

# 市流攤販或炸物餐館回鍋深炸油和實驗室模擬深炸調理油品變異毒性之比較研究

## The Molecular Mechanism of Paraquat-induced Collagen Production in Human Lung Fibroblast MRC-5 Cells

### 中文摘要

爲了進一步確定市流攤販或炸物餐館回鍋深炸油的基因毒性，復予隨機採樣收集油樣品，並另行實驗室模擬回鍋深炸作業的油品對照。應用 ISO ( International Organization for Standardization ) 極性分離法之萃取流程，分離採自攤販餐館之回鍋深炸油 8 件，單項炸物實驗室深炸油 5 件及複項炸物之深炸油 2 件，共計 15 件同步作基因毒性分析，採用 Ames test，對 *Salmonella typhimurium* TA98 及 TA100 兩種變異型菌株測定各項抽離物的直接、間接變異反應。

依上次測定的經驗，雖以鹽基對置換型菌株測定出 primary mutagens 的污染，而主要的偵測反應則是來自 secondary mutagens 對架構轉移的作用。故對 TA100 菌株採不添加鼠肝微粒體酵素而 TA98 菌株併用該項酵素系統進行測試。攤販餐館回鍋深炸油和單項炸物實驗室深炸油，經 TA100 菌株不加 S9 mix 和 TA98 菌株添加 S9 mix 酵素系統進行測試，結果均無致變異原性反應。顯示目前市販炸油品尚稱安全。然而，在複項炸物實驗室深炸 30 小時的 non-polar、polar 和 very-polar 三相的油樣對 TA98 菌株產生明顯的 dose-response 的致變異反應。由結果得知，炸油反覆長時間使用可能會進一步轉變成具有基因毒性。

### 英文摘要

The re-used deep-frying fats, 8 samples collected arbitrarily again from the vendors' stands and restaurants after sensory indication of abuse and 7 samples collected from the laboratory by which 5 samples only fried each one kind of food and 2 samples fried many kinds of food were used to analyze any existence of genotoxicity. After ISO ( International Organization for standardization ) polar separation of the oil samples, the Ames mutagenicity test was applied to analyze their genotoxic activities. The tester strains included *Salmonella typhimurium* TA98 and TA100 for

detecting the direct or indirect mutagenic activities.

According to the results of the precedent studies, the contamination of primary mutagens was detected by using the tester strain of base-pair substitution; however, the major mutagenic activity came from the secondary mutagens by frame-shift replacement. Therefore, the TA100 strain without S9 mix and TA98 strain with S9 mix were used to test again the genotoxic effects of the deep-frying fats.

The results showed that there were no any mutagenic reaction among re-used deep-frying fats from the vendors' stands and restaurants and the conditional laboratory products when we only fried one kind of food for a short term at high temperature above 200°C. On the other hand, the most mutagenic activities were obviously measured out with dose-response from the non-polar, polar and very-polar fractions of the continuously-used oil when we fried many kinds of food for 30 hrs in the laboratory, but when we fried them up to 40 hrs, the mutagenic activities almost disappeared. At present, the re-used oils of the vendors' stands and restaurants could be said hygienically safe under the general cooking condition here in Taiwan. Nevertheless, the re-used oil could further turn to be genotoxic when they were seriously abused during such as a long-term frying.