

P38: DETERMINATION OF 18O/16O RATIO OF GLYCEROL OF TRIGLYCERIDE IN FAT USING GC/P/IRMS AFTER SAPONIFICATION

Qi-ding Zhong^{1)*}, Dao-bing Wang, Guo-hui Li

China National Institute of Food and Fermentation Industries, 24-6, Jiuxianqiaozhonglu, Chaoyang District, Beijing,
100015 P.R.China. Telephone: (+86)1053218327; FAX:(86)1053218325- zhongqiding@163.com ;

Small changes in the 18O/16O ratio can provide a fingerprint that provides a unique identifier for the origin of particular compounds within a food, which has been proved be a valuable tool for fighting against fraud food. As the backbone of triglyceride in fat, glycerol contains three non-exchangeable oxygen, which could be used to reveal the biosynthetic origin of corresponding fat. However, the need for highly pure glycerol using tedious procedures for off-line IRMS methods or GC-IRMS analysis limited the researches and applications of glycerol 18O/16O ratio in edible oil authenticity control. In this paper, a new method, with time and cost-saving procedures, is introduced for reliable, rapid, and accurate determination of the 18O/16O ratio of glycerol orginated from triglyceride in fat: By saponification in 20 volumes of KOH methanol solution, the glycerides from different origin were converted to free glycerol and to fatty acid methyl esters (FAMES); 2,2,4-Trimethylpentane were added and the upper layer were removed after shook several times; molecular sieve was added to trap the microscale water; the 18O/16O ratio was measured using GC-Py-IRMS systems. Using standard correction procedures, the method above for $\delta^{18}\text{O}$ determination was assessed, good precision that better than 0.4‰ was obtained, the reproducibility of $\delta^{18}\text{O}$ values from triglyceride was better than $\pm 0.7\%$. The validation of the method was carried out by measuring the intimate triglyceride samples that mixed with glycerol with known $\delta^{18}\text{O}$ value, and a very good agreement between the measured values and the predicted data. In addition, 3 animal fats and 10 edible oil were analyzed, the mean $\delta^{18}\text{O}$ value of glycerol samples from animal fat was approximately 16.2‰ which close to the peanut oil, $\delta^{18}\text{O}$ value of the edible oils that from crop plant were higher than animal fat but lower than that from woody plant.