Determination of CPD Esters and Glycidyl Esters in Vegetable Oils

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3-Monochloropropane-1, 2-diol (3-MCPD) and other chloropropanols such as 2-monochloro-propane-1, 3-diol (2-MCPD) have for a long time been known as contaminants in various foods. 3-MCPD is formed when fat- and salt-containing foods are processed at high temperatures during production.

GC/MS has been widely used for the direct analysis of CPD esters. For direct determination using GC/MS, the CPD esters were first separated from co-extracted lipids (e.g.,TAG) into fractions containing mono- and diesters of CPD using preparative chromatographic techniques such as thin layer or column chromatography. The individual CPD esters were then separated using capillary GC and identified by GC/MS.

Until recently, these methods have provided only a partial quantification of individual CPD esters due to the limited availability of reference CPD esters. However, a recent method utilizing multiple reference CPD esters and combining chromatographic separation and detection based LC/MS looks very promising. Many of the current methods for CPD esters analysis actually measure the amount of CPD released from its esters using, for example, enzyme (lipases) or chemical treatment. The CPD moiety released in this way is then typically derivatized for detection using established GC/MS procedures. While these methods can not provide information concerning the nature of individual CPD esters, prior fractionation of the oil/extracted fat does permit a quantification of total mono- and total diester species.

Transesterification has been carried out under both alkaline and acidic conditions. Transesterification of CPD esters in extracted fats and oils followed by GC/MS of the CPD-moiety has been widely used to provide a relatively rapid measure of total CPD esters or total mono- and diesters.

In conclusion, studies are currently underway to develop methods of analysis CPD esters.