

# Development of an Analytical Method for the Specific Determination of 2- and 3-MCPD Fatty Acid Esters in Smoked and Thermally Treated Fish Products

S Merkle<sup>1</sup>, H Karl<sup>2</sup>, J Fritsche<sup>1</sup>

<sup>1</sup>University of Applied Sciences Hamburg, Hamburg, Germany

<sup>2</sup> Max Rubner-Institut, Department of Safety and Quality of Milk and Fish products, Hamburg, Germany

3-Monochloropropane-1,2-diol (3-MCPD) is a food processing contaminant formed by heating foods containing a source of acid and fat. The IARC has classified 3-MCPD as a “possible human carcinogen (group 2B)” [1]. Investigations have shown that 3-MCPD in food is present not only in unbounded forms, but also as mono- or di-esters of fatty acids. Further identified analogous compounds are 2-monochloropropane-1,3-diol (2-MCPD) and glycidyl esters. Due to different toxicological properties the determination of sum parameters of these contaminants is scientifically not sufficient [2]. Furthermore limited data on the occurrence of these contaminants in fish and fish products is published and the EFSA is actually calling for additional occurrence data in foods [3].

The aim of this project was to develop an analytical method for the specific determination of 2- and 3-MCPD fatty acid esters in smoked fish and thermally treated fish products. The developed indirect method comprises an extraction of the 3-MCPD esters followed by an alkaline ester hydrolysis and stopping the ester cleavage by ammonium sulfate solution as well as a derivatization with phenylboronic acid. The method validation was implemented by use of internal and external reference material. Furthermore, a method comparison was performed with a validated method for the analysis of 3-MCPD (and analogues compounds) in edible oil developed by a commercial food laboratory.

Analytical details of the method development as well as the 2- and 3-MCPD fatty acid ester contents of various commercial fish products applying the developed method are presented.

[1] IARC (International Agency for Research on Cancer) (2012). IARC Monographs 101, S.349-374.

[2] BfR (Bundesinstitut für Risikobewertung) (2012). Collaborative Study for the Determination of 3-MCPD-Fatty Acid Esters in Edible Fats and Oils Second Collaborative Study – Part I Method Validation and Proficiency Test. Berlin, Germany.

[3] EFSA (European Food Safety Authority) (2013). EFSA Journal 2013;11(9):3381.