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MONITORING THE CONTENT OF PHTHALATES IN THE PACKAGING OF MEAT PRODUCTS WITH PRINTING AND WITHOUT PRINTING

Streszczenie

As a result of abundant production and versatility, phthalic acid esters (PAE) have become ubiquitous environmental contaminants. They are used mainly as plasticizers or softeners in the production of plastics. Phthalates are not firmly bonded by covalent bonding in the material and so they can release into the surrounding environment by volatilisation, leaching or migration. Toxic and most abundant phthalates include our detected di-n-butyl phthalate (DBP) and di-2-ethylhexyl phthalate (DEHP), which are of lipophilic nature and accumulate in fatty tissues. The materials with which food comes into contact are the main source of food contamination. These have to meet the requirements of the Regulation of the Commission (EU) No. 10/2011 on materials and articles of plastics intended for food contact, one that defines a migration limit and a specific limit. Migration limit defines that the plastics and plastic products shall not release their ingredients into the food in amounts greater than 60 mg.kg^{-1} of the food or food simulant. The limit of aggregate migration per unit of area was set at 10 mg.dm^{-2} of the surface of the material or product. The specific migration limit is 0.3 mg.kg^{-1} for DBP and 1.5 mg.kg^{-1} for DEHP. This study monitored the presence of di-n-butyl phthalate and di-2-ethylhexyl phthalate in packages which are used for packaging of meat products. A total of 30 packages were analysed. A sample with printing (1 dm^2) and sample without printing (1 dm^2) were taken from each of the analysed packages in order to determine whether a printed package indicates a higher presence of phthalates or not. Phthalates were determined by HPLC method with UV detection at a wavelength on 224 nm. Final concentrations were calculated based on the calibration curve in the AgilentChemstation software for LC and LC/MS systems. Our detected values of phthalates ranged from undetectable values ($<0.05 \text{ }\mu\text{g.ml}^{-1}$) to $219.91 \text{ }\mu\text{g.dm}^{-2}$ for samples with printing and also in the range from undetectable values ($<0.05 \text{ }\mu\text{g.ml}^{-1}$) to $191.08 \text{ }\mu\text{g.dm}^{-2}$ for samples without printing. Higher content of DBP and DEHP was determined for 22 packages with printing and a slightly higher content of monitored phthalates was determined for 8 packages without printing. This study demonstrates the variability in the phthalate content in printed and non-printed areas of packaging. In most cases the printed area shows higher concentrations probably due to the addition of phthalates into printing inks.