INTRODUCTION
The development of a fast and simple analytical method for the simultaneous identification and quantification of a variety of free fatty acids (FFA) is desirable for use in various fields (1). FFA content in crude edible oil is used to characterize both high quality pressed oils and fish oils. FFA content is also a parameter that may be used to monitor oil degradation that arises from storage under different conditions and to follow the thermal degradation of oils that are used to cook or fry. The determination of fatty acid profile has mainly been carried out by gas chromatography (GC) after the acids are converted to esters (2). However, the reverse-phase volatility of longer-chain acid esters and the thermally labile property of unsaturated acids can complicate the GC analysis. Liquid chromatography (LC), including silver-ion chromatography and reversed-phase chromatography (RPLC), have been applied to the fatty acid analysis (3). Silver-ion chromatography is the method of choice for separation and isolation of cis and trans fatty acids, but it needs to be coupled with other techniques (such as GC) for complex samples (4). The methods for fatty acid peak identification. RPLC has been widely studied for the fatty acid determination, either with or without derivatization. However, the separation efficiency in RPLC is not as great as that in GC.

UltraPerformance Convergence Chromatography (UPC™) is a new, generation supercritical fluid chromatography (SFC). It has been demonstrated that it has excellent separation efficiency and speed in the separation of positional isomers, acylglycerols, and short fatty acids, but it needs to be coupled with other separation and isolation of fatty acid analysis techniques. Previous work demonstrated that it has been widely studied for the fatty acid determination, either with or without derivatization. However, the separation efficiency in RPLC is not as great as that in GC.

EXPERIMENTAL
Sample preparation
All the samples were prepared at room temperature in the absence of light. Each food sample was extracted from food products using petroleum ether and dried in water bath. The samples were dissolved in chloroform at 1.8 µm (186006685) connected in series. The separation of the fatty acid isomers is impressive. Under this 28 minute run time, lower Rt (see Fig 1. B, D and E). The retention time increased with increasing chain length and geometrical configuration. The retention time increased with increasing chain length and geometrical configuration. The separation of the fatty acid isomers is impressive. Under this 28 minute run time, lower Rt (see Fig 1. B, D and E). The separation of the fatty acid isomers is impressive. Under this 28 minute run time, lower Rt (see Fig 1. B, D and E). The separation of the fatty acid isomers is impressive. Under this 28 minute run time, lower Rt (see Fig 1. B, D and E). The separation of the fatty acid isomers is impressive. Under this 28 minute run time, lower Rt (see Fig 1. B, D and E).

Column: HSS C18 SB 3.0 x 150 mm, 1.8 µm (186006685) connected in series.

Results and Discussion
1) Chromatography method development
The effects of different columns, the co-solvents (mobile phases), and the gradient, the sample diluents, and the ABPR pressures were investigated. Two ACQUITY UPC2 (C18 2.1mm x 150mm, 1.8µm) columns gave the best separations of the isomers. These two columns were installed in the ACQUITY UPC Column Manager. The conditions for the gradients were 50% MeOH and 50% H2O (up solvent pump) at 1 ml/min. The column oven was set at 50°C (injection) and 110°C (up gradient). The more reduction in the RT (see Fig 1. B, D and E).

2) Separation of the fatty acid isomers and their isomers from Fig 1. A and Fig 2, one can see that under this condition, the fatty acids were separated based on their chain length, the degree of saturation, and the geometrical configuration. The retention time increased with increasing chain length and geometrical configuration. The separation of the fatty acid isomers is impressive. Under this 28 minute run time, lower Rt (see Fig 1. B, D and E).

The separation of the fatty acid isomers was impressive, under this 24 minute gradient. The thin-tube columns were started after the initial 1 minute of initial gradient. The group, the more reduction in the RT (see Fig 1. B, D and E). The separation of the fatty acid isomers was impressive, under this 24 minute gradient. The thin-tube columns were started after the initial 1 minute of initial gradient. The group, the more reduction in the RT (see Fig 1. B, D and E). The separation of the fatty acid isomers was impressive, under this 24 minute gradient. The thin-tube columns were started after the initial 1 minute of initial gradient. The group, the more reduction in the RT (see Fig 1. B, D and E).

3) Calibration results
The calibration results for the fatty acid compounds were obtained using a mixture of a stock solution of the UPC2 fatty acids standard mix. The weighted level solvents (% CO2 and water) were used for the calibration. The retention times (RT), the calibration equations, the 6x values, the estimated line of quantification (LOQ) and the estimated noise to signal ratio (S/N) were given below. The LOQs were lower than the lowest concentration in the calibration range.

4) Analysis of food samples
Six food samples were analyzed using this UPC2-MS method. The samples were fat that were extracted from food products using petroleum ether and dried in water bath. There was no optimization at derivatization. So, the free fatty acids were determined in the presence of the fat matrix (Triacylglycerols).

Table 2 shows the analysis results for the six food samples. In Figure 3, there were lots of unknown peaks in the total ionization on many of the TIC. These peaks were believed from the fat matrix.

Table 2. Details of the fatty acid standards in the GLC-463 reference mix and their retention times, square of the correlation coefficients, limit of quantification (LOQ) and calibration curve concentration range method.

Table 3. Overlay of chromatograms of 51 fatty acid compounds in a standard mix (GLC-463 fatty acid). The chromatograms of fatty acids from C4 to C24 were used for the calibration curve. The shaded area are the unknowns, which are believed from the sample diluents, and the ABPR pressures were investigated.

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CONCLUSION
The determination of the FFA composition in food samples has been demonstrated that Waters ACQUITY UPC2 coupled with Xevo TQ-S MS. The benefits of this UPC2-MS method include:

• No derivatization;
• Suitable for samples that contain long chain fatty acids and thermal labile fatty acids;
• Simplified sample preparation procedure;
• Reduced chemical waste;
• Fast analysis run time (35 min);

This UPC2-MS method provides an alternative approach for the analysis of the fatty acid composition in food.