredient in foods and for cooking. There is possibility of these contaminants having genotoxic and carcinogenic risks on ingestion due to the release of glycidol (2,3-epoxy-1-propanol) on hydrolysis, which has been identified as a carcinogen in rats and mice through oncogenicity studies. At present, no tolerable daily intake value has been established for glycidol in the form of GE, thus risk management should follow the principle of 'as low as reasonably achievable'. The objective of this study is to measure the level of GE in selected cooked-fried dishes, as a part of a risk assessment study on dietary exposure among the Malaysian population. **Materials and Methods:** This study analyses eight common Malaysian fried dishes e.g., fried rice (nasi goreng), beef satay, char-kuey-teow, and indian flatbread (roti canai), as well as fast food items e.g., burger patty, french fries and chicken nuggets. Three food samples for each variety were purchased randomly from various restaurants/stalls in the Klang Valley, and were analysed for GE occurrence level using GC-MS. The daily dietary exposure for the average Malaysian adult was estimated using the food consumption data from the MANS survey (2014). Risk characterisation through Margin of Exposure (MOE) was calculated to identify food types with high concern for carcinogenic risk, with a benchmark dose: lower confidence limit (BMDL10) value for GE identified at 2.4 µg/kg body weight/day. **Results:** Our analysis showed that all our collected food samples contained traces of GE contaminants. Overall, the median occurrence level of GE in the food samples was  $0.32 \pm 0.36$  mg/kg. Butter prawn recorded the highest level of GE content (1.30 mg/kg), followed by fried anchovies (1.22 mg/kg), and bergedil daging (0.68 mg/kg). The lowest values were detected in the fast-food samples, where both fried chicken nuggets and frankfurter sausages recorded values below 0.05 mg/kg. Daily dietary exposure was estimated to be 1.89 µg/kg body weight/day. The MOE estimates ranged from 3 to 2774, indicating all food items recorded values below 10000. This indicates potential concern of carcinogenic risk on daily consumption. **Conclusion:** Malaysian fried dishes were found to have low to moderate levels of GE, warranting mitigation strategies in food preparation and processing. However, the exposure of Malaysian citizens to these compounds through consumption of fried food alone does not present a significant health risk. Since there is no established recommended value for reference at this point, daily exposure should be kept to a minimum.