BaP Analysis in Vegetable oil by a Rapid SPME – GC – MS method

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Polycyclic aromatic hydrocarbons (PAHs) are a large class of compounds originated from organic matter incompletely combusted. They comprise several carcinogenic and genotoxic compounds and among these, benzo[a]pyrene (BaP) is the most studied, due to its high toxicity and because it has been chosen as marker of the presence of PAHs.

It has been estimated that human intake of PAHs from food is considerably higher than from air pollution. Among the foodstuffs, fats and oils can be highly contaminated, due to PAHs lipophilic nature.

In early 2005 the European Commission (EC) fixed the limit of 2 µg/kg for only BaP in edible fats and oils. Furthermore, the EC directive number 2005/10 has fixed the performance criteria which must be fitted by the method of analysis used in official checking of the levels of BaP in foodstuffs.

The aim of this work was to validate a rapid solid-phase microextraction (SPME) method for analysis of only BaP in vegetable oils. SPME is a rapid, low solvent consuming technique widely used for PAH sampling in head space or water matrices. Instead, only one work reported the use of SPME directly dipped in an organic solution for PAHs analysis.

The method previously reported by Purcaro et al. is based on SPME as unique preparation step. The fiber is desorbed at 340°C into a comprehensive chromatography coupled with a mass spectrometry (GC×GC-MS). In this study was tested the possibility to use the SPME method as preparation step but followed by a one dimension GC – MS. Then a blank oil sample was used for the in-house validation for only BaP, following the EURACHEM guideline

Statistic tests were performed to elaborate the data. Linearity range was up to about 15 µg/kg and the fitting of the calibration curve resulted satisfactory (r^2 = 0.999). Detection limit and quantification limit were 0.17 and 0.46 µg/kg, respectively. In-day and inter-day repeatability were less than 6% in both cases.