DETERMINATION OF HYDROCARBONS (n-alkanes) IN OIL MATRIX

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SCOPE

This test method describes a method for the determination of hydrocarbons (n-alkanes) in vegetable oils and fats using gas chromatography-mass spectrometric (GCMS) detection. Vegetable oils may be contaminated by mineral fuel oils (diesel-oil) due to the use of transport/storage facilities which are not strictly for transport/storage of food-grade, or due to other reason. The mineral fuel oil consists mainly of hydrocarbons (n-alkanes) with a chain length in between C10 to C24 and their quantification limit is 1.0 mg kg^{-1}.

DEFINITION

Alkanes are a homologous series of saturated aliphatic hydrocarbons. Alkanes have the general formula $C_nH_{2n}+2CH_4$ (where n is an integer greater than or equal to 1) and are generally grouped as low molecular weight, *e.g.* methane, ethane and propane are gases; intermediate molecular weight, *e.g.* hexane, heptane and acetone are liquids; and high molecular weight, *e.g.*, eicosane (C_{20} H_{42}) and polyethylene are solids. Paraffin is a mixture of high molecular weight alkanes sometimes called the paraffin series.

PRINCIPLE

The test sample dissolved in n-pentane is added onto an aluminium oxide (alumina) column, from which the hydrocarbon are eluted with n-pentane (*Figure 1*). The aluate is analysed using GC-MS (gas chromatography mass spectrometry) (*Figures 2* and *3*). Comparison is made with a sample of a standard diesel oil.

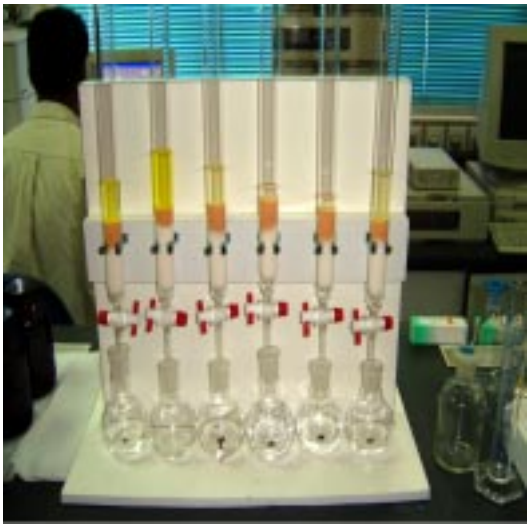

Figure 1. Set-up for separation of the hydrocarbons from oil matrix.

Figure 2. GC-MSD for analysis of the hydrocarbons.

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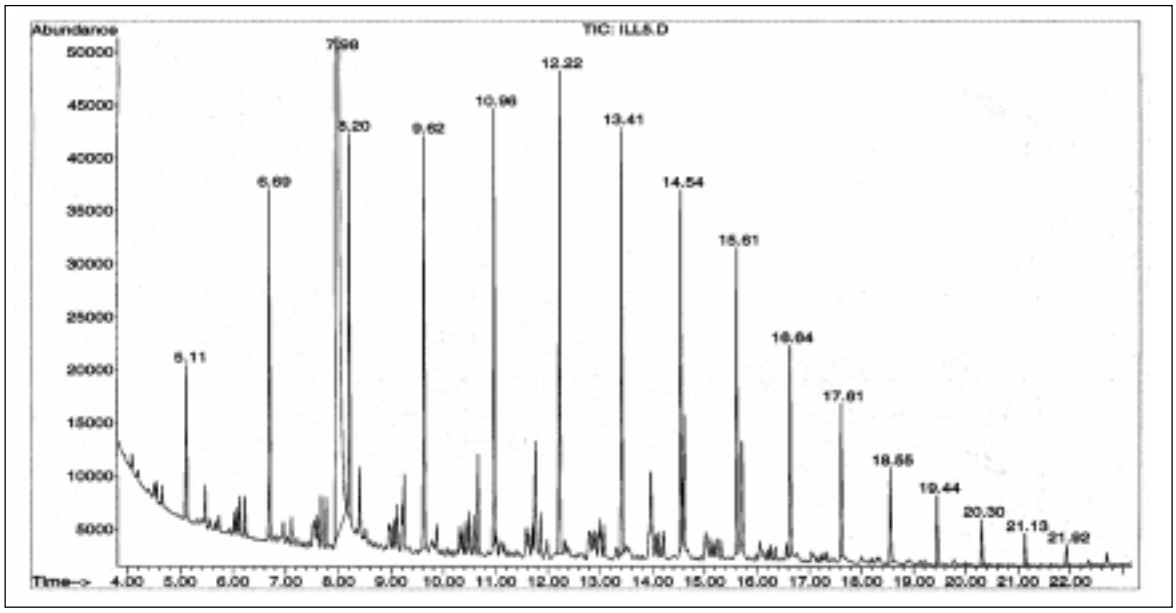

Figure 3. Chromatogram of standard n-alkanes.

RECOVERY

Recoveries of the hydrocarbons from spiked oil matrix at the range of 25-100 µg ml^{-1} were 87.1%-103.5%.

Coefficient of variation was <10% at all concentrations.

Limit of detection was 1 µg ml^{-1}.

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