DETERMINATION OF BENZO(a)PYRENE IN EDIBLE OILS AND FATS BY HPLC AND FLUORESCENE DETECTION

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SCOPE

The method is applicable for the determination of benzo(a)pyrene (BaP) in crude or refined edible oils and fats. It is suitable for the determination of quantitative of benzo(a)pyrene in a range of 0.1 to 5µg kg^{-1}. The limit of detection is 0.1µg kg^{-1}. From the BaP content, it is possible to calculate the content of total heavy poly aromatic hydrocarbon (PAHs).

Figure 1. Chemical structure of benzo(a)pyrene.

DEFINITION

BaP is a member of a class of compounds known as PAHs which generally occur as complex mixtures and not as single compounds (*Figure 1*). PAHs are primarily by-products of incomplete combustion. These combustion sources are numerous and include natural sources such as wildfires, industrial processes, transportation, energy production and use, food preparation, smoking tobacco and disposal activities such as open trash burning. BaP along with other PAHs are suspected of causing cancer in humans. It is bioaccumulative, does not break down easily in our environment and is subject to long range air transport.

PRINCIPLE

BaP in crude or refined edible oils and fat is determined by an aluminium oxide clean-up step followed by reversed phase high performance liquid chromatography (HPLC) (*Figure 2*). An appropriate quantity of oil or fat dissolved in petroleum ether is added onto the aluminium oxide column.

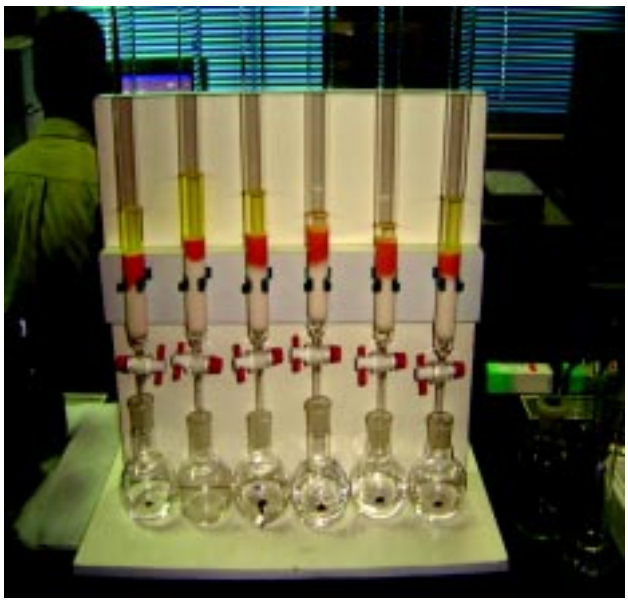

Figure 2. Set-up for separating of the benzo(a)pyrene from oil matrix.

This column will retain the lipids. BaP present is eluted from the column with petroleum ether. The collected eluate is concentrated and the final analysis is performed by HPLC, using fluorescence detection at optimized wavelengths (*Figure 3*). The retention time of BaP standard is used for identification. The concentration is calculated by external calibration.

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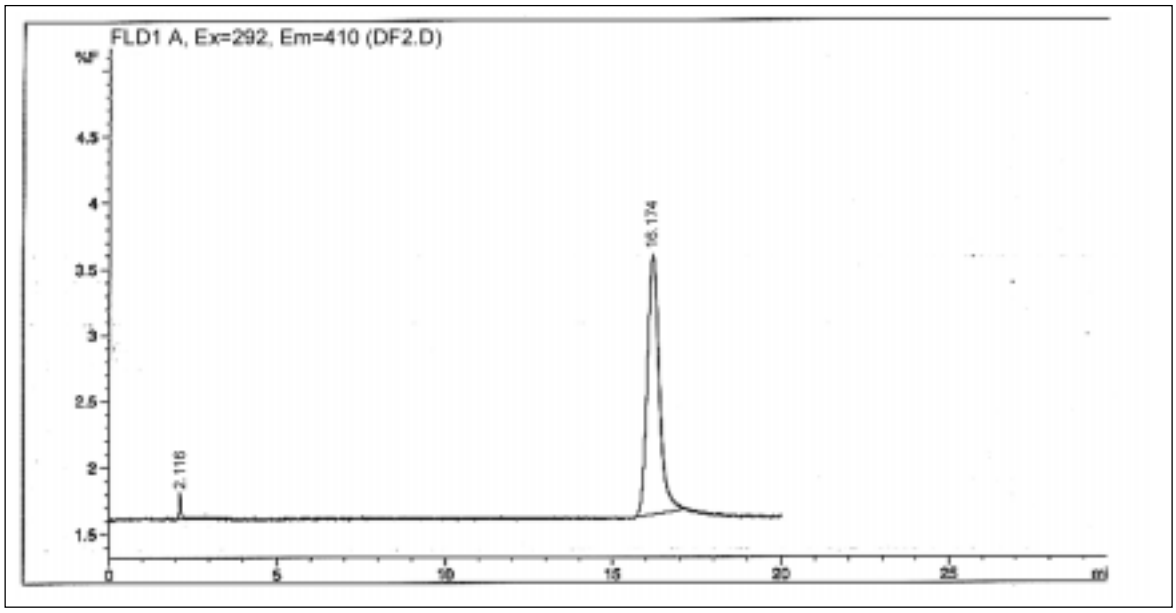

Figure 3. Chromatogram of standard benzo(a) pyrene.

RECOVERY

Recoveries of the benzo(a)pyrene at the range of 0.01 µg ml^{-1} – 0.5 µg ml^{-1} were 99%-102%.

Coefficient of variation was <5%.

Limit of detection was 0.1 µg kg^{-1}.

For more information kindly contact:

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