Occurrence of volatile and non-volatile N-nitrosamines in processed meat products and the role of heat treatment - DTU Orbit (05/10/2019)

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Most of the available data on the occurrence of N-nitrosamines (NA) in processed meat products have been generated in the 1980s and 1990s and especially data on the occurrence of non-volatile NA (NVNA) are scarce. Therefore we have studied the levels of volatile nitrosamines (VNA) and NVNA in processed meat products on the Danish market (N = 70) and for comparison also products on the Belgian market (N = 20). The effect of heat treatment on the NA levels, in selected samples, was also studied, in order to enable an evaluation of how preparation before consumption affects the levels of NA. For the Danish products the mean levels of the VNA were generally low (≤0.8 μg kg−1), whereas the mean levels of the NVNA were considerably higher (≤118 μg kg−1). Slightly higher mean levels were indicated for the Belgian products (i.e. VNA ≤1.5 μg kg−1 and NVNA ≤270 μg kg−1). The sums of VNA were higher than 10 μg kg−1 for one Danish sample and two Belgian samples. Levels of up to 2000 and 4000 μg kg−1 of N-nitroso-thiazolidine-4-carboxylic acid (NTCA) an NVNA occurred in the Danish and the Belgian samples, respectively. The majority of the Danish processed meat products contain NVNA but also VNA occur. The levels of NA are comparable with those reported in previous and recent studies; however the frequency in which they are found may be lower and thereby also the mean contents. The levels of N-nitrosopiperidine (NPIP) increased by frying and baking, whereas varying impacts were observed for N-nitrosoproline (NPRO), N-nitrosodimethylamine (NDMA), N-nitrosopyrrolidine (NPYR), N-nitrosodiethylamine (NDEA) and N-nitrosomethylaniline (NMA) depending on the type of product and/or the heat treatment. The levels of the NVNA, NTCA and N-nitroso-2-methyl-thiazolidined 4-carboxylic acid (NMTCA) decreased after frying and baking.

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