

## Formation of 3-MCPD Esters from Acylglycerols in Model Systems

Vojtěch Ilko, Zuzana Zelinková, Marek Doležal, Jan Velíšek

Department of Food Chemistry and Analysis, Institute of Chemical Technology, Prague,  
Czech Republic

3-MCPD (3-chloro-1,2-propanediol) and its fatty acid esters are contaminants that are formed during processing and manufacture of certain foods and food ingredients. Velíšek et al. were the first to report the discovery of MCPD esters as reaction products of hydrochloric acid with TAG and in acid-hydrolyzed vegetable protein (HVP). 3-MCPD might be also formed in the food as a result of a reaction between a chlorine source and a lipid source. This reaction is accelerated during the heat processing of foods. In 2001, the EC Scientific Committee on Food established a tolerable daily intake of 2 µg/kg body weight for 3-MCPD and a maximum concentration level of 0.02 mg/kg has been specified in EU legislation for 3-MCPD in HVP and soy sauce (for products containing 40 % of dry matter).

The aim of this work was to design a model system that would allow to monitor the kinetics and reactivity chloropropanol esters and related compounds (esters of glycidol with fatty acids). The newly prepared model systems are aimed for monitoring formation and decomposition of 3-MCPD esters with palmitic acid. Palmitic acid was chosen not only because of its frequent occurrence in the oils and hence food, but also with respect to its oxidative stability. Besides monitoring the actual amount of esters (mono- and diesters) of 3-MCPD was necessary to develop a method which also allow quantificate the amount of other degradation products and related compounds - especially in oil recently identified glycidyl esters. It is also important to compare the reactivity of triacylglycerols, diacylglycerols and monoacylglycerols, which should validate the proposed reaction mechanisms of above mentioned contaminants.