### 台湾食用油3－单氯丙二醇酯含量调查

**李昱宗**

1. 財團法人 食品工業發展研究所
2. 長庚學校財團法人長庚科技大學 民生學院 中草藥研究中心與食品暨化妝品安全研究中心

(接受刊載日期：中華民國－○六年十二月一日)

3－單氯丙二醇酯(3-monochloro-1,2-propanediol esters, 3-MCPDEs)為油脂精煉過程中所產生之物質，其已證實經人類脂解酶作用後產生3－單氯丙二醇(3-Monochloropropane-1,2-diol, 3-MCPD)，而其已被列為國際癌症研究署(International Agency for Research on Cancer, IARC)列為2B級疑似致癌物，過去研究中指出環氧丙烯(glycidol)存在亦導致高3-MCPDEs含量，故本研究利用降低環氧丙烯或其鉬化物之物質的3-MCPDEs分析方法，針對台灣市售87件食用油進行背景值調查。結果顯示，利用硫酸/甲醇處理30分鐘並經後續水解及衍生化後，可大幅度減少環氧丙烯或3-MCPD，僅1.2％環氧丙烯轉換成3-MCPD，且經確認實驗結果皆符合食品化學檢驗方法之篩檢規範，而本方法之檢定極限為100 μg/kg，於背景值調查中，依3－單氯丙二醇當量(3-MCPD equivalent)由高至低依序為棕櫚油(9,647 μg/kg)，葡萄籽油(4,224 μg/kg)，米糠油(3,695 μg/kg)，橄欖油(2,994 μg/kg)，紫花油(1,088 μg/kg)，精製橄欖油(977 μg/kg)，芝麻油(841 μg/kg)，大豆油(413 μg/kg)，芥花油 (439 μg/kg)，苦茶油 (167 μg/kg)及初榨橄欖油(未檢出)。綜合上述結果，所使用之樣品製備方法可有效篩除3-MCPDEs含量高估之情形，亦針對食用油脂進行調查，其結果可供未來政府在風險評估或訂定殘留限制之依據。

**關鍵字**：3－單氯丙二醇酯，食用油，鈣相層析質譜儀。　

### Investigation of 3-MCPD Ester of Edible Oils in Taiwan

**Yu-Tsung Lee** and **Yan-Hwa Chu**

1. Food Industry Research and Development Institute, Hsinchu, Taiwan, R.O.C.
2. Research Center for Chinese Herbal Medicine and Research Center for Food and Cosmetic Safety, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan, R.O.C.

(Accepted for publication: December 1, 2017)

3-monochloro-1,2-propanediol esters (3-MCPDEs) are substances produced during the oil refining process. 3-MCPDEs could be hydrolyzed by human intestinal lipase to produce 3-monochloro-1,2-propanediol (3-MCPD), which has been listed as the Class 2B suspected carcinogen by International Agency for Research on Cancer (IARC). Previous studies have shown that the presence of glycidol can overestimate the amount of 3-MCPDEs content. This study established a 3-MCPDEs analytical method by reducing glycidol or its esterification products. This method was used to assess the amount of 3-MCPDEs in 87 commercial edible oils in Taiwan market. The results showed that after treatment with sulfuric acid/methanol for 30 minutes, the 3-MCPD produced from glycidol was significantly reduced. An average of 1.2% glycidol was converted to 3-MCPD in this study. The method was validated and was consistent with the validation regulation of food chemistry. The quantitative limit for this method is 100 μg/kg. According to 3-MCPD equivalent level detected in oil samples, palm oil had the highest concentration (9,647 μg/kg), followed by grape seed oil (4,224 μg/kg), rice bran oil (3,695 μg/kg), olive oil (2,994 μg/kg), sunflower oil (1,088 μg/kg), refined olive oil (977 μg/kg), sesame oil (841 μg/kg), soybean oil (413 μg/kg), canola oil (439 μg/kg), bitter camellia oil (167 μg/kg) and extra virgin olive oil (not detected). In conclusion, we established a method for MCPDEs determination by modifying sample preparation procedure to avoid overestimation of 3-MCPDEs. We also conducted a 3-MCPD investigation to oil sample in the market. These data can be provided as basis on risk assessment and residue limits management for government authority.

**Key words**: 3-monochloro-1, 2-propanediol esters, Edible oil, GC-MS.

* Corresponding author. E-mail: r01641003@g.ntu.edu.tw

DOI: 10.6578/TJACFS.201804_56(1&2).0006