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DEVELOPMENT AND OPTIMISATION OF A SUB ROOM TEMPERATURE SPME-GC-MS METHOD FOR THE ANALYSIS OF FURAN IN FOOD

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Furan is classified as "*Possibly carcinogenic to humans*" (Group 2B) by the International Agency for Research on Cancer (IARC) since 1995. In 2004 the United States Food and Drug Administration (US FDA) find this undesirable compound in a variety of canned and jarred food. Recently, European authorities as well as member states need information about the contamination levels of the food chain.

First studies show that some matrices like baby food and instant coffee are contaminated from sub-ppb to hundreds ppb's levels. Other like bread and milk have levels below the current detection limits.

According to the physicochemical properties of furan the fit for purpose technique is a gas phase extraction coupled to gas chromatography – mass spectrometry (GC-MS); the isotopic dilution technique (ID), with a D_4-furan, is useful for the quantitative approach. The most promising extraction technique reported in the literature is the headspace Solid Phase Micro Extraction (SPME) because it usually provides better detection limits than static headspace.

Time and temperature are generally the most influencing parameters on SPME extraction efficiency. Stirring and salt addition might also have some influence. However, a Plackett-Burman experimental design reveals a slight influence of stirring and salt addition while it shows a sound interaction between extraction time and temperature. A Central Composite Design (CCD) experiment plan is further used to optimise them together. First results show that the temperature elevation has a negative effect on the extraction efficiency. Further experiments demonstrate that the optimum conditions are at sub room temperature (r.t.). Tests carried out under different matrices show that the optimum conditions are matrix dependant. For example, the optimum conditions for carrot baby food are an extraction of 26 minutes at 4°C and for water are 15 minutes at 12°C. These settings allow to detect quantities until sub-nanograms in the first case to 10 picograms in the second.