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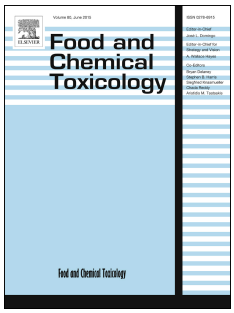

Proteomic effects of repeated-dose oral exposure to 2-monochloropropanediol and its dipalmitate in rat testes

Falko Frenzel, Axel Oberemm, Alfonso Lampen, Albert Braeuning

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Proteomic effects of repeated-dose oral exposure to 2-monochloropropanediol and its dipalmitate in rat testes

Falko Frenzel, Axel Oberemm, Alfonso Lampen, Albert Braeuning*

*Corresponding author: Albert Braeuning, German Federal Institute for Risk Assessment, Dept. Food Safety, Max-Dohrn-Str. 8-10, 10589 Berlin, Germany; tel.: +49-(0)30-18412-3758; fax: +49-(0)30-18412-63758; email: Albert.Braeuning@bfr.bund.de

Abstract

2- and 3-monochloropropanediol (2-MCPD) and their fatty acid esters are food contaminants which are concomitantly formed upon thermal treatment of foodstuff containing fats and salt. Exposure to 2- or 3-MCPD thus results, for example, from refined vegetable oils, in instant meals or infant formula, as well as in cereals or pastries. The molecular mechanisms of 2-MCPD toxicity are poorly understood. Here, we performed a comprehensive proteomic analysis of 2-MCDP-induced alterations in the testes from rats following oral administration of 10 mg/kg body weight per day 2-MCPD, or an equimolar dose of 2-MCPD dipalmitate as a representative 2-MCPD fatty acid ester. In the absence of overt histopathologically detectable toxicity, moderate alterations in cellular proteomic signatures were recorded. The observations are in line with the assumption that the molecular mechanisms of 2-MCPD and 3-MCPD toxicity differ. Observed proteomic alterations point towards effects of 2-MCPD on mitogen-dependent signaling and mitochondrial energy utilization. Presented data for the first time provide insight into proteomic effects of 2-MCPD in testicular tissue.