K25 Development of an LC/MS/MS Method for the Analysis of Fatty Acids

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After attending this presentation, attendees will be introduced to a novel LC/MS/MS method that can be used in the analysis of fatty acids. This method was applied to the analysis of fish oil and other omega-3-supplements and should be applicable to the analysis of other samples as well.

This presentation will impact the forensic science community by supplying a method that can alleviate time and effort in the analysis of fatty acids.

A common method for the analysis of fatty acids utilizes Gas Chromatography/Mass Spectrometry. This process requires several time-consuming and complicated steps to prepare the sample. This process also includes working with hazardous chemicals in order to derivatize the fatty acids. The current research focused on the development of an LC/MS/MS method that can be utilized in the analysis of fatty acids. This method was applied to the analysis of fish oil and other omega-3-fatty acid supplements. This method includes using a Restek Ultra C8 (3µm, 50x2.1 mm) along with a 20x2.1 mm Ultra C8 Guard Cartridge, also from Restek. Solvent A of the mobile phase was 50 mM formic acid/ 2 mM ammonium formate and Solvent B was 95% acetonitrile/water containing 50 mM formic acid and 2 mM ammonium formate. The following gradient was used: 50% B for five minutes, 50 to 100% B in 28 minutes, and holding at 100% B for two minutes. Heptadecenoic Acid was used as the internal standard. The essential omega-3 acids, Docosahexaenoic Acid (DHA) and Eicosapentaenoic Acid (EPA) were quantitated in the supplements. The limits of detection for DHA and EPA were 0.49 and 0.33 ug/mL, respectively. The limits of quantitation for DHA and EPA were 1.12 and 1.11/mL, respectively. The linear range for DHA was up to 5 mg/mL and the linear range for EPA was up to 2 mg/mL. Supplements were analyzed before and after a base hydrolysis step. The before samples were simply diluted with 70/30 acetonitrile/chloroform and injected. Base hydrolysis samples were extracted with chloroform and then diluted with acetonitrile, keeping with the 70/30 ratio. At least 24 different brands of omega-3 supplements were examined using this method.

Laws and regulations surrounding dietary supplements may not be firm enough to cover the safety and quantity of the ingredients included in these products. Due to increasing production and use of these omega- 3 supplements, some monitoring of the composition and safety of these products is warranted. The newly developed LC/MS/MS method simplifies the procedures involved in the analysis of fatty acids and provides a less time consuming and less hazardous method that can be applied to dietary supplements such as fish oil but should be applicable to other samples as well.

LC/MS/MS, Dietary Supplements, Fatty Acids

 ** Presenting Author*