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3-Monochloropropane-1,2-diol (3-MCPD): a review on properties, occurrence, mechanism of formation, toxicity, analytical approach and mitigation strategy

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Abstract
3-Monochloropropane-1,2-diol (3-MCPD) is one of the most common food contaminants in processed oils which forms mostly during the deodorization step of edible oil refining process. It has been detected in many types of food products such as infant formula, margarine, bread and soy sauce, which could result in kidney and testicular damage. The presence of 3-MCPD contaminant have been occurring for more a decade, which warrants a maximum permissible amount of 2 µg/kg body weight in food products in national and international levels. The purpose of this review is to provide an overview in the past 12 years on its physicochemical properties, occurrence, potential precursors and formation mechanism of 3-MCPD in foodstuffs. The toxicity, its quantification methods and mitigation strategy are also reviewed with an emphasis on the applicability, efficiency and issues encountered during the analysis. This review provides an elucidation regarding 3-MCPDEs and their food safety implications. © 2023, The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature.

Author Keywords
3-Monochloropropane-1,2-diol; Food products; Oil contaminant; Toxicity

Index Keywords
Damage detection, Food products, Oils and fats, Petroleum refining, Physicochemical properties; 3-monochloropropane-1,2-diol, Analytical approach, Deodorisation, Food contaminants, Infant formula, Mechanism of formation, Mitigation strategy, Oil contaminants, Oil refining process, Property; Toxicity

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