

## SCOPE

**T**his test method describes a gas chromatographic method using flame ionisation detector (GC-FID) to determine hydrocarbons (C20-C44) in an oil matrix.

## INTRODUCTION

Thermal oil is used in the processing of edible oil. It comprises long chain carbon number C20 to C44. Thermal oil can be differentiated from edible oil based on carbon chain length. The carbon chain length is up to C18 with C16 as the prominent carbon chain. Therefore, the presence of bell-shape hump from GC chromatograms (*Figures 2 and 3*) in front of other peaks of the oil component denotes contamination.

A method was developed to detect long chain hydrocarbons in contaminated palm oil and palm oil products spiked with thermal oil. This method has been validated based on a single laboratory requirement. Now, the method is able to yield the

following:

- determination of hydrocarbons of C20-C44 in palm oil products; and
- a database on contamination levels of palm oil products and other vegetable oils.

The benefits to potential takers are as follows:

- assisting the industry to address the issues related to quality and safety of palm oil and other vegetable oil products in food manufacturing; and
- the method can be used to monitor the quality and safety of products.

## PRINCIPLE

A simple method to analyse long chain hydrocarbons is developed by diluting the oil matrix with hexane and injecting to GC-FID (*Figure 1*). This developed method can qualitatively determine long chain hydrocarbons from oil matrix. A bell-shape hump of long chain hydrocarbons peaks eluted before the peaks from palm products. The optimised GC conditions and the selection of high temperature (HT) column were the two main parameters which determined the separation of individual hydrocarbon.



*Figure 1. Gas chromatography with flame ionisation detector instrument.*

## GC CHROMATOGRAMS

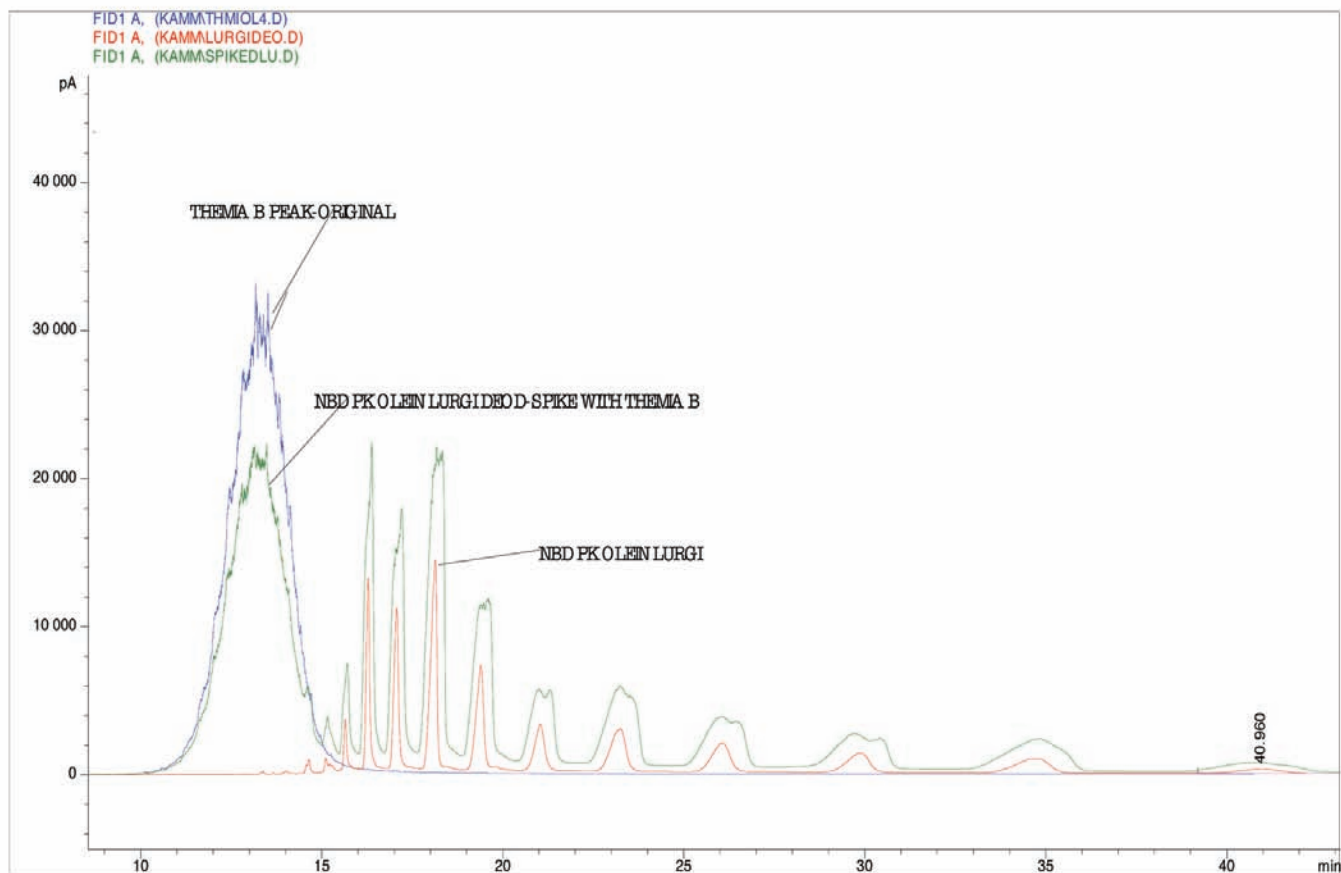
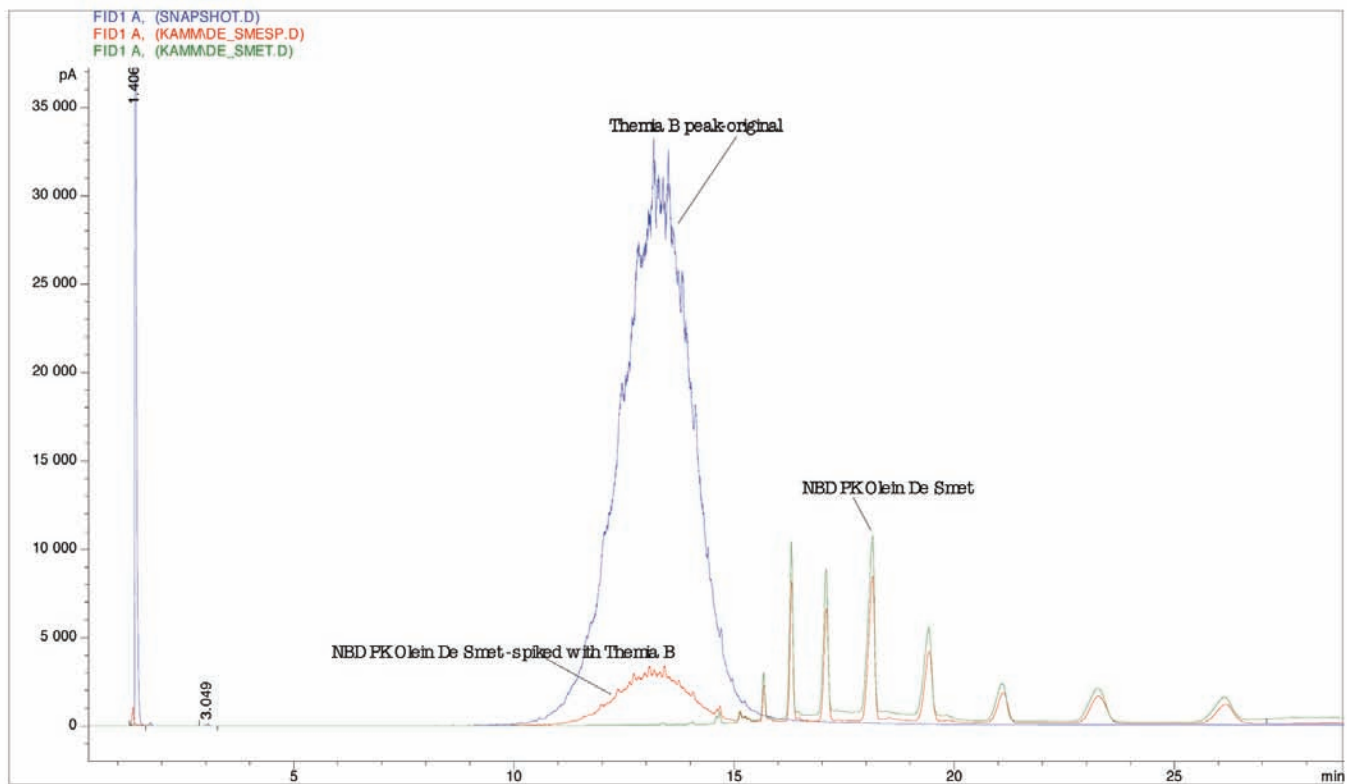
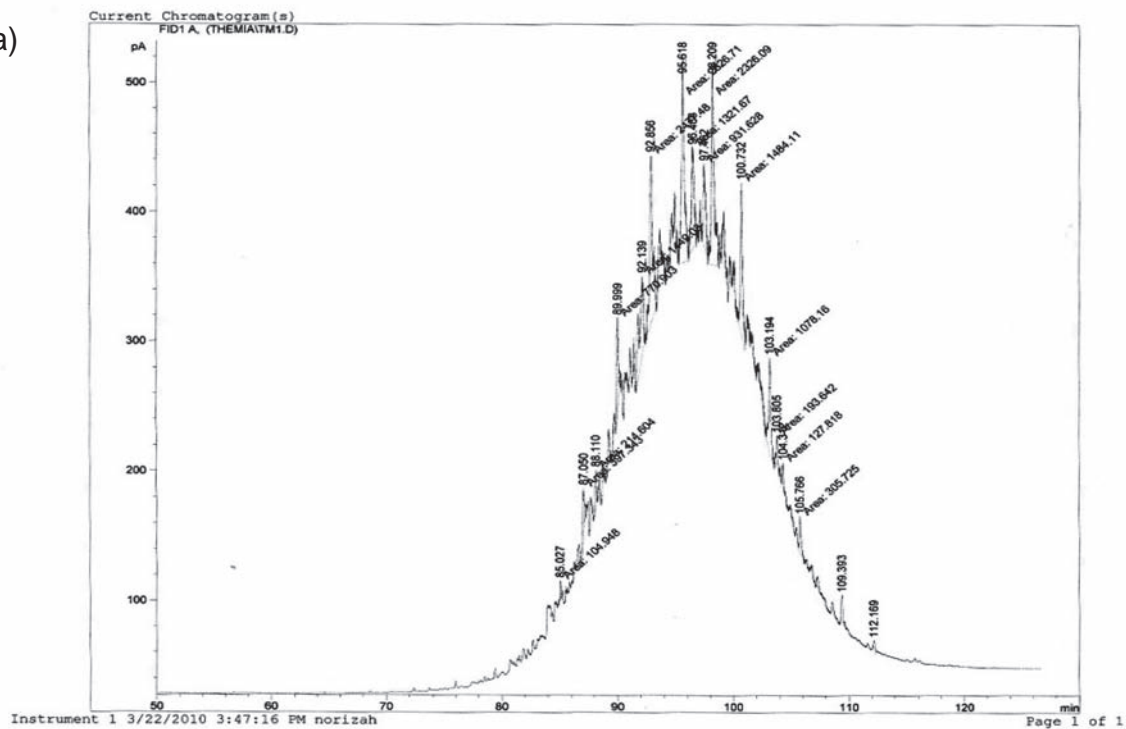


Figure 2. The overlaid chromatogram of the bell-shape hump with the peaks from palm products.

(a)



(b)

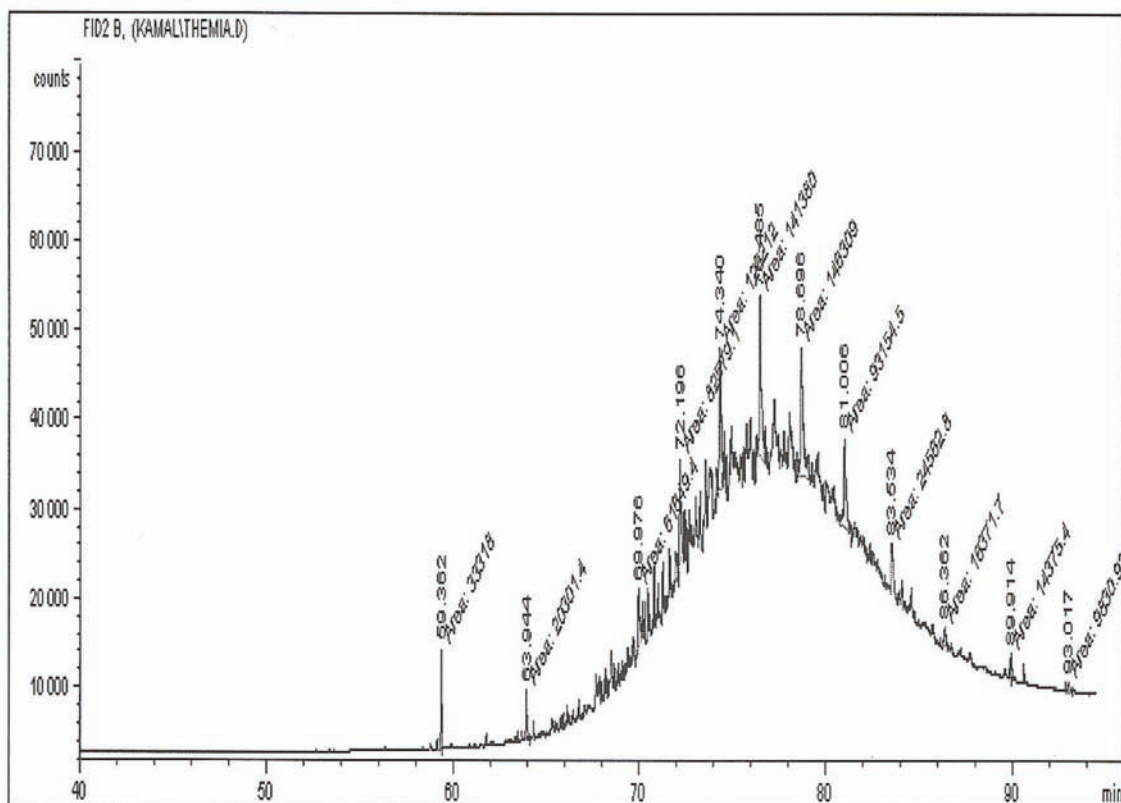


Figure 3. Chromatograms of individual hydrocarbons from (a) MPOB laboratory compared to (b) reference laboratory.

### **Cost of the Method**

Cost of the method is RM 30 000 and subject to change.

### **Cost per Analysis**

Cost per analysis is RM 150 and subject to change.

### **CONCLUSION**

This successfully developed method can be used for qualitative analysis of long chain hydrocarbons of thermal heating oil in oil matrix.

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